

A COLLECTION OF LESSON PLAN
FOR PRIMARY AND SECONDARY
SCHOOL TEACHERS

SCHOOL GARDEN-BASED NUTRITION EDUCATION



Southeast Asian Ministers of Education Organization
Regional Centre for Food and Nutrition
SEAMEO RECFON
2022

**A Collection of Lesson Plans for Primary and Secondary School Teachers:
School Garden-based Nutrition Education**

pages: vi-213

Authors

Luh Ade Ari Wiradnyani
Judhiastuty Februhartanty
Anak Agung Sagung Indriani Oka
Dewi Shinta
Arienta Rahmania Putri Sudibya
Cahya Ayu Agustin

ISBN: 978-623-7759-63-8 (PDF)

Cover and layout designer:

Joko Setiyono

Publisher:

Southeast Asian Ministers of Education Organization, Regional Center for Food and Nutrition (SEAMEO RECFON)

Editor:

Jalan Raya Utan Kayu No. 1A RT 001 RW 008, Kel. Utan Kayu Utara, Kec. Matraman
Jakarta Timur 13120

Phone +6221-22116225 - Fax. +6221-22116465 - PO. Box 3852

Website: www.seameo-recfon.org - email: information@seameo-recfon.org

English Translated Edition, 2022

All rights reserved. No part of this book may be quoted and reproduced, in part or in whole in any form, such as print, photocopy, microfilm, and sound recording without written permission of the copyright holder.

Preface

Nutrition problems can occur across all age groups, including school-age children and adolescents. Studies show that schools are effective venues for students to learn, socialize, and practice good habits, including healthy living and balanced nutrition practices.

The Nutrition Goes to School (NGTS) program, or "Gizi untuk Prestasi" for national implementation in Indonesia, is one of SEAMEO RECFON's flagship programs to contribute to improving the nutrition and health practices of primary and secondary school students. School gardening is one of the core components of the NGTS Program and considered both a demand and supply activity under the program's DeSPIS (Demand, Supply, Policy and Information System) approach.

SEAMEO RECFON regards a school garden as a teaching-learning medium for students to improve their knowledge and practice on health and nutrition. By growing vegetables and fruits in the school garden, for example, the students are able to learn about the various types of food sources of nutrients as well as develop their interest in the food they consume. Having a school garden also allows the students to harvest and consume the crops that they have grown which, in the process, give them a sense of accomplishment.

Teachers' understanding on a school garden as a medium for instilling good health and nutrition habits among students needs to be enhanced by, for example, providing them with practical guidelines. In this regard, SEAMEO RECFON has developed this book entitled "Collection of Lesson Plans of School Garden-Based Nutrition Education for Primary and Secondary School Teachers." This book contains general concepts and principles of nutrition and school gardening, experiences of selected teachers in using school garden as a medium for nutrition education for school-age children

and adolescents as well as lesson plans for delivering nutrition and health messages through simple and attractive activities in the school garden.

This book is the English version of a module titled '*Edukasi Gizi Berbasis Kebun Sekolah: Kumpulan Rencana Ajar untuk Guru Sekolah Dasar dan Menengah*' published by SEAMEO RECFON in 2018 in Indonesian. The Indonesian version module obtained acknowledgement from the Director General of Primary and Secondary Education Ministry of Education and Culture of Republic of Indonesia.

We hope that this book will benefit and motivate school teachers to be creative in delivering nutrition and health education through their respective school gardens

Director of SEAMEO RECFON,



Prof. dr. Muchtaruddin Mansyur

Instructions for Use

Book:

This book is designed as a handbook for teachers of primary, junior high, senior high school, and their equivalent education levels. As a handbook, it contains compact information related to the topic of nutrition and health of school-age children and adolescents by utilizing a school garden as a learning tool. The chapters and sub-chapters in this book can be used as references as needed and as appropriate. This book contains information related to the nutrition and health problems of students as well as the solutions to address these problems.

The nutrition slogan on balanced diet in Indonesia i.e., “4 Sehat 5 Sempurna” (or Healthy Four, Perfect Five) has now been updated following advances in science and technology as well as the increasingly complex nutritional problems faced by the community. Therefore, this book is expected to assist teachers in obtaining accurate information on nutrition and health for students.

Lesson Plans:

This book is equipped with a collection of lesson plans that are adjusted and classified according to the education level and grades of students. It is divided into lesson plans for primary school, junior high school, and senior high school, by taking the level of teachers’ preparation abilities and student activities into consideration. These lesson plans are options that teachers could adopt. In case a teacher needs ideas for teaching and learning activities, these lesson plans may be used as references. To make it easier for teachers, in each lesson plan, we include a material summary taken from the handbook by mentioning the page number. Thus, the handbook and the lesson plan constitute as one integral reference material. Teachers may modify the lesson plans according to resource availability, as long as they are relevant to the learning objectives.

Most of these lesson plans require special preparations before they can be used such as:

1. Establishing a school garden (either by utilizing a vacant land or using the pots or hydroponics method)
2. Planting several types of vegetables and fruit plants to be used as teaching materials
3. Scheduling the activity time near the harvest time
4. Ensuring that vegetables and fruit supply from the school garden meets the learning framework in implementing the activity with the students

The Module Team

Authors

- Dr Luh Ade Ari Wiradnyani, M.Sc – SEAMEO RECFON
- Dr Judhiastuty Februhartanty, M.Sc – SEAMEO RECFON
- Anak Agung Sagung Indriani Oka, RD, M.Gz – SEAMEO RECFON
- Dewi Shinta, M.Gz – SEAMEO RECFON
- Arienta Rahmania Putri Sudibya, M.Sc – SEAMEO RECFON
- Cahya Ayu Agustin, M.Gz – SEAMEO RECFON

Contributors

- Dr Jesus C Fernandez – SEAMEO RECFON
- Cici Handayani, S.Pdi – SDN Suryalaya, Kota Bandung
- Alfira Firnanda, M.Pd – MAN 19 Jakarta
- Dra. Rr. Yudi Ekowati – SMAN 6 Bogor
- Teti Herawati, S.Pd – SD Islam Sabilina, Kota Bekasi
- Tri Mariyanti, S.Pd – School of Human, Kota Bekasi
- Andry Roberto, S.Si – SMPN 12 Kotabumi, Lampung Utara
- Aprian, S.Si – SD Islam Azhari, Jakarta
- Ika Satyasari – DeTara Foundation, Jakarta
- Indriyani Supandi, S.Pt – SD Cerdas Mulia Ekselensia, Kota Bandung
- Drs. Budi Purwanto – SMAN 1 Sokaraja, Purwokerto
- Reni Septiana, S.Pd – SDN 2 Kampung Kotaagung, Tanggamus
- Savitri Mutia Agustine, S.Pd – SMPN 13 Sukabumi

External Reviewers

- Suci Destriatania, SKM, MKM - FKM Universitas Sriwijaya
- Trias Mahmudiono, SKM, MPH(Nutr.), GCAS, PhD - FKM Universitas Airlangga

Photo & Ilustrasion Credit

The photographs and illustrations used in this book are downloaded from the internet from various sources in the public domain.

Table of Content

Preface	i
Instruction for Use	iii
The Module Team	iv
Table of content	v
1 School Garden as a Medium to Improve Students’ Literacy, Nutrition, and Entrepreneurship	2
2 Nutrition Education through the Utilization of the School Garden	12
3 Meeting the Nutritional Requirements of School Children through Balanced Nutrition	22
4 Nutrition Education Lesson Plans for Primary Schools	32
Lesson Plan 1. Have Fun Drawing Fruits and Vegetables	32
Lesson Plan 2. Green Vegetables in the School Garden	37
Lesson Plan 3. My School Garden Plant Cards	41
Lesson Plan 4. Math in Gardening	45
Lesson Plan 5. Let’s Plant!	49
Lesson Plan 6. Have Fun Cooking Spinach Omelet	53
Lesson Plan 7. Beauty and Benefit of My Garden	57
Lesson Plan 8. The Vegetable is My Friend	64
Lesson Plan 9. Get to Know Me	71
5 Nutrition Education Lesson Plans for Junior High Schools	76
Lesson Plan 10. Let’s Play Quartet	76
Lesson Plan 11. Fainting?	82
Lesson Plan 12. Let’s Get to Know Vegetables and Fruit from Other Countries	87
Lesson Plan 13. Time-lapse Images of Vegetable Growth	91
Lesson Plan 14. Rainbow Meal	96
Lesson Plan 15. Juice for You	102

Lesson Plan 16.	Slowmation in the School Garden... Let's Try	110
Lesson Plan 17.	BYO (Bring Your Own) Potluck	114
Lesson Plan 18.	My School Garden Experience	119
Lesson Plan 19.	Simple Food Technology	125
Lesson Plan 20.	Balanced Nutrition for Adolescents	134
6	Nutrition Education Lesson Plans for Senior High Schools	139
Lesson Plan 21.	My Excellent Food, My Excellent Nutrition	139
Lesson Plan 22.	My Self-Grown Fruit is Delicious	144
Lesson Plan 23.	My Vegetables, My Work, My Health!	155
Lesson Plan 24.	Assessing Protein and Glucose Content in Oyster Mushrooms	166
Lesson Plan 25.	Balanced Nutrition for My Body	174
7	Nutrition Education Lesson Plans for Cross-Level	179
Lesson Plan 26.	Colourful Campaigns	179
Lesson Plan 27.	My Tubers	188
Lesson Plan 28.	Veggie Sticks	192
Lesson Plan 29.	Making and Selling Processed Food from Corn	196
Lesson Plan 30.	Processing and Selling Oyster Mushrooms	201
Bibliography		210

School Garden as a Medium to Improve Students' Literacy, Nutrition, and Entrepreneurship



School Garden as a Medium to Improve Students' Literacy, Nutrition, and Entrepreneurship

Written by Dr Jesus Fernandez

(the former Deputy Director for Program SEAMEO BIOTROP)

Topic

Background

Training Design and Implementation

From Training to Multi-Component School Garden Program

Expansion of School Garden Program Coverage

Challenges and Solutions

A Background


As an educational institution, the school serves several functions, including the provision and improvement of knowledge, social skills, cultural norms, and values to students through systematic teaching and learning process. The school has also long been proven to be an effective entry point for building awareness and advocacy in addressing social issues, such as about health and the environment. Moreover, the school can be a potential medium for economic development, especially to improve the welfare of students and teachers, including their families and communities, and ultimately their country through production and entrepreneurship activities.

Therefore, in 2015, the Southeast Asian Ministers of Education Organization (SEAMEO) through a program called SEAMEO College initiated a "Participatory Action Research Project on School and Community-Based Food and Nutrition Program for Literacy, Poverty Reduction, and Sustainable Development". The SEAMEO Regional Centre for Tropical Biology (BIOTROP) was designated as the main implementing organization for this project in Indonesia and the SEAMEO Regional Centre for Graduate Study and Research in Agriculture (SEARCA) was responsible for the same program in the Philippines. The project has the following objectives: (1) To increase the diversity and availability of food to meet the nutritional requirements of school children, families, and communities; (2) To increase students' and teachers' capacity in producing nutritious food through learning and experiential activities by promoting the importance of agriculture, environmental issues, and the use of locally adapted and environmentally friendly technologies; and, (3) To help reduce food expenditure for families and communities, generate savings, and provide alternative income so that they can overcome poverty and access learning opportunities. There were 3 main activities carried out in this project, namely: mobilization and needs assessment of the participating schools, a training on school gardens for each school's representative teachers, and the preparation and implementation of the school garden.

Group photo of SEAMEO Secretariat, BIOTROP, RECFON, and SEAMOLEC officials and the participants of the first batch of the school garden training course



In carrying out the project, SEAMEO BIOTROP integrated the three activities in a Training Course on "Development of School Gardens to Improve Students' Literacy, Nutrition and Entrepreneurship" in collaboration with SEAMEO Regional Centre for Food and Nutrition (RECFON) and SEAMEO Regional Open Learning Center (SEAMOLEC). In this regard, SEAMEO BIOTROP was expected to provide its expertise in technology-based agriculture and environmental protection topics, while SEAMEO RECFON and SEAMEO



SEAMOLEC were tasked with sharing their expertise in health and nutrition as well as distance learning systems, respectively.

Before carrying out the training, SEAMEO BIOTROP conducted a profile survey of prospective schools that would participate in the training, especially to gather information on their existing facilities, potential, and intention to establish a school garden. The survey results were used as a basis for selecting school teachers to be trained. More than 150 schools participated in the survey and registered for the training. Fifty six schools were then selected to join the first batch of training held on 27-31 March 2016. The training had since then been made a regular program of SEAMEO BIOTROP even after the project funding ended in 2016.

B Training Design and Implementation

In general, the training is aimed to improve teachers' knowledge and skills in setting up and optimizing the functions of the school garden in improving students' competence in literacy, nutrition, and entrepreneurship. The specific objectives are as follows:

1. To improve school teachers' competence in understanding the importance of nutrition for school children's education development.
2. To raise the awareness of school teachers on various ways to incorporate gardening activities at school into classroom lessons and extra-curricular activities for students.
3. To improve the basic knowledge and skills of school teachers on school garden models and agricultural technology that can be adopted in school gardening activities.
4. To build the capacity of school teachers on online teaching concepts and principles to support students' literacy development in the context of the school garden.
5. To improve school teachers' competence in formulating action plans and implementing them at their respective school after the training.

Classroom session during the training



The training consisted of lectures and interactive discussions as well as practical exercises on the following topics:

1. Overview of the Study Project “School and Community-Based Food and Nutrition Program for Literacy, Poverty Reduction, and Sustainable Development”
2. The importance of nutrition in the education of school children in Indonesia
3. Composting organic wastes at the household and school level
4. School garden and entrepreneurship models
5. Hydroponic techniques for leafy and fruit vegetables
6. Vegetable cultivation techniques in a narrow land
7. School gardening as a project-based learning activity
8. School garden learning through material development and online teaching
9. Formulation of action plans

The training requires the participants to develop an action plan on establishing a school garden or improving their existing school garden based on the knowledge and skills they had gained from the classroom and practical activities. Because of this assignment, most of the training alumni have managed to establish and sustain their respective school gardens in various models and at varying degrees of success.

School garden harvest with students



The WhatsApp group has proven to be an effective platform in maintaining the interest and motivation of the training alumni to continue school garden activities, especially in growing a variety of plants and initiating new techniques that are more appropriate to their current situations. Utilizing social media, such as WhatsApp, is one of the approaches taken by SEAMEO BIOTROP in building a community of practice consisting of the training alumni and resource people.

From 2016 to 2018, SEAMEO BIOTROP had conducted three trainings involving a total of 122 school teachers from various levels of education from 14 provinces in Indonesia.



There were several changes to the topics delivered in the second and third training, such as:

1. The topic “Overview of SEAMEO's Participation in School and Community-Based Food and Nutrition Study Project for Literacy, Poverty Reduction, and Sustainable Development” was eliminated in the second and third training, considering that the SEAMEO College Project ended in 2017.
2. During the third training, there were 3 additional topics, namely: (a) Integration of School Gardens into Classroom Learning; (b) Integration of Conservation and Promotion of Agricultural Biodiversity (Agrobiodiversity) in the School Gardens; and, (c) Preparation of Project Proposals regarding the School Garden. The first and third topics were added to ensure that teachers would not only develop school gardens but also optimize them as learning media for students to improve their literacy, nutrition, and entrepreneurship competencies. The third topic replaced the “Formulation of Action Plans” session. The second topic was added to strengthen the promotion of environment-friendly schools.

From Training to Multi-Component School Garden Program

1. School Garden Action Research Project Grants for Teachers

This component aims to:

- a. collect empirical data and best practices on the benefits of school garden for improving literacy, nutrition, and entrepreneurial competence of primary and secondary school students in Indonesia.
- b. increase the capacity of primary and secondary school teachers in Indonesia to conduct an action research project involving their students.
- c. produce learning and promotional materials regarding the benefits of school garden based on the research results of the grant recipients

Since SEAMEO BIOTROP started implementing this component in 2017, 11 training alumni/school teachers have received the grants and completed their action research projects.



2. Documentation of Best Practices on School Garden

This component aims to collect school garden practices carried out by training alumni that have resulted in significant improvements in students' literacy, nutrition, and entrepreneurship. This documentation is conducted through the sharing of experiences and photos by the training alumni on the dedicated WhatsApp group and personal blogs as well as through incidental monitoring visits to the training alumni's schools.

SEAMEO BIOTROP plans to conduct a workshop on writing best practices for the trainees who have success stories in implementing school garden activities. The best practices will be published as a book to inspire other schools to establish their own school garden.


3. Best School Garden Award

This component was announced during SEAMEO BIOTROP's Golden Anniversary Celebration in February 2018. From 2019 to 2021, SEAMEO BIOTROP will be annually opening the application for the following awards:

- Best School for Students' Literacy Improvement
- Best School for Students' Nutrition Improvement
- Best School for Students' Entrepreneurship Improvement

D Expansion of School Garden Program Coverage

On 12 February 2018, SEAMEO BIOTROP signed a Memorandum of Understanding with the government of Bogor City. One of the main objectives of the MoU signing is to transform Bogor City into a School Garden City by 2021. It means that SEAMEO BIOTROP will train one teacher from each school out of a total of 72 kindergartens, 239 primary schools, 101 junior high schools, 62 senior high schools, and 62 vocational high schools located in Bogor City. SEAMEO BIOTROP had trained 12 school teachers in Bogor City during the third training in July 2018. SEAMEO BIOTROP will also provide similar technical assistance to other cities in Indonesia that are interested in developing school gardens.



Since 2017, SEAMEO RECFON has included the school garden as one of the components of its flagship program “Nutrition Goes to School (NGTS)”.

In this context, a school garden is regarded as a learning medium to teach students about nutrition. A session on the school garden is always delivered by SEAMEO BIOTROP staff in every Training of Trainers in the NGTS program for school teachers. So far, SEAMEO RECFON has trained school teachers from its school partners in the NGTS program in five locations, namely Bogor, Cimahi, and Cirebon (West Java), Klaten (Central Java), and Sambas (West Kalimantan). As part of their action plans, the NGTS training alumni have also established their school gardens and have been using them to teach nutrition to their students. Their experiences on creating a school garden and the lesson plans developed by selected teachers are contained in this book.

E Challenges and Solutions

This program has been hampered by the following challenges:

1. Training Component:

- a. *Limited duration of the training which does not meet the teachers' expectation to obtain more materials to discuss.*

This challenge has been resolved by continuously providing technical assistance from experts via the WhatsApp Group.

- b. *Uncertainty of the school's support in implementing the teachers' action plans upon the completion of the training.*

SEAMEO BIOTROP encourages the training alumni to formulate a complete proposal regarding their plan and submit it for funding through the SEAMEO BIOTROP's School Garden Action Research Project Grants.

2. Action Research Component:

- a. *The teachers' limited capacity to write an action research proposal and implement their plan after the proposal is approved.*

Thus, a session on Project Proposal Formulation on the School Garden was added in the training to enable the participants to prepare their proposal. SEAMEO BIOTROP also continuously assists the participants in completing their proposal even after the training has been concluded.

- b. *Conflicts related to the teachers' workload in implementing the action research activities.*

At the beginning of the action research proposal writing, the school teachers are always reminded to design activities that suit their teaching workload and could be integrated into other school activities. This integration is part of the criteria for evaluating the practicability of the proposal to be submitted.

Students learn entrepreneurial skills as part of school gardening activity



Students maintain their container garden at school



Nutrition Education through the Utilization of the School Garden



Nutrition Education through the Utilization of the School Garden

Topic

What is a School Garden?

Where does the school garden originate from?

Why should we utilize a school garden?

The utilization of the school garden in various countries

Taman Gizi Anak SD Negeri No. 071034 Lotu, Kecamatan Lotu, Nias Utara

(Sumber: OBI, 2018)



A What is a School Garden?

One school program considered to be a channel for delivering nutrition education is a school garden. A school garden is an innovative teaching and learning method that utilizes all of its components in delivering teaching materials in various fields of science and involves children actively in the process (Kammar et al., 2017). A school garden may also be used as a medium for teaching and learning various subjects other than science. Nutrition education based on the school garden can be carried out during and outside class hours or during extracurricular activities (Robinson-O'Brien et al., 2009 as cited in Laird, 2016).

B Where does the school garden originate from?

The use of a school garden as a learning method is actually not a new thing. The first school garden is believed to have originated in Europe and was introduced to America in 1891. In the 1950s, the number of school gardens began to decrease as schools shifted their teaching focus to technology (Desmond et al., 2004). Nowadays, the school garden has regained its popularity in various countries.

A student inspecting the growth of seedlings at the school garden of the Nationally Standardized Primary School (SDSN) Cibubur 11 Pagi, Jakarta

(Source: Warta BP2SDM, 2014)





C Why should we utilize a school garden?

In many developing countries, a school garden has become a tool to improve nutrition and education for school children, families, and communities (FAO, 2006). Education through a school garden program can provide various benefits, one of which is to increase children's knowledge about nutrition, as well as their preferences for and consumption of vegetables and fruits (FAO, 2010; Morris & Zidenberg-Cherr, 2002). Moreover, a school garden can provide an active learning atmosphere, thereby strengthening the students' academic, personal, and social skills (Kammar et al., 2017).


A school garden is an excellent medium for an active learning of numerous subjects. Science is a subject largely related to gardens. Many teachers use the school garden as a living laboratory in conducting scientific experiments. Aside from science, a school garden can also be used to learn mathematics, English, and arts so that the teaching and learning process becomes more interesting (CSGN, 2010). A school garden can also serve as a tool for providing knowledge and skills related to agriculture. Therefore, it can generate people's interest in and knowledge about gardening and farming, increase the knowledge of students and their parents on food production and nutrition, while stimulating the development of home gardens (FAO, 2015).

D The utilization of the school garden in various countries

The school garden has been integrated in the process of teaching and learning in various countries. A large number of studies on the effectiveness and benefits of implementing the school garden have also been carried out.

1. Bangladesh

In Bangladesh, agricultural and economic education has been included in the national education curriculum, albeit still lacking practices and applications. Therefore, the School Nutrition Gardening (SNG) program is implemented as a medium to apply the theories learned by the students. The SNG program was



conducted at 30 schools in 15 districts. The materials, which were delivered weekly, consisted of theories and practice alternately.

Vegetables and fruits, such as guava, papaya, broccoli, cabbage, spinach, water spinach, tomatoes, carrots, and onions, are planted in the school gardens. The plants were selected based on the ease of growing them, their nutritional value, and their availability in each season.

The SNG program was carried out during lunch breaks. Students were asked to consume vegetables and fruits as part of their diet. Many of the students who belonged to the lower-middle class found it difficult to bring meals every day to school. Therefore, in the SNG program, students were taught how to prepare food that is easy to cook, cheap, and/or easy to grow. As a result, more than 70% of the students ate vegetables every day after receiving adequate information regarding vegetables (FAO, 2006).

More than 500 students of the Stoklosa Middle School participate in establishing the school garden!

(Source: Mill City Grows, 2014)





2. United States

Morris & Zidenberg-Cherr (2002) conducted a study on school garden applications at three schools in California, the United States with 213 fourth-grade students. During the study, students were given materials about plant parts, nutrition, food pyramid, serving size, food labels, physical activities, goal setting, consumerism, and snack preparation.

In addition to the theories, practical skills were taught, such as planting seeds, both indoor by using used bottles and outdoor, identifying plants, creating insect boxes, and harvesting.

The study results showed that school gardening significantly improved students' knowledge about nutrition. There was also an increase in students' preference for vegetables, such as broccoli and carrots (Morris & Zidenberg-Cherr, 2002).

3. Australia

A study at a school in Brisbane involved students aged 8-13 years old from grades 4-7. All classes took part in weekly activities conducted around the school garden area. They shared the responsibility of planting, caring for, and harvesting their produce from the garden. The teachers also used the school garden for teaching and learning activities (Somerset & Markwell, 2009).

After the application of the school garden program, several changes were noticed among the students. There was an improvement in the students' ability to identify types of vegetables and fruits. Besides, there was an increase in vegetable and fruit consumption among younger students (Somerset & Markwell, 2009).

4. Belgium

In November 2014, four schools in Ghent, Belgium participated in a study related to school gardening. The study involved students from grades 5 and 6 who were between the ages of 10-13 years. It was found that some schools utilized the school garden to deliver classroom teaching materials, while a few of them used



it to carry out extracurricular activities during free time, such as recess and lunch breaks (Huys et al., 2017).

Having a school garden made it easier for the students to remember various information about plants. The students mentioned that they learned about new types of vegetables, how plants look like, and how different vegetables taste. To increase their consumption of vegetable, parental involvement was crucial because it could affect their child's dietary habits (Huys et al., 2017).

5. Sri Lanka

The national nutrition program implemented at schools in Sri Lanka consists of several activities, including providing lunch meals and milk, as well as using food for education. Out of the 10,119 schools, 8,692 of them have nutrition programs, and 5,650 of them have school gardens. Meanwhile, 4,600 schools have both nutrition programs and school gardens. The success of the school garden program was attributed largely to good promotional activities through regional and national competitions, quiz competitions, food exhibitions, and interactive media (FAO, 2015).

6. India

A study by Kammar et al. (2017) on the application of the school garden was carried out in India on 1400 junior and senior high school students from 14 schools. The students and teachers involved were introduced to various concepts, ranging from the school garden, balanced nutrition, to the importance of micronutrients. Furthermore, each class was given a particular seed to sow and plant.

After the school garden was introduced, students' intake of fresh vegetables was found to increase. The vegetables produced from the garden could also be cooked as school meals for the students to improve the nutritional quality of food served and reduce the cost of providing the school meals (Kammar et al., 2017).



7. Cambodia

In Cambodia, apart from developing a school garden, several activities related to nutrition education are also carried out to complement the already running activities, such as the use of fortified rice in school meals, training on safe food preparation, and healthy diet practice. Nutrition issues are integrated into the school curriculum, particularly in the science subject. To establish school gardens, 600 teachers were given a training on developing and managing the school garden. A total of 1,010 schools received plant seeds and were guided in the implementation. The schools were also taught to utilize the vegetables from their school garden in preparing school meals.

However, the implementation of the school garden is still challenged by several obstacles, including the limitation of the land, water, and funds from the school, so not all schools in Cambodia have included the school garden in their curriculum (FAO, 2015).

8. Vietnam

Vietnam has invented the slogan "Green-Clean-Beautiful" to mark the movement of changes to schools. This movement fosters the planting of trees and various flowering and medicinal plants. In rural areas, the cultivation of horticultural crops and livestock farming are made compulsory subjects for seventh-grade students. As for urban areas, students are taught to take care of pets, plants, and bonsai and to cultivate hydroponics. Specifically, modules are given to ninth grade students on growing flowers, rice, fruits, and medicinal plants by themselves. Parents are also involved in planting and tending the school garden (FAO, 2015).

9. Indonesia

The Indonesian government is committed to increasing the availability and accessibility of nutritious food nationally even at the household level. One of the efforts made by the Ministry of Agriculture through the Agricultural Research and Development Agency is to initiate a model called "Sustainable Food House

Area Model” (“Model Kawasan Rumah Pangan Lestari”/M-KRPL) in 2012 (Jakarta Agricultural Technology Research Institute, 2013).

M-KRPL is a model that utilizes yards and narrow land to produce food sources by planting various types of vegetables, fruits, tubers, and medicinal plants and through livestock farming. The word “area” (“kawasan”) in M-KRPL shows that this program is integrated and implemented at a large scale including in public facilities, such as schools. The food sources for this program are selected based on their availability in a particular locality, as well as their nutritional and economic values to the community (Ministry of Agriculture, 2012).

In the implementation of M-KRPL, each KRPL (Sustainable Food House Area) group is required to develop one school garden located at a school close to the KRPL area. The school garden serves as a learning tool to cultivate food and improve students’ understanding of Diverse, Nutritious, Balanced, and Safe (B2SA) food consumption (Ministry of Agriculture, Republic of Indonesia, 2018).

A student picking yellowing leaves in the Kids’ Nutrition Garden of the Public Elementary School No. 071034 Lotu, Lotu District, North Nias

(Source: OBI, 2018)





Considering the potentials of the school garden in improving students' health and academic achievements, since 2016, three SEAMEO centres, namely BIOTROP, RECFON, and SEAMOLEC, have been collaborating in offering a 5-day training course on school garden Indonesian school teachers and principals to improve students' literacy, nutrition, and entrepreneurship.

Additionally, in Nias Island, a school garden program has been implemented. This program is carried out at several primary schools, one of which is SDN 071026 Lasaro Sawo. Students are taught about nutrition topics and how to grow nutritious plants in the school garden. The benefits are felt not only by the students but also by their parents as those activities are practiced at home as well. They grow vegetables and medicinal plants at home so that they can reduce the cost of buying them (OBI, 2014).

Meeting the Nutritional Requirements of School Children through Balanced Nutrition



Meeting the Nutritional Requirements of School Children through Balanced Nutrition

Topic

10 Principles of Balanced Nutrition

Balanced Diet Food Pyramid / *"Tumpeng Gizi Seimbang"*

My Plate / *"Isi Piringku"*

Optimizing the nutrition intake by school children is an issue of paramount importance. An optimal nutritional status is required to ensure the normal growth and development of school children as well as their ability to concentrate on activities at school. Special attention should also be given to those in the pre-teen and teenage years. The nutritional requirements of this group increase sharply along with their second growth spurt after their toddler and puberty periods. The failure in meeting the nutritional requirements during these critical periods can delay sexual organ maturation and result in linear growth (SEAMEO RECFON, 2016).

One of the most common nutritional problems is anemia. In Indonesia, the results of the Basic Health Research (Riskesdas) in 2013 showed that 26.4% of school children aged 5-14 years suffered from anemia. The research also found a twofold increase in obesity in children aged 5-12 years, from 9.2% in 2010 to 18.8% in 2012. Apparently, the eating behavior of this age group which can increase the risk of being obese, such as consuming high-sugar or high-fat food and the aversion to vegetables and fruits, needs

to be addressed. Moreover, the research findings by the Southeast Asian Nutrition Survey (SEANUTS) in 2011 revealed that 55.2% of children in Indonesia were spending more than two hours daily on sedentary activities, such as playing gadgets and watching television, rather than being involved in physical activities (Briawan, 2016).

To achieve an optimal nutritional status, eating a balanced diet and adopting an active and healthy lifestyle are necessary. Indonesia's Guidelines for Balanced Nutrition have been developed and implemented since 1995. In addition, the Regulation of the Minister of Health of the Republic of Indonesia No. 41 of 2014 lays out 10 Principles of Balanced Nutrition.

A 10 Principles of Balanced Nutrition

1. Be Grateful for and Enjoy Various Types of Food


Consuming a wide variety of foods helps fulfill all the nutrients needed by the body. Thus far, only breast milk contains all the nutrients needed by a newborn until he/she reaches 6 months of age. However, for other age groups no single food contains all types of nutrients the body needs to maintain good health.

Therefore, people need to consume a variety of foods to obtain all the nutrients essential for the optimum growth and development of their body. A regular diet typically consists of breakfast, lunch, and dinner, and snacks, and all of these must include the right food choices, including sources of carbohydrates, protein, vegetables, and fruits.

2. Eat Plenty of Vegetables and Enough Fruits



Consuming vegetables and fruits is generally not a common habit in Indonesia. Meanwhile, the recommended amount of vegetables and fruits to be consumed daily is 300-400 grams or 3-4 servings per day. The fulfillment of the required vitamins, minerals, and fiber from vegetables and fruits is important in achieving balanced nutrition.



Sugar consumption exceeding the prescribed daily intake amount will most likely increase body weight and blood sugar levels. The link between excess sugar consumption and the onset of type 2 diabetes has also been found in many studies. Meanwhile, excess salt consumption can increase blood pressure. High blood pressure is one of the early signs of health problems which, if left untreated, can develop into a more serious disease.

6. Have Regular Breakfast



(Adolphus K, 2013).

The habit of having regular breakfast can have a big influence on productivity throughout the day, including studying. However, the results of 2013 Riskesdas (Basic Health Research) reveal that 44.6% of Indonesian children consumed breakfast that did not fulfill their daily nutritional needs, which should constitute 15-30% of the nutritional requirements. For school children, having an adequate breakfast is proven to increase learning concentration and stamina

7. Drink Enough and Safe Water



About two-thirds of our body weight consist of water. Water is one of the essential macronutrients, which means that our body requires an adequate amount of it to live a healthy life. The recommended amount of water for consumption is based on the proportion of a person's body weight per kilogram. The percentage of water content in a child's body is higher than in an adult's body. Therefore, children need more water for every kilogram of their body weight than adults.

8. Read Nutrition Facts Label on Food Packaging



Food packaging usually provides detailed information to help consumers find out the ingredients and nutrients contained in the food. This is to minimize possible dangers to the consumers, such as food allergies, or to prevent the occurrence of certain diseases. Therefore, reading nutrition facts labels on food packaging, especially information about the nutritional value and the expiration date, is recommended before buying or consuming the food.

9. Wash Hands with Soap in Running Water



An example of IEC material on Five Steps in Washing Hands with Soap developed by Indonesian Ministry of Health

Hygienic behavior is closely related to one's health. Personal hygiene and a well-maintained environment will reduce a person's risk of being infected with any disease. A person with a poor nutritional status will take longer time to recover from a disease than someone with a better nutritional status. Also, when a person is infected with a disease, some of the nutrients will be used to combat the disease, so the nutrients needed for growth and health maintenance will be reduced.

Washing hands with soap in running water is one of the main ways to maintain personal hygiene. This should be done in the right way and at the right time, especially before eating, after defecating, and after covering the mouth when sneezing or coughing. There are 5 ways to wash hands properly (as shown in the picture above) to make sure the hands are always clean.

10. Exercise Regularly and Maintain Normal Body Weight



An example of IEC material on Physical Activity developed by Indonesian Ministry of Health

Adopting an active lifestyle provides many benefits to the body. An active lifestyle is done not only by exercising but also by doing activities that make the body physically move more often. Some examples are playing with friends, cleaning the house, gardening, and other activities, both indoor and outdoor.

Performing physical activities can improve the blood circulation, which then increases the functioning of the body organs, including maintaining concentration

when learning and working. Any physical activity carried out regularly will help balance the energy that enters the body (through food) with the energy expended (through physical activities). This way, the body will become fit and healthy, and the risk of obesity can be reduced.

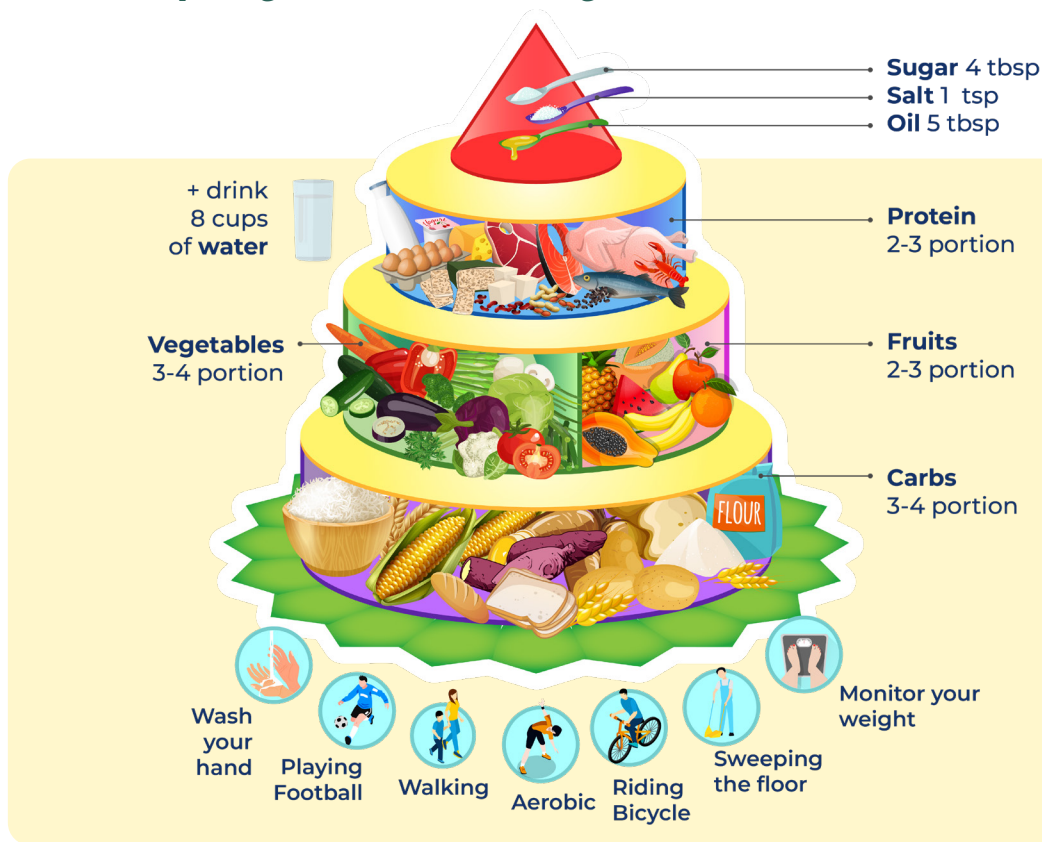
One of the signs that indicate a balance of nutrients in the body is achieving an optimal nutritional status, which is measured by the Body Mass Index (BMI). BMI is obtained from the ratio of body weight to height adjusted for age. By monitoring weight regularly, we can immediately make lifestyle adjustments (through specific diet or physical activities) to prevent unhealthy weight changes.



An example of IEC material on 10 Balanced Nutrition Messages developed by Indonesian Ministry of Health

The 10 Principles of Balanced Nutrition are summarized in the above infographics. As a guide for daily consumption and meal portions, The Indonesian Ministry of Health released a visualization of balanced nutrition in the form of Food Pyramid called "*Tumpeng Gizi Seimbang*" and My Plate or "*Isi Piringku*". "*Tumpeng Gizi Seimbang*" is intended to provide a simple description and explanation of the recommended daily consumption and daily physical activities. Meanwhile, My Plate or "*Isi Piringku*" is intended to be a guideline that shows the recommended serving of food and drinks for each meal.

B Balanced Diet Food Pyramid / “*Tumpeng Gizi Seimbang*”



Balanced Diet Food Pyramid / “*Tumpeng Gizi Seimbang*”

developed by Indonesian Ministry of Health

In In **Balanced Diet Food Pyramid for Indonesian / “*Tumpeng Gizi Seimbang*”**, there are four sequential layers from bottom to top, which means that the higher the position of the food source is, the lesser the recommended consumption of it should be. The lowest layer of the *tumpeng* is for carbohydrates or staple foods, which should be consumed in 3-4 servings a day. The amount of servings per portion is adjusted to the choice of carbohydrates consumed. For example, one serving of rice is ideally 100 grams. This amount is equivalent to 1 cassava of 120 grams or 2 medium-sized potatoes with a total weight of 210 grams. The message is to consume various staple foods every day. Rice is not the only source of carbohydrates that can be consumed to meet the body’s optimal nutritional requirements.

The next layer of the *tumpeng* consists of a variety of vegetables and fruits that a person should consume everyday. The recommended amount of vegetables to be consumed is 3-4 servings for one meal, while daily fruit consumption could be as many as 2-3 servings.

The third layer of the *tumpeng* is a recommendation to eat a variety of protein sources, from both animals and plants. This is because one type of food source cannot fully supply the body's protein needs. It is suggested to consume 2-4 servings of protein sources every day.

At the top of the *tumpeng* is a picture of spoons filled with sugar, salt, and oil. This illustrates the recommended daily consumption limit for these food items. The recommended maximum daily consumption is 4 tablespoons of sugar, 1 teaspoon of salt, and 5 tablespoons of oil. It is important to consider the amount of sugar, salt, and oil in packaged foods and drinks by reading the nutrition facts labels before buying them.

C My Plate / “Isi Piringku”



My Plate/ “Isi Piringku” developed by Indonesian Ministry of Health

My Plate/ “Isi Piringku” depicts the recommendation for healthy eating by filling half of the plate with vegetables and fruits and then filling the other half with staple foods and side dishes. “Isi Piringku” also suggests the importance of drinking water in every meal and engaging in a physical activity for at least 30 minutes a day. Healthy eating habits also need to be complemented with the maintenance of proper personal hygiene, such as handwashing before and after eating and choosing healthy foods that do not contain excessive sugar, salt, or oil.



Nutrition Education Lesson Plans for Primary Schools



Nutrition Education Lesson Plans for Primary Schools

Lesson Plan 1

Have Fun Drawing Fruits and Vegetables



Grade	: Primary School Grade 1
Implementation of Learning	: Intracurricular (Art)
Duration	: 2 class periods (@30 minutes)
Method	: Drawing and telling stories about fruits or vegetables

A Learning Objectives

Students will be able to:

1. Identify various types of fruits and vegetables through drawing activities
2. Explain the right steps to draw fruits and vegetables
3. Understand the benefits of consuming fruits and vegetables through storytelling in front of the class

B Preconditions

To implement this lesson plan, schools must have fruit or vegetable plants in the school garden and students/schools should have prepared the tools and materials for drawing.

C Summary of Learning Material

Fruits and vegetables are sources of vitamins and minerals. For instance, oranges and tomatoes are sources of vitamin C, green leafy vegetables are sources of vitamin A and iron, while bananas are sources of potassium. Moreover, fruits and vegetables are sources of fiber which is necessary for maintaining a healthy digestive tract. Thus, it is important to introduce a variety of vegetables and fruits to students from an early age by doing creative and interesting activities in the school garden.

By drawing vegetables and fruits, students can be creative in determining the object they will draw, exploring ideas to present the drawing, and choosing colors. Their drawings will be used by the students to tell their stories in front of the class to sharpen their storytelling skills and build self-confidence.



Sumber foto: agungrangga.com

The main messages to be delivered to the students

- Don't hesitate to be creative. Creating is fun.
- Fruits and vegetables are very important to maintain good health

D Students' activities

1. Students listen to the teacher's explanation about the benefits of fruits and vegetables.
2. Students mention their favorite vegetables and fruits, as well as their family members at home.
3. Under the teacher's guidance, students observe fruits and vegetables in the school garden.

4. Students are invited to a discussion by mentioning the names of crops and identifying whether the student or any of their family members has ever consumed those fruits and vegetables.
5. Under the teacher's guidance, students decide on the fruits and vegetables that they will draw (e.g. the favorite fruits and vegetables of the students or their family members)
6. Students are asked to return to the classroom.
7. Students listen to the teacher's explanation on sample drawings of fruits and vegetables, as well as the drawing steps.
8. Students prepare the fruits and vegetables to be drawn and the tools needed with the teacher's guidance.
9. Students draw the vegetables and fruits that they have chosen.
10. After completing the drawing activities, students are asked to write a story/brief description of the fruits and vegetables they have drawn. For example, *"Orange is my favorite fruit. It has a round shape and has a fresh taste. The color is orange, and it is my favorite color. Orange contains a lot of vitamins needed to keep me healthy."*
11. Students take turns telling stories about the fruits and vegetables they have drawn and their benefits in front of the class.



Sumber foto: agungrangga.com



E Teacher's Guide

1. Teacher explains the activities to be performed and the learning objectives.
2. Teacher asks the students to mention their favorite fruits and vegetables and their family members' favorites. The teacher emphasizes that fruits and vegetables contain lots of vitamins and minerals needed to maintain health.
3. Teacher prepares the students for a fun learning process in the school garden.
4. Teacher conveys how magnificent God is and then starts a discussion session with the students about the drawing, colors, and shapes of the fruits and vegetables found in the school garden. The teacher explains that drawing fruits and vegetables can be an interesting activity.
5. Teacher guides the students to decide on the fruits and vegetables they will draw. It is highly recommended to draw fruits and vegetables with unique shapes, such as star fruits, bitter melon, cassava leaves, papaya leaves, water spinach, and corn.
6. Teacher gives sample drawings of fruits and vegetables and describes the tools and materials to be used.
7. Teacher explains the drawing steps.
8. Teacher guides the students in preparing the fruits and vegetables to be drawn and the tools needed.
9. Teacher guides the students in drawing the vegetables and fruits that they have selected.
10. After completing the drawing activities, the teacher advises the students to write or tell stories about the fruits and vegetables that they have drawn.
11. Teacher invites the students to take turns telling their stories in front of the class. The other students are welcome to ask questions to the students presenting stories.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Identify types of fruits and vegetables by showing sample drawings of fruits and vegetables.
- Explain the right steps to draw fruits and vegetables.
- Confidently tell the benefits of fruits and vegetables that are used as drawing objects in front of classmates and teachers.

G Materials or tools to be prepared by the school

- Watercolor, crayon, canvas/drawing book
- School garden
- Sample drawings of fruits and vegetables
- Fruits and vegetables to be drawn



Sumber foto: agungrangga.com

Lesson Plan 2

Green Vegetables in the School Garden



Grade	: Primary School Grade 1 – 2
Implementation of Learning	: Habituation Session
Duration	: 1 class periods (30 minutes)
Method	: Playing picture cards

A Learning Objectives

Students will be able to:

1. Identify various kinds of vegetables and fruits in the school garden and their benefits through picture card games.
2. Understand the importance of eating vegetables every day.

B Preconditions

The school must prepare a pile of cards with various pictures of vegetables.

C Summary of Learning Material

One of the methods to encourage students to consume vegetables and fruits is by introducing vegetables and fruits planted in the school garden. This is crucial because the consumption of vegetables and fruits in Indonesia is still low. Vegetables and fruits are very beneficial as the main sources of vitamins, minerals, and fiber. Thus, they should be consumed every day. Generally, vitamins and minerals function to regulate all systems in the body to run properly, while fiber is useful for the bowel movement and a healthy digestive system. The use of vegetable and fruit picture cards can help the students to quickly identify the various types of fruits and vegetables that can be consumed every day.



The main messages to be delivered to the students


- Various types of vegetable can be found around us.
- Some of the commonly grown vegetables in the school garden include red spinach, bitter melon, bok choy, water spinach, spinach, string beans, lettuce, and eggplants.
- Vegetables must be consumed every day to keep the body healthy.

D Students' activities

1. Under the teacher's guidance, students are divided into several groups
2. Students mention the names of vegetables they often consume and those that they have never eaten
3. Students mention the names of green vegetables and non-green vegetables.
4. Students go to the school garden in groups
5. Each group receives vegetable picture cards
6. Students are asked to observe and name the vegetables in the school garden. Then, the students hold up a picture card according to the name of the vegetables in the school garden
7. Students mention the reasons why it is important to eat vegetables every day.

E Teacher's Guide

1. Teacher divides the students into groups (of 4-5 people).
2. Teacher mentions and explains the names of some vegetables using vegetable picture cards.
3. Teacher asks students to mention the types of vegetables they have eaten, vegetables that they have never consumed, and vegetables that they like.

- 
4. Teacher asks students to mention green vegetables and non-green vegetables.
 5. Teacher invites and accompanies the students to observe the vegetables planted in the school garden.
 6. Teacher distributes vegetable picture cards to each group. Teacher then explains the rules of playing vegetable picture cards to students by showing a vegetable picture card that matches with a vegetable plant in the school garden.
 7. Teacher asks the question “Why do we need to eat vegetables every day?”
 8. At the end of the activity, the teacher emphasizes that besides having delicious taste, green vegetables are very beneficial for our body’s health and therefore they should be eaten daily to maintain our health.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Identify various types or names of vegetables, either through picture cards or by seeing them directly in the school garden.
- Explain the benefits of consuming vegetables.

G Materials to be prepared by the school

- Picture cards of various types of vegetables which are made of laminated cardboard.

Appendix

1. Picture cards

Vegetable picture cards can be made in the following ways:

- Take photos or draw some vegetables along with their names on a piece of blank paper with a size of 6 x 10 cm (or as needed).
- Cut out the pictures or drawings and then laminate them.

2. Modification Ideas:

To make the cards more varied, pictures of some non-green vegetables can be included (according to the conditions of each school), e.g. bitter melon, bok choy, and red spinach.



Sumber foto: australiangardener



Lesson Plan 3

My School Garden Plant Cards



Grade	: Primary School Grade 2
Implementation of Learning	: Intracurricular (English / National or Local Language)
Duration	: 2 class periods (@30 minutes)
Method	: Creating plant cards which contain the characteristics of plants and their benefits

A Learning Objectives

Students will be able to:


1. Explain the characteristics of fruits and vegetables in the school garden.
2. Explain the benefits of fruits and vegetables to maintain health.

B Preconditions

To implement this lesson plan, the school must have planted leafy and/or fruit vegetables (e.g., tomato, cucumber, eggplant, etc.) in the school garden and the students/school should have prepared the tools and materials to make plant cards.

C Summary of Learning Material

The diversity of vegetable plants (i.e., either leafy or fruit vegetables) and physical properties can be identified by introducing parts of the plants to students. In practice, the introduction of the characteristics of these types of vegetable plants by directly observing them in the school garden will enable students to play an active role in the process of observing and conveying opinions on the results of their observations. Students can be directly involved in the process of finding answers so that they can better understand the parts of the plants, especially the types of vegetables. Thus,



aside from making students' learning satisfying to them, it is hoped that students can learn to recognize and appreciate the various types of vegetables and start to consume them.

The main messages to be delivered to the students

- Each type of vegetable has different characteristics. Apart from their physical characteristics, the nutritional content in each type of vegetable also varies.
- The different nutrients found in a particular type of vegetable provide different benefits for the body. Hence, we must consume various types of vegetables to get optimal benefits from them.

D Students' activities

1. Together with the teacher, students discuss the types and characteristics of plants found in the school garden, as well as their benefits for health.
2. The students work in small groups. Each group is assigned to make plant cards which contain the characteristics of plants and their benefits for health.
3. Each group is responsible for making 2 plant cards. The characteristics of the plants are identified from a direct observation in the school garden.
4. Assisted by the teacher, each group conducts a discussion about the characteristics of plants and their benefits for health.
5. After finishing making plant cards, each group presents their work in the class.
6. The finished cards can then be laminated and posted on the corresponding plant pots, hung on tree trunks, or stuck in the ground near the plants using a wooden stick.



E Teacher's Guide

1. Teacher guides students to discuss the types and characteristics of plants found in the school garden, as well as their benefits for health.
2. Teacher divides the students into several groups based on the word cards taken. The word cards contain the names of vegetables and/or fruits. Students gather with other students who have the same card.
3. Teacher explains the steps of the activity to be performed by the students.
4. Teacher assists the students in doing an observation and making plant cards.
5. Teacher guides a discussion with the students about the characteristics of plants and their benefits for health.
6. Teacher assesses the plant card presentation of each group.
7. At the end of the activity, the teacher emphasizes about:
 - a. The diversity of vegetable plants
 - b. The importance of consuming various types of vegetables every day.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Understand and explain the characteristics of various types of vegetable plants in the school garden.
- Explain the benefits of various types of vegetables for health.

G Materials to be prepared by the school

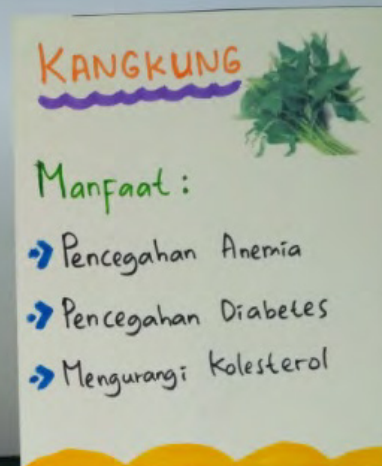
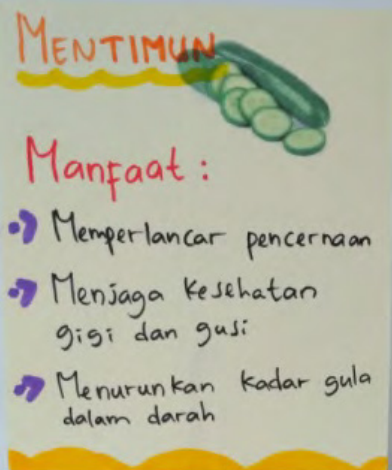
- Pictures of vegetable plants found in the school garden (print-outs), which can include tomatoes, chilies, eggplant, spinach, mustard greens, lettuce, or others depending on what vegetables are available in the school garden. If there are no photos available, the students can draw the plants on the cards to be created.
- Cards made of buffalo paper or white manila cardboard.
- Paper and laminating machines (if any).
- Stationery and colored markers.

Appendix

Example of My School Garden Plant Cards



Plant Name :
Leaf Color :
Fruit Color :
Leaf Shape :
Fruit Shape :
Benefits of
Tomato :



Lesson Plan 4

Math in Gardening



Grade	: Primary School Grade 2
Implementation of Learning	: Intracurricular (Mathematic)
Duration	: 2 class periods (@30 minutes)
Method	: Measuring the length/height of vegetable plant parts by using various length measuring instruments

A Learning Objectives


Students will be able to:

1. Know about length/height measurements and types of measuring instruments
2. Measure the length of vegetable plants in the school garden
3. Know the functions of vegetables for health
4. Create a simple report on measurement results.

B Summary of Learning Material

Determining the right time to harvest is one way to obtain vegetables with maximum quality. Each type of vegetable has specific ready-to-harvest criteria. However, there are several methods of determining whether a vegetable plant is ready to harvest, including:

1. Visual characteristics, marked by any changes in color, shape, and size of leaves or fruits. For fruit crops, the signs are dried leaves and fully developed fruits.
2. Physical characteristics, which include a fruit being easy to remove from the stalk, changes in the hardness of fruit flesh, and the leaf size developing optimally.
3. Chemical characteristics, indicated by an increase in sugar content and a decrease in acid content.

- 
4. Computations, which are done by counting the number of days from the time the seeds are planted until they are ready to harvest.
 5. Physiological characteristics, as observed from the pattern of respiration to determine the ripeness.

The aim of observing vegetable plants in the school garden is to take a closer look at the physical properties of the plants. This includes the aroma, shape, size, weight, and fruit/vegetable ripeness (harvesting). In this activity, physical observation is emphasized more on measuring the length/height of vegetable plants, which also serves as a practice of reading numbers and taking measurements for students.

The main messages to be delivered to the students

- Vegetables are foods that contain lots of vitamins and minerals that have many benefits for the body.
- The harvest timing can affect the quality of the vegetables consumed. The size of the leaf or fruit can be a sign of the right time to harvest.

C Students' activities

1. Students listen to the teacher's explanation about various length measurements and measuring instruments.
2. Students work in small groups. Each group is assigned to measure the parts of several plants in the garden, such as chili, eggplant, mustard greens, lettuce, tomatoes, water spinach (the types of plants are subject to their availability in the school garden).
3. Each group is assigned to measure the length of fruit or leaves directly from the garden and record the results in the table provided.
4. Each group makes a simple report on the measurement results by sorting out the fruit and leaves from the shortest/longest or tallest
5. Students discuss the measurement results from different measuring instruments.



D Teacher's Guide

1. Teacher guides the students to discuss length/height measurements and types of measuring instruments.
2. Teacher divides the students into groups based on the word cards taken. The word cards contain the names of vegetables/fruits/medicinal plants. Students gather with other students who have the same card.
3. Teacher explains the steps of the activity to be performed by the students.
4. Teacher assists the students in taking measurements and recording the results.
5. Teacher assists the students when discussing differences in the measurement results.
6. At the end of the activity, the teacher explains to the students that the vegetables used in learning about length/height measurements are food sources that contain lots of vitamins and minerals which are beneficial for the body.


E Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Know about length/height measurements and types of measuring instruments.
- Take measurements and find out the ratio of 'long', 'tall', and 'short'.
- Understand the functions of vegetables for health.
- Create a simple report on measurement results.

F Materials to be prepared by the school

- Cards with vegetable/fruit/medicinal plant names
- Various types of measuring instruments (ruler, cloth tape, tape measure)
- Record table of measurement results
- Stationary.



Appendix

Example of Measurement Result Record Table

No	Plant name	Parts of Plant (leaf/fruit/ flower/others)	Length/ height(cm)
1			
2			
3			
4			
5			
6			

1. The order of plants from the shortest:
2. The order of plants from the highest/tallest:
3. Longest fruit:
4. Shortest/tallest leaf:

Lesson Plan 5

Let's Plant!



Grade	: Primary School Grade 3
Implementation of Learning	: Habituation Session
Duration	: 3 class periods (@30 minutes)
Method	: The practice of growing vegetables in pots

A Learning Objectives

Students will be able to:

1. Grow vegetables in pots
2. Cultivate a sense of responsibility to care for plants in the school garden
3. Understand the benefits of vegetables for health.

B Summary of Learning Material

To implement this lesson plan, students and the school should have prepared the tools and materials for making potted plants

C Summary of Learning Material

The vitamins, minerals and fiber contained in vegetables make them one of the most important food groups to be consumed every day. The vitamins and minerals in vegetables are needed for the body's metabolism to run smoothly. Fiber is needed to help keep the digestive system healthy. Studies show that the habit of eating vegetables among school children in Indonesia is not optimal, so that efforts to introduce and familiarize them with vegetables must be carried out continuously.



Introducing various types of vegetables to the students can be conducted in various ways. One way is to invite them to practice growing vegetables in pots. This is believed to foster a sense of love and responsibility for the plants being cared for, as well as increasing the diversity of vegetable crops in the school garden.

Sumber foto: pertanianku.com

The main messages to be delivered to the students

- Vegetables contain a lot of vitamins, minerals, and fiber which are beneficial to maintain our health.
- Growing potted vegetables is fun and easy.
- The plants must be nurtured properly to grow optimally.

D Students' activities

1. Students listen to the teacher's explanation on activities and learning objectives.
2. Students are divided into several groups (each group consists of 3-4 people).
3. Guided by the teacher, students perform a question-and-answer session about the types and benefits of vegetables.
4. Students in each group discuss the types of vegetables to be planted. Then, they listen to the teacher's explanation on the steps for planting.
5. Students make name boards for their respective groups.


6. Each group starts planting according to the steps previously explained by the teacher.
7. Students arrange the pots planted with vegetable seeds and put up the group's name board.
8. Students tidy up the tools and materials and wash their hands.
9. Students make a schedule to water and tend the plants per group.



Sumber foto: pertanian1blog.blogspot.com

E Teacher's Guide

1. Teacher explains the activities and learning objectives.
2. Teacher divides the students into several groups (each group consists of 3-4 people).
3. Teacher explains the benefits of vegetables for health and the activities to be carried out.
4. Teacher leads the discussion regarding the types of vegetables to be planted and the tools needed. If possible, one student can grow one type of vegetable, and each student in one group is encouraged to plant a different type of vegetable.

- 
5. Teacher defines the steps for planting in a pot and making a name board (information to be written down on the name board includes vegetable name, group name, group members, and date of planting).
 6. Teacher guides the students to plant vegetable seeds, put up the boards, and wash their hands.
 7. Teacher divides the task of taking care of the plants to each group (watering schedule, the students in charge of watering, and the students who need to report on the progress).
 8. Teacher concludes the activity by highlighting that God has given us abundant natural resources, including vegetables. It is our responsibility to plant and nurture the vegetable plants and utilize them well for our body's health benefits.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Understand how to grow vegetables in pots.
- Care for vegetable crops in the school garden.
- Understand the benefits of vegetables for health.

Lesson Plan 6

Have Fun Cooking Spinach Omelet



Grade	: Primary School Grade 4
Implementation of Learning	: Intracurricular (Indonesian Language)
Duration	: 2 class periods (@30 minutes)
Method	: Cooking spinach omelet

A Learning Objectives

Students will be able to:

1. Recall and write the instructions for cooking spinach omelet.
2. Know the benefits of spinach and eggs for health.

B Preconditions

- To implement this lesson plan, the school must have ready-to-harvest spinach in the school garden.
- If the amount of harvested spinach is insufficient, students are asked to bring fresh spinach from home as an additional ingredient to cook spinach omelet.
- Students are also asked to bring the tools and materials needed to cook spinach omelet.

C Summary of Learning Material

Instructions provide direction or guidance on how something should be done, e.g., instructions for use or for implementation. Instructions must be arranged according to the order or stages of the process. The material on the "Instructions" can be delivered in an interesting way for students, such as instructions for making a certain meal in a group cooking activity.




One of the foods that is healthy and easy to make is an omelet. To add nutritional value to it and get children used to eating vegetables, an omelet can be mixed with vegetables grown in the school garden. One of the vegetables commonly grown in school gardens is spinach. Spinach contains several nutrients that are useful for the body, such as vitamin A, which plays a role in maintaining eye health, and fiber, which can help regulate bowel movements. Spinach also contains iron that the body needs to produce red blood cells so that it can reduce the risk of anemia among students. Thus, students can have good concentration while attending lessons because they do not experience anemia.

The main messages to be delivered to the students

- Vegetables contain various nutrients, including vitamins, minerals, and fiber, which are highly beneficial for health
- A spinach omelet has a delicious taste and is nutritious.
- Cooking a spinach omelet is easy and fun.

D Students' activities

1. Together with the teacher, students discuss the benefits of spinach and eggs for health
2. Students work in small groups. Assisted by the teacher, each group prepares the ingredients and utensils for cooking. Spinach is harvested from the school garden as an outcome of students' gardening activities.
3. Students pay attention to the teacher's explanation (through slides or pictures) on the steps for making a spinach omelet and the benefits of spinach and eggs
4. Each group starts cooking. During the cooking process, one of the students in each group lists down the steps to make a spinach omelet in the provided worksheet.

- 
5. Once done, each group presents their steps for cooking a spinach omelet to the other groups.
 6. The final activity is to clean up the place and the cooking utensils and to enjoy the spinach omelet they have cooked.

E Teacher's Guide

1. Teacher guides the students to discuss the benefits of spinach and eggs for health.
2. Teacher explains the benefits of spinach and eggs and also the steps for making a spinach omelet. To make it easier for students, it is recommended for the teacher to use slides or pictures on large papers while explaining.
3. Teacher divides the students into groups and checks the tools and ingredients for cooking.
4. Teacher assists the students in cooking.
5. Teacher guides the students to reflect and make a conclusion on the activity.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Understand the benefits of spinach and eggs for health.
- Demonstrate the steps for making a spinach omelet.

Appendix

Steps for making a spinach omelet:



Ingredients:

- 450 grams of fresh spinach
- 1/2 part of onion
- 4 large eggs
- 3 tablespoons of cooking oil
- salt and pepper to taste

Instructions:

1. Wash the spinach thoroughly. Boil water in a cooking pot before adding the spinach, and cook for 5 minutes. Remove and drain the spinach.
2. Pour 1 tablespoon of cooking oil in a flat skillet and then sauté the onions until golden brown. Add the spinach, season with salt and pepper, and stir-fry for a moment then set aside in a plate.
3. Beat the eggs. Pour 2 tablespoons of cooking oil in a flat skillet. Pour the beaten eggs and flatten it with a fork.
4. Reduce the heat, add the spinach (and chilies) on top of eggs, and flatten them again so they are mixed with the eggs. Let it cook over low heat until fully cooked.

Lesson Plan 7

Beauty and Benefit of My Garden



Grade	: Primary School Grade 5
Implementation of Learning	: Intracurricular (English / National or Local Language)
Duration	: 3 class periods (@30 minutes)
Method	: Hand puppet play

A Learning Objectives

To introduce the nutritional content of vegetables to the students through hand puppet play.

B Summary of Learning Material

Introducing vegetables and fruits to students can be done through various activities. In order convey a message properly to the students, teachers need to use methods that are interesting, creative, varied, innovative, and fun. One method that can be used is storytelling using hand puppet media. Hand puppets are chosen as learning media because they are very close to the world of children and are useful for visualizing the story being told. Through hand puppets, students are invited to make dialogues that contain encouraging messages to plant and eat vegetables and fruits grown in the school garden. The dialogue also contains an explanation of the nutritional content and benefits of vegetable and fruit crops grown in the school garden. In addition to conveying stories or messages effectively, hand puppet dialogues can improve students' language skills, including enriching vocabulary, improving sentences, and practicing courage in communicating (Delimasa, Ngadino, and Samidi., 2012).



The main messages to be delivered to the students

- Communicating a message using hand puppets is fun.
- Vegetables are food sources of vitamins and minerals that are important for the body's health.

C Students' activities

Meeting I

1. Students are divided into several groups. Each group consists of 3- 4 people.
2. Students gather information about the nutritional content of several vegetable plants in the school garden. Information can be collected from textbooks or the literature provided by the teacher.
3. Students choose the vegetables they like to be used as hand puppet characters for each group member.
4. Students make a dialogue about the nutritional content and benefits of vegetables for health and the encouragement to eat vegetables.
5. Students are given a list of materials and tools that need to be prepared to make hand puppets and are asked to bring them to the next meeting.

Meeting II

1. Students gather with their respective group members and prepare the materials and tools needed for making hand puppets.
2. Under the teacher's guidance, students make hand puppets according to the vegetable characters they have chosen. The steps for making hand puppets are in Appendix 1.
3. The finished hand puppets will be used for the next meeting.



Meeting III

1. Each group performs a dialogue in a hand puppet stage play in front of the class.
2. The other groups can comment on the story presented by each group.

D Teacher's Guide

Meeting I

1. Teacher divides the students into groups. Each group consists of 3- 4 people.
2. Teacher prepares reading materials, such as textbooks or other literature as sources of information related to the nutritional content of vegetables. Teacher assists the students in gathering information from the reading materials. Then, teacher explains the information in more details to the students.
3. Teacher asks the students to choose the vegetables they like to be used as hand puppet characters.
4. Teacher explains how to create a conversational text (can be in the form of a dialogue script or direct sentences). The following are the steps to write direct sentences:
 - a. A direct sentence is enclosed in quotation marks ("...").
 - b. The sentence starts with a capital letter.
 - c. The conversational text is written after a colon (:); this mark is placed after a word that indicates a character or an actor in the dialogue.
5. Teacher provides a list of materials and tools that need to be prepared for making hand puppets. Then, the students are asked to bring them to the next meeting.



Meeting II

1. Teacher guides the students to gather with their respective group members and prepare the materials and tools needed for making hand puppets.
2. Teacher explains and demonstrates the steps for making hand puppets. The demonstration can be done through presentation slides (PowerPoint) or a tutorial video on making hand puppets (if available).
3. Teacher assists the students in making hand puppets.

Meeting III

1. Each group of students performs a dialogue in a hand puppet stage play in front of the class.
2. The other groups can comment on the dialogue or story presented by each group.

E Learning Outcome Indicators

Through hand puppet dialogues, students are able to provide information on nutrition and encourage others to eat vegetables and fruits.

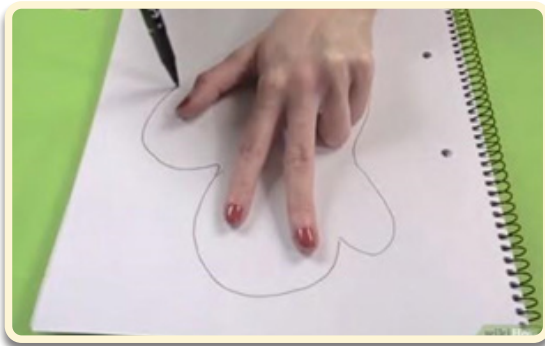
F Tools and materials needed

- Flannel cloth with various colors (minimum of two or three colors) according to the created character.
- Needles
- Threads in colors which match the flannel.
- Paper
- Pen
- Scissors

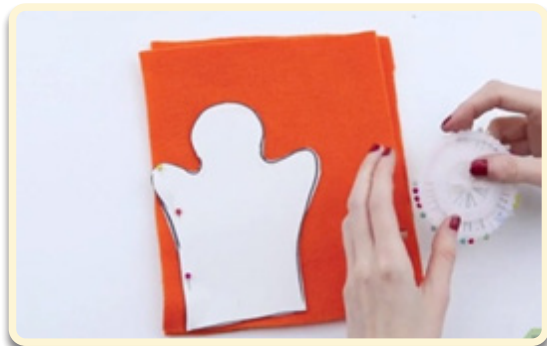
Appendix 1

Steps to make a hand puppet:

1. To make a hand puppet, use flannel, fabric, or other material.
2. **Make a pattern of the hand puppet.** The hand puppet should be in the size of the hand from the wrist to the fingertips. Trace around the hand on a sheet of paper by stretching out the thumbs. The thumb will be one of the arms of the puppet, the index finger will be the head, and the middle or pinky finger will be the other arm. Then cut out the paper along the pattern.



3. **Attach the pattern paper onto the two pieces of fabric/material.** Stack the two pieces of material on both sides (front and back). Using a needle, attach the pattern to the stack.



4. **Cut the material according to the pattern.** Try to cut it smoothly and neatly without jagged edges to get good results.




5. **Glue the front and back sides of the material.** Stick them together by using hot glue or by sewing them with threads of the same color as that of the material. Add accessories according to the hand puppet character.



Berikut ini contoh boneka tangan dengan karakter sayuran





Appendix 2

Example of a dialogue script

Tomato : Hello friends. My name is Tomato.

Spinach : Hi Tomato, my name is Red Spinach

Tomato : Hi Spinach, what are you carrying in your body?

Spinach : Oh, I have lots of nutrients which are highly beneficial for health. I also have lots of iron. Iron is very useful for making red blood cells and carrying oxygen throughout the human body.

Tomato : Whoa, that's great!

Spinach : Thanks. You're also nutritious, right, Tomato?

Tomato : Of course. I contain a lot of vitamin C to maintain the human's immune system so they don't get sick easily.

Recommendation:

For students in grades 1-3, the puppet stage play and the puppet-making process can all be done by the teacher, while the students are tasked to observe these. As an evaluation, students are asked to retell the nutritional content of vegetables according to the hand puppet characters.

Lesson Plan 8

The Vegetable is My Friend



Grade	: Primary School Grade 5-6
Implementation of Learning	: Intracurricular (Science)
Duration	: 3 meetings (@30 minutes)
Method	: Measuring and observing the growth of vegetable plants in the school garden

A Learning Objectives

Students will be able to:

1. Know the growth of vegetable plants.
2. Recognize the nutritional content of vegetables.

B Preconditions

- The school garden has existing vegetables to be observed by the students.
- Internet devices and connections are available to find information related to vegetables as objects of observation.

C Summary of Learning Material

A nutritious food contains substances needed by the body. These include carbohydrates, proteins, fats, vitamins, and minerals. Each of these substances has an essential role in the body. Carbohydrates and fats serve as sources of energy, protein functions as a building block, while vitamins and minerals act as regulatory substances.

The school garden can be utilized as a learning medium for students about vegetables and fruits as sources of vitamins and minerals. The introduction of fruits and vegetables in the school garden can be done by monitoring plant growth regularly. Through



this activity, the students learn to make observations, collect simple data, and draw conclusions about plant growth. The students are also asked to explain the nutritional content and benefits of consuming vegetables and fruit as an effort to promote and help them develop such eating habit. Moreover, by observing the growth of fruit and vegetable plants, students can be more interested in planting and consuming fruits and vegetables regularly.

The main messages to be delivered to the students

- The growth of vegetable plants, in terms of increase in height, can be illustrated by a line graph.
- Vegetables are nutritious and beneficial for health.

D Students' activities

Meeting I

1. Students are invited to discuss different kinds of plants.
2. In groups, students make preparations for planting a selected vegetable plant, including preparing the planting media and seeds.
3. Students plant the vegetable in the planting media and put up a name board made of used cardboard which has been covered with transparent plastic.
4. Students look for information (on the Internet or in the literature in the library) about the plant assigned to their group. The information that must be collected includes the characteristics of the plant, the parts of the plant that can be consumed, and the nutritional content of the plant.



Meeting II

1. In groups, students measure the height of the vegetable they planted in the previous meeting and count the number of leaves the plant has.
2. Students write down the observation results in the observation table provided by the teacher.
3. The students measure the height of the plant and the number of its leaves twice a week (once every 2-3 days) for 3 weeks. The measurement data are displayed in a line chart.
4. Students summarize the information about plants (point 4 of the first meeting) in presentation slides (PowerPoint) or pictures on cardboard.


Meeting III

1. Each group of students presents their observation results on the height of the vegetable plant and the number of its leaves. Moreover, the students describe the plant growth chart (point 3 of the second meeting) and the information on the vegetable plant (point 4 of the first meeting).
2. Under the teacher's guidance, students make conclusions about the growth and benefits of vegetable plants.

E Teacher's Guide

Meeting I

1. Teacher divides the students into groups (4-5 people).
2. Teacher invites the students into a discussion about plant growth and its influencing factors, for example:
 - a. Does every plant have the same growth rate?
 - b. What are the influencing factors? The teacher assists students in identifying the types of vegetables grown in the school garden.

- 
3. Teacher assists the students in determining the vegetable plant to be used as an object of observation in each group (each group observes a different vegetable plant). The teacher also helps students in providing name boards for the vegetable plants.
 4. Teacher asks the students to find information about the selected vegetable plant. This includes their characteristics, parts of the plant that can be used, and their nutritional content

Meeting II

1. Teacher delivers instructions to the students on observing the growth of vegetable plants. Then, the teacher distributes an observation table that the students need to fill out.
2. Teacher assists the students in distributing the group tasks and conducting these tasks independently (each group has a list of tasks for each group member).
3. Teacher assists the students in measuring the height of the vegetable plant and the number of its leaves. For the next measurement (for 3 weeks, once every 2-3 days), students can do it independently. Teacher ensures that each student carries out his/her duties by checking the checklist made by each group.
4. Teacher asks students to summarize the information about the plants (point 4 of the first meeting) in Power Point slides or pictures on cardboard.

Meeting III

1. Teacher asks students to present their observation results on the height of the vegetable plant and the number of its leaves, as well as the information about the plant (points 3 and 4 of the second meeting).
2. Teacher assists students in concluding about plant growth and the benefits of plants.



F Learning Outcome Indicators

- Students are able to collect plant growth data through routine observations and can display their observations in the form of line graphs
- Students are able to present information on observation results well and search for information related to the benefits and nutritional content of vegetables.

G Tools and materials needed

- Several types of vegetable plants available at school
- Used cardboard boxes
- Color paper
- Rami yarn
- White paperboard
- Scissors
- Paper hole puncher
- Transparent plastic
- Internet connection

Appendix

1. Observation Table

Name of Plant: Nutritional Content:	Picture / Photo	Group : Members :
--	------------------------	--

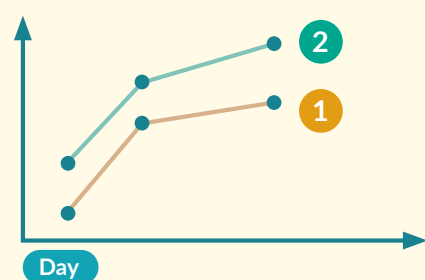
Plant Height

Day/Date	Plant										Average plant height	Notes
	1	2	3	4	5	6	7	8	9	10		

Number of Leaves

Day/Date	Plant										Average number of leaves	Notes
	1	2	3	4	5	6	7	8	9	10		

Line graph (plant height)



Line graph (number of leaves)



Informasi :

Berisi tentang informasi mengenai tanaman yang diamati, kandungan gizi yang dimiliki tanaman tersebut serta manfaatnya bagi tubuh manusia.

Kesimpulan :

Peserta diminta membuat kesimpulan dengan dibimbing guru



2. List of student work checklist during observation

Day/ Date	Student's Name	Task				Notes
		Name of Plant	Measure the plant height	Count the number of leaves	Additional information about plant	
	A	✓				
	B		✓			
	C			✓		
	D				✓	

3. List of student work checklist on making line graphs and final reports:

Day/ Date	Student's Name	Task				Notes
		Make line graph on plant height	Make line graph on the number of leaves	Gather information on the plant observed	Draw conclusion	
	A	✓			✓	
	B	✓			✓	
	C			✓	✓	
	D			✓	✓	

Lesson Plan 9

Get to Know Me



Grade	: Primary School Grade 5-6
Implementation of Learning	: Intracurricular (English / National or Local Language)
Duration	: 1 class period
Method	: Composing and reading poems about the school garden

A Learning Objectives

Students will be able to:

- Compose and read poems on the theme of the school garden.
- Understand the nutritional content of vegetables in the school garden.

B Summary of Learning Material

According to the Dictionary of Literary Terms (Sudjiman, 1984), poetry is a variety of literature whose language is bound by rhythms, dimensions, rhymes, and the arrangement of lines and stanzas. Poetry is a work of art because it has an aesthetic function. Through poetry, people can be easily attracted to love or enjoy experiences, events, or something that is being conveyed.

The school garden is part of the school environment that should be loved and cared for by the whole school community. One way that can be done to invite the school community to get to know and love the school garden is to inform them about it through poetry. The process of introducing vegetable and fruit plants to students can be done by inviting students to compose a poem to explain the characteristics or benefits of vegetables.

The main messages to be delivered to the students

- Vegetable plants in the school garden and their nutritional content can be made as a topic in composing poems.
- Vegetables contain nutrients which are needed by the body to maintain good health.



C Students' activities

3. Students are divided into groups of 4-8 people.
4. Students examine several examples of poems.
5. Students are asked to observe vegetable plants in the school garden.
6. Students fill out an observation table on vegetable plants in the school garden.
7. Students write one poetic line representing the observed plant. Then they combine the lines written by their groupmates to become several stanzas of a poem
8. A representative from each group reads the poems in front of their classmates.

D Teacher's Guide

1. Teacher divides the students into groups of 4-8 students.
2. Teacher prepares several examples of poems.
3. Teacher prepares the guidelines and an observation table for observing vegetable plants in the school garden.
4. Teacher invites the students to go to the school garden and asks students to observe the types of vegetables planted in the school garden.
5. Teacher explains the nutritional content and the benefits of several types of vegetables in the school garden.
6. Teacher explains the assignment and assists the students in completing the assignment in the school garden.
7. Teacher asks the representatives of several groups to read their poems aloud, and the rest of the students are encouraged to give their comments on the poems.
8. The poems composed by the students may then be displayed on the school wall magazine or recited during art performances or other school events

E Learning Outcome Indicators

Students are able to write poems on the topic of vegetable plants in the school garden and their nutritional content.

Appendix 1

Student Worksheet

Grade :

Group :

Name of group members : 1.

: 2.

: 3.

: 4.

: 5.

Observation table on vegetable plants in the school garden

No	Object observed	Observation result	Verse of poem
1	Name of plant		
	a. Color		
	b. Stem shape		
	c. Flavor		
	d. Height		
	e. Nutritional Content		
2	Name of plant		
	a. Color		
	b. Stem shape		
	c. Flavor		
	d. Height		
	e. Nutritional Content		



Appendix 2

Examples of Poems

Poem 1

Tasty Green Leaves

By Indriani Supandi

(Cerdas Mulia Ekselensia Primary School)

A divine creature
Green so pretty refreshes the eye
Supported by its soft stem

Containing nutritious component
Could we name you
Bok Choy
Tasty green leaves bring joy

Poem 2

Panic in the Vegetable Garden

By Elton Camp

(<https://www.poetrysoup.com/>)

The carrot turns from yellow to pale
“Danger!”
it called out to the kale

The tomato gaped in great fear
“Caution broccoli, they’re here.”

Mushroom whispered to the squash,
“Beware for they’re here to nosh.”

Pumpkin felt of his hard shell
“If they touch me, I’ll yell.”
“Oh horrors!” said the peas
“How we hate such as these.”

Why did the veggies begin to shout?
Because vegans were roving about!



Nutrition Education Lesson Plans For Junior High Schools



Nutrition Education Lesson Plans for Junior High Schools

Lesson Plan 10

Let's Play Quartet



Grade	: Junior High School, Grades 6 to 7
Implementation of Learning	: Intracurricular (English Language)
Duration	: 2 class periods (@45 minutes)
Method	: Conversation using quartet card game

A Learning Objectives

1. To increase students' English vocabulary of the names of plants, objects, and activities and use them confidently during a conversation.
2. To increase students' fluency in English conversations, particularly when asking for something as well as responding to it.
3. To foster sportsmanship, effective negotiation skills, perseverance, and confidence among students.

B Summary of Learning Material

The material to be conveyed is everything related to the school garden. To make the learning process attractive for the students, quartet cards with various kinds of pictures related to school gardens, nutrition, and a healthy lifestyle will be used.



Teachers can buy quartet cards at bookstores. However, sometimes the theme of the cards does not match the material to be delivered to students. Thus, to suit the theme, it is recommended that the teachers make their own cards with pictures taken directly from the daily activities of students, pictures of plants from the school garden, objects around the school, or pictures downloaded from the Internet.

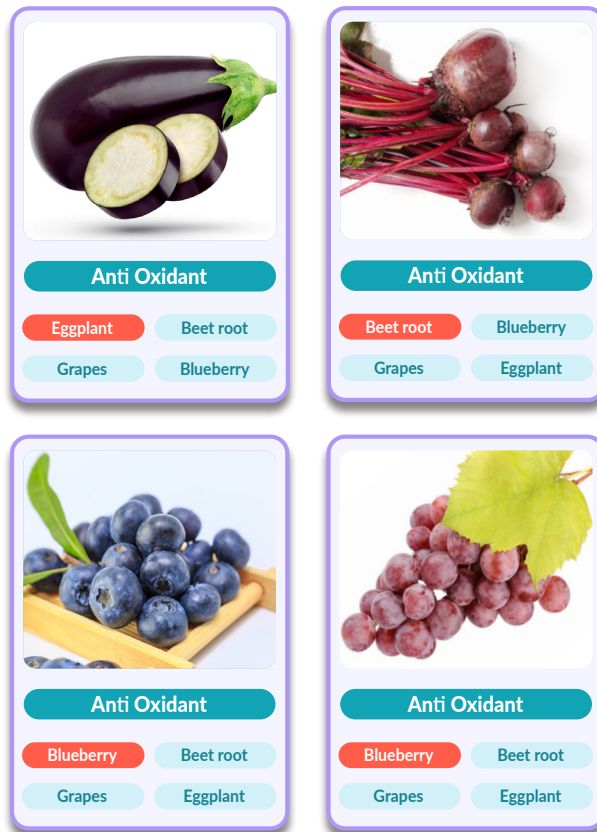
To correspond to the themes of school gardens, nutrition, a healthy lifestyle, and language learning, the following pictures can be made into cards:

1. Plants in the school garden
2. Fruit and vegetables by color group
3. Gardening tools
4. Gardening activities
5. Activities related to a healthy lifestyle
6. Healthy food and drinks.

The English learning material delivered may vary. This lesson plan will focus on *asking for and responding to a questions during a conversation*.

When asking for cards, students must express the sentences in English correctly and will be responded appropriately according to the existing conditions by the other player, for example:

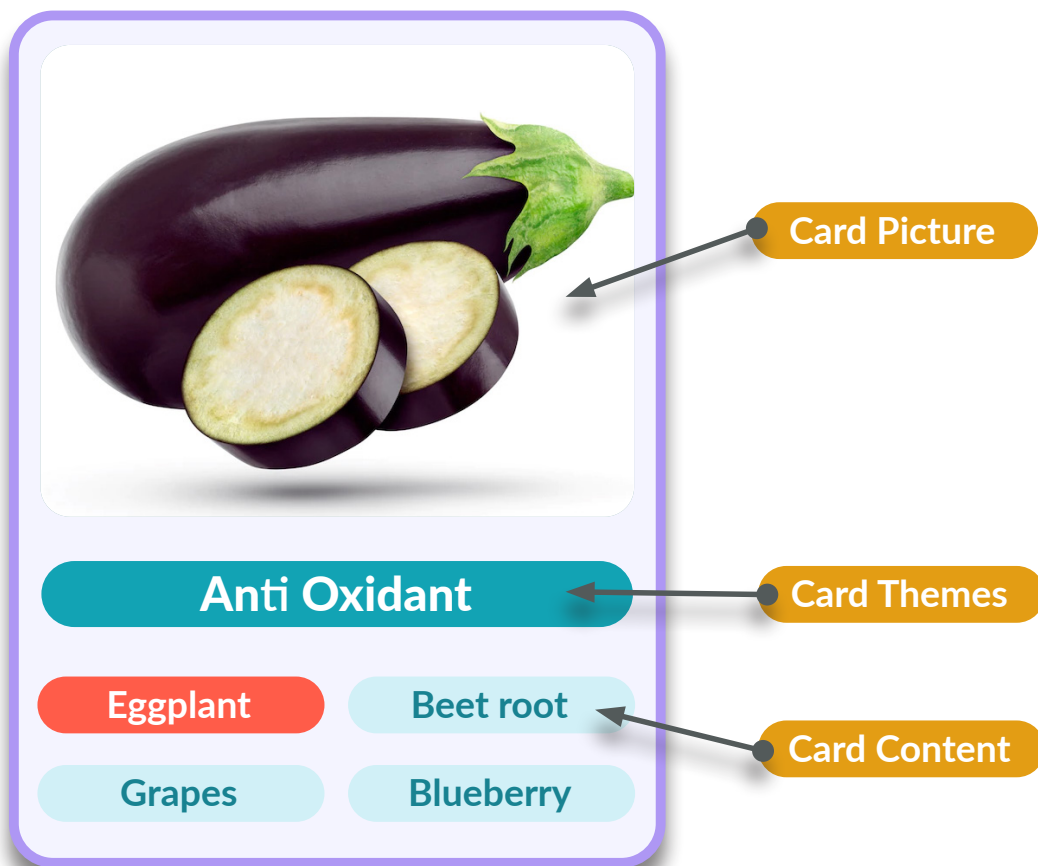
- ▶ Can I have an antioxidant card, please?
 - I am sorry, I don't have it.
- ▶ How about you, Billy? Do you have any antioxidant card?
 - Yes, I do.
- ▶ Can I have the beetroot, please?
 - Oh, sorry, this is not a beetroot card.
- ▶ Ok, that's okay. How about you Nia, do you have an antioxidant card?
 - Oh, yes, I do. Which one do you need?
- ▶ I need a beetroot.
 - Ok, here it is. Do you need any other?
- ▶ Yes, I do. I also need a blueberry, please.
 - Oh so sorry, I do not have a blueberry antioxidant card
- ▶ Alright then, thank you.
 - You are welcome.



C Students' activities

1. Students are divided into groups of 4 - 6 people.
2. Each group receives a set of quartet cards.
3. Initially, one student shuffles the card set and distributes 4 cards to each student.
 - The player who shuffles the cards will start the game. In a clockwise direction, the player mentions one of the card themes he/she has and asks for other cards containing one of the words written on his/her card from other players (other than the words whose the picture is on the card).
 - The other player who has the card being requested must hand it over to the requesting player. The process continues as long as the card requested is available.
 - If the requested card is not available, the player may ask the next player and so forth. If the card is still not available, the player's turn ends. The game will continue with the next player's turn. As a closure, he/she takes one card from the drawing stack.

- The game ends if a player manages to collect four cards belonging to the same theme.
 - If a player runs out of card on his/her hand and the game has not ended yet, the player can take one card from the drawing stack, and this process continues until the drawing stack runs out of cards..
4. The winner of the game is the player who has the most serial cards belonging to the same theme.
 5. If the time permits, the winners from each group may compete again.





D Teacher's Guide

1. In the previous meeting, the teacher has provided the English material on asking for something and responding to it.
2. Teacher prepares several sets of quartet cards.
3. Teacher explains the game rules and divides the students into several groups.
4. During the game, the teacher supervises each group alternately.
5. Teacher observes the course of the game and pays attention to the words uttered by the students.
6. When the game ends, the teacher appreciates each player.
7. Teacher reviews the game and the themes on the cards.
8. At the end of the lesson, the teacher may assign students to rewrite the words they remember from this card game.

F Learning Outcome Indicators

Students will be able to:

- Deliver request expressions and respond correctly in English.
- Collect cards with a similar theme.
- Play the game with sportsmanship, honesty, and confidence.

G Materials or tools to be prepared by the school

Learning Resources

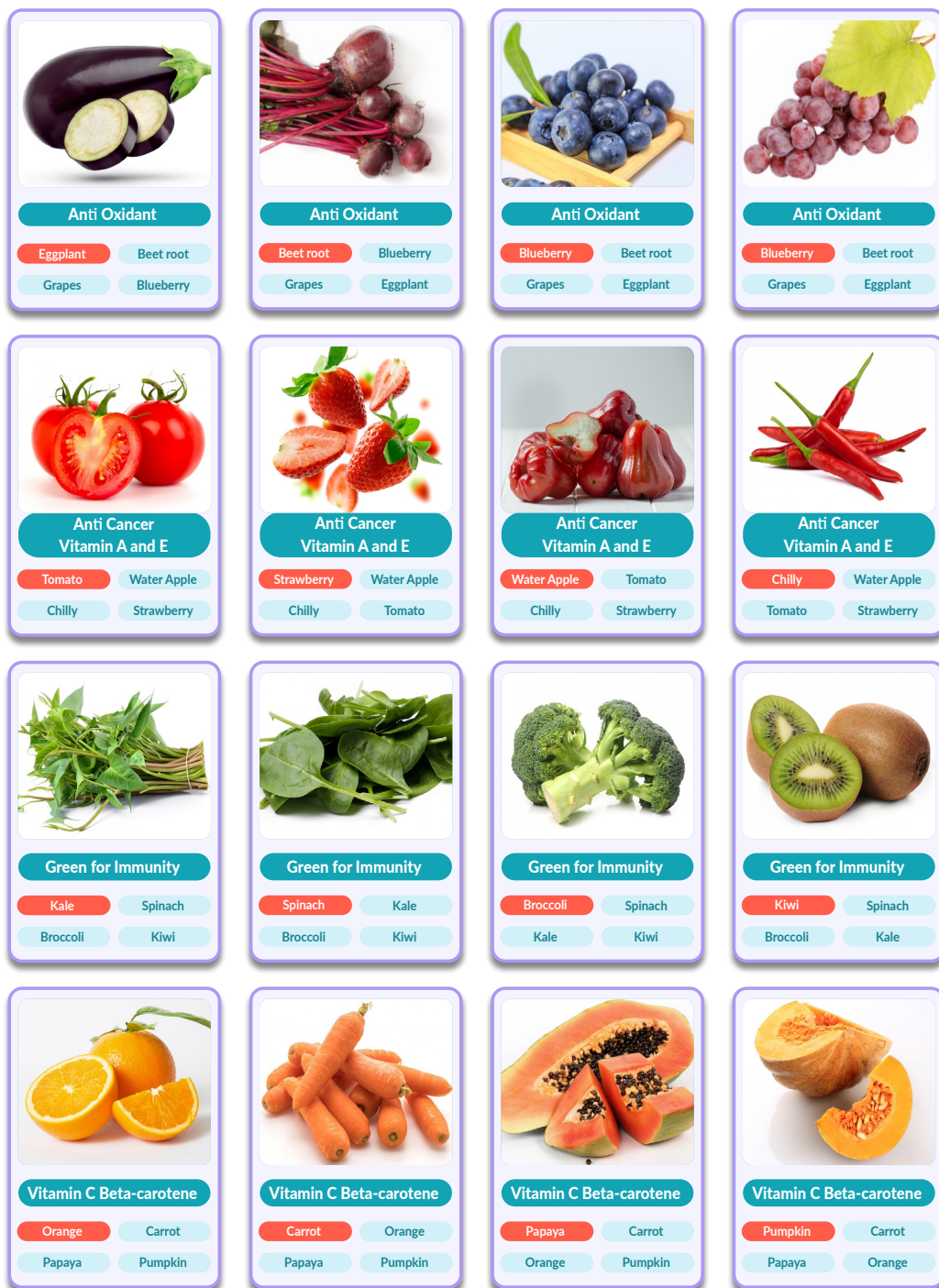
- Adolescent Nutrition and Health Book
- Articles related to the topic of discussion (health)
- Online articles
- Pictures from www.pinterest.com and www.google.com

Tool

- Quartet game cards

Appendix

Examples of Picture Cards



To obtain the complete cards, please contact savitrimumtia@gmail.com

Lesson Plan 11

Fainting?



Grade	: Junior High School, Grade 7
Implementation of Learning	: Habituation Session (Homeroom teacher's session/ guidance & counselling)
Duration	: 2 class periods (@45 minutes)
Method	: Discussing the importance of breakfast

A Learning Objectives

- To emphasize the importance of balanced daily activities and food intake.
- To encourage students to maintain physical fitness by having nutritious breakfast regularly.
- To encourage students to motivate themselves and the people around them on the importance of breakfast.

B Summary of Learning Material

Adolescence is a transition from childhood to adulthood. In this phase, adolescents experience changes in their social life situations especially regarding their appearance in society. Teenagers often feel 'distressed' to present in a particular event when they feel that something is lacking in their appearance.

Teenagers consider body image as one factor that influences their confidence. A teenager sometimes feels that his/her body is imperfect, overweight, or disproportionate. This often leads them to skip a meal, usually breakfast, which causes eating disorders and interferes with their activities. Teenagers skip breakfast for various reasons, such as fear of being late, having no one to prepare it, or not getting used to having breakfast. Often, students feel exhausted during the flag ceremony or a sports session or halfway through a learning session. This can be prevented by regularly having breakfast and nutritious food so that their stamina and concentration while studying can be maintained until the break and lunch time..



The main messages to be delivered to the students


- Having nutritionally balanced breakfast can help maintain fitness and the ability to concentrate at school.

C Students' activities

1. Students discuss breakfast habits.
2. Teacher guides the students to make a summary of today's learning activities.
3. Students are encouraged to be committed to maintaining their health and having nutritionally balanced breakfast every day.
4. Students are asked to make "memes" from selfie photos of having breakfast for 7 consecutive days (Breakfast Challenge).
5. The memes must be uploaded on their respective social media to campaign for having daily breakfast.

D Teacher's Guide

1. Teacher moderates a discussion by asking what food the students usually consume for breakfast.
2. Teacher asks the students' reasons for choosing the foods as their breakfast menu. Is the food delicious? Healthy? Affordable? Accessible?
3. Teacher moderates the discussion to create a healthy and dynamic discussion atmosphere.
4. Teacher begins to associate the preliminary activities with the material to be conveyed.
5. Teacher delivers "10 Principles of Balanced Nutrition "
6. Teacher asks the students to observe events at school during morning activities.

- 
7. Teacher encourages the students to have balanced and nutritious breakfast every day.
 8. Teacher asks the students to make memes from selfie photos of having breakfast for 7 consecutive days (Breakfast Challenge) to be uploaded on social media.

Breakfast Challenge

Breakfast challenge for 7 consecutive days

1. Make **A MEME** picture of **YOU HAVING BREAKFAST** for 7 consecutive days every day.
2. The picture can be a selfie photo or portray you having breakfast together with your family.
3. In the photo, you and your meal must be visible.
1. Pictures are to be uploaded on Facebook. Tag **FB SEAMEO RECFON**, your teachers, and your friends to get as many likes as possible. If students have an Instagram account, tag **@seameorecfon**.
2. Any writing on the MEME must not be offensive to any ethnicity, religion, race, and inter-group relations
3. In the caption, use the hashtags #breakfastchallenge #7daybreakfastchallenge #classnumber (according to your class) #healthymeal #breakfast.
4. Add the hashtag #breakfastday1 #breakfastday2 #breakfastday3 #breakfastday4
5. #breakfastday5 #breakfastday6 or #breakfastday7 according to the day you post.
6. The class with the highest number of senders (and has completed the 7-day challenge) will be rewarded



E Learning Outcome Indicators

- Students are able to differentiate the various types of healthy breakfast by mentioning several foods that can be consumed by them.
- Students begin to have breakfast regularly before leaving for school.
- Students understand the importance of having balanced breakfast to avoid any health problems.
- Students create memes for the "Breakfast Challenge" to motivate others to have breakfast every day and maintain a healthy lifestyle.

G Materials or tools to be prepared by the school

Learning Resources

- Adolescent Nutrition and Health Book (available at SEAMEO RECFON's website)
- Articles related to the topic of discussion (health)
- Online articles
- Pictures from www.pinterest.com and www.google.com

Tool

- Laptop
- Projector
- Internet connection
- Upbeat music

G Materials or tools to be prepared by the school

After delivering the material on the importance of breakfast, the next steps are to:

1. Continuously supervise students' nutritional status through observations on the students' health by the school community. It is important for the teacher to check if there is a student who faints during morning activities, looks weak, or could not

concentrate while studying in the class. If any, the teacher continues to provide guidance and communicates with the parents/guardians of the students.

2. Conduct regular inspections of the canteen to ensure that healthy foods and snacks are available to students.

Appendix

Examples of Memes



Start Your Day with a heartfelt bowl of chicken porridge



Poster inviting to have breakfast

Lesson Plan 12

Let's Get to Know Vegetables and Fruit from Other Countries



Grade	: Junior High School, Grade 7
Implementation of Learning	: Intracurricular (Science)
Duration	: 2 class periods (@45 minutes)
Method	: Discussing vegetables and fruit from other countries

A Learning Objectives

- To introduce a variety of vegetables and fruit from other countries, such as pagoda vegetable, bok choy, horenzo, okra, lettuce, and cherry tomato
- To gather information on the nutritional contents and the benefits of the abovementioned vegetables/fruits.

B Precondition

- If possible, students are asked to bring imported vegetables and fruit from home.
- If not possible, the teacher can prepare pictures of those vegetables and fruits

C Summary of Learning Material

Currently, there are various imported vegetables and fruit that are not only consumed but also developed in Indonesia. Some of the examples are pagoda vegetables, bok choy, lettuce, purple cabbage, radish, Taiwanese pumpkin, white bitter gourd, pinto beans, and fruits, such as pome, Dutch tomatoes, Japanese cucumber, kiwi, almond, and mulberry. Without downgrading local fruits, students can be introduced to vegetables and fruit from other countries to find out the diversity of vegetables and fruits around the world.



The main messages to be delivered to the students


- Vegetables and fruits, both originally from Indonesia and imported from other countries, are highly diverse.
- Knowing various vegetables and fruits enriches knowledge and the 'taste' experience of the students.

D Students' activities

1. Students discuss vegetables and fruits that they are familiar with and often consume.
2. Students learn to recognize fruits native to Indonesia and other countries.
3. Students search for information in groups about the nutritional contents of those vegetables and fruits and their benefits for health on the Internet.
4. Students compile the search results on flipchart paper.
5. Students discuss the information on the flipchart paper in front of the class.
6. Students transfer the information on the flipchart paper to the school wall magazine board to provide information to other students.

E Teacher's Guide

1. Teacher assists the students in discussing vegetables and fruits that are familiar to them, commonly found in the local market and frequently consumed.
2. Teacher assists the students in discussing vegetables/fruits native to Indonesia and other countries.
3. Teacher assists the students in looking for information on the nutritional contents of vegetables and fruits from Indonesia and other countries on the Internet.

- 
4. Teacher assists the students in compiling the search results on flipchart paper or paperboard.
 5. Teacher asks the students for their opinions regarding the types of vegetables and fruits available in the school garden. Do they taste sweet? Bitter? Sour? Which one is their favorite?
 6. Teacher assists the students who work in groups to transfer the information about fruit and vegetables on the flipchart paper to the wall magazine.
 7. Teacher assesses students' presentation regarding the accuracy of the information and the attractive design of the wall magazine.
 8. At the end of the activity, teacher encourages students to consume fresh and varied vegetables and fruits every day.

F Learning Outcome Indicators

- Students are familiar with various vegetables and fruits, as well as their nutritional contents.
- Students are able to display the information in a wall magazine on the school's wall board.

G Materials or tools to be prepared

- Teacher prepares ripe fruit or vegetables which are ready to be consumed (tasted) by the students.
- Teacher prepares an observation sheet.
- Teacher prepares various supporting tools to deliver the material, such as pictures, flipcharts/cardboard, and color markers



Appendix

Observation Sheet

No	Name of Plant	Taste	Aroma	Nutritional Content	Benefit

Lesson Plan 13

Time-lapse Images of Vegetable Growth



Grade	: Junior High School, Grade 7
Implementation of Learning	: Habituation session
Duration	: 2 class periods (@45 minutes)
Method	: Creating time-lapse images

A Learning Objectives

Students will be able to:

- Understand the growth process of vegetable crops
- Document the growth process of vegetable crops in the school garden periodically in the form of time-lapse images.

B Precondition

To implement this lesson plan, the school must first plant seeds in the school garden. Choose a crop that has a growing speed and enables students to observe it using a time-lapse method, such as green bean sprouts, water spinach, and mustard greens.



Photo source: womansworld.com

© Summary of Learning Material

The school garden ecosystem usually has ornamental plants. It will be more useful, however, if the plants can be utilized by the school community. Planting vegetables and fruits in the school garden will provide a new experience for students as they can learn about where the vegetables and fruits they usually consume come from. Another experience is to observe the growing process of the plants closely.

One method that can be used in the observation is by creating periodic time-lapse images. In taking pictures of a plant, the camera is set to take many pictures of the growing plant during a period of time and then the images are arranged into a short video clip. Thus, events that take place in a long period of time can be documented and displayed in just a few seconds. The camera position and shooting time are set and fixed every day to show the time acceleration effect in the video, which is created from multiple images.

The main messages to be delivered to the students

Vegetables are the source of fiber, vitamins, and minerals needed by humans. It takes a specific period of time before they can be harvested and consumed. The observation of vegetable plant growth using the time-lapse method is very fun.



Sumber foto: sciencephotography.com

D Students' activities

1. Students listen to the explanation about the roles of the school garden and the benefits of gardening in maintaining the ecosystem and in providing nutritious food.
2. Students are divided into several groups of 5 people. Each group receives 1 worksheet.
3. Students plan the time to shoot a time-lapse video of vegetable crops in the school garden to be presented in the next meeting. The video is recorded outside school hours.
4. Students add information related to the observed plants.
5. Students compile the observation photos into a time-lapse video.
6. Students create a Power Point presentation based on their answers on the worksheet.
7. Students present their observation results in front of the class.



Photo source: sciencephotography.com

Follow-up activity

- Making a portfolio of students' time-lapse videos.



E Teacher's Guide

1. Teacher explains the roles of the school garden and the benefits of gardening in maintaining the ecosystem and in providing nutritious food.
2. Teacher divides students into several groups of 5 people. Each group receives 1 worksheet.
3. Teacher assists the students in planning the time to shoot a time-lapse video of vegetable crops in the school garden to be presented in the next meeting. The video is recorded outside school hours.
4. Teacher assists students in looking for information related to the observed plants.
5. Teacher assists students in compiling the observation photos into a time-lapse video.
6. Teacher assists the students in creating a Power Point presentations based on their answers on the worksheet
7. Teacher assesses students' presentations of their observation results.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Identify interactions between ecosystem components.
- Report their observation results in the form of time-lapse videos
- Present the results of the report to the whole class.

G Materials or tools to be prepared

- Science Book for grade 7
- Worksheet
- Internet
- Power Point
- Computer/laptop camera
- Application to create time-lapse videos

Appendix

Student Worksheet

Group :

- After listening to your teacher's explanation, go to the school garden with your group members.
- Identify the components of the ecosystem in the table below!

No	Biotic Component	Abiotic Component
1.		
2.		
3.		

- What do you know about the producer, consumer, and decomposer? Name each example that you find in the garden!
- What affects the balance of the school garden's ecosystem?
- What are the benefits of a vegetable garden in your school?
- What is your plan for creating a time-lapse video?

No	Information	Answer
1.	Name of Plants	
2.	Method for shooting a time-lapse video (fps and frame/minutes)	
3.	Duration of observation	
4.	The time the crops are planted	
5.	The period of time needed for harvest	
6.	The benefits of the vegetables	

Lesson Plan 14

Rainbow Meal



Grade	: Junior High School, Grade 7
Implementation of Learning	: Intracurricular (Biology)
Duration	: 2 class periods (@45 minutes)
Method	: Observing various food sources at school and home

A Learning Objectives

Students will be able to:

- Recognize the variety of foods available in various places (the school garden, school canteen, food vendors, home).
- Understand the nutritional contents of foods.
- Understand the importance of consuming various foods to meet a person's daily nutrient requirements.

B Summary of Learning Material

To live a healthy life, the body requires the fulfillment of macronutrients (carbohydrates, fats, and proteins) and micronutrients (vitamins and minerals) intake. The requirement of nutrients can be fulfilled by consuming various kinds of food as no single food source contains all the nutrients needed by each person (except breast milk for children aged less than six months).

Generally, sources of carbohydrates come from staple foods (e.g., rice, corn, breadfruit, yam) and certain pulses. Protein can be obtained from plants (plant-based protein) and animals (animal-based protein). Meanwhile, fat has two types, namely the saturated and unsaturated fats. Animal-derived fats tend to contain more saturated fats, whereas plant oil tend to have more unsaturated fats.



Vitamins and minerals are also the nutritional components needed by the body in small quantities. However, the excess or lack of vitamins and minerals may cause problems in our bodies. Vegetables and fruits are examples of food sources of vitamins and minerals.

A variety of food sources, including staple food, animal and plant-based protein sources, as well as vegetables and fruits, served in rainbow colors will help to boost students' appetite. The concept of "rainbow meal" does not mean eating foods in a sequence of the rainbow color; rather, it means eating a variety of foods every day.


The main messages to be delivered to the students

- Various foods around us are sources of nutrients that the body needs.
- The more various the foods we consume are, the more likely we are to meet our daily nutritional needs.

C Students' activities

Meeting I

1. Students listen to the teacher's explanation on the important nutrients needed by the body (macronutrients and micronutrients). Students can ask questions and express their opinions afterward.
2. Students are divided into several groups according to the number of students in one class (e.g., 4 groups). Students receive an explanation on the assignment from the teacher.
3. Each group of students receives a different assignment.
4. Each group discusses their respective assignment (students are asked to go to the school garden or school canteen to identify food sources available for a short period of time).

- 
5. Students present their discussion results to the whole class. The visuals can be a PowerPoint presentation, pictures on cardboard, or another creative medium. If possible, the presentation can be complemented with photographs or pictures. Each group is allowed a maximum of 5 minutes to present their identification results.
 6. Other groups may provide comments on the presentation or ask questions during the allotted time (5 minutes for the questions and answers session).
 7. Together with the teacher, students conclude the results of each group's discussion. Students receive appreciation from the teacher, such as an applause and yells.

Meeting II


1. Students sit together with their respective group members. They have brought food in accordance with the "Rainbow Meal - My Nutritious Lunch" theme according to the assigned tasks for each group.
2. Students present the food they bring to the class (the order of presentation can be determined via games or a toss).
3. Each group is given a maximum of 3 minutes to present the food brought.
4. The other groups may respond to the presentation of one group for a maximum of 2 minutes.
5. Students receive appreciation and constructive input from the teacher.
6. Students may eat the food together and share it with the other groups. If time does not permit, each student can store their food in a lunch box and eat it together during the break.



E Teacher's Guide


Meeting I

1. Teacher explains the important nutrients needed by the body (macronutrients and micronutrients). Teacher asks the students to ask questions and express their opinions regarding the presented material.
2. Teacher divides the students into several groups according to the number of students in one class (e.g., 4 groups) and then explains the assignment:
 - a. **Group 1:** identify the diversity of plant species in the school garden, and identify the nutritional contents of each plant.
 - b. **Group 2:** identify the foods sold in the school canteen, the food ingredients, and their nutritional contents.
 - c. **Group 3:** identify the foods sold by food stalls/vendors around the school, the food ingredients, and their nutritional contents.
 - d. **Group 4:** identify foods usually consumed at home, the food ingredients, and their nutritional contents.
3. Teacher assists students in discussing their respective assignments and observing food sources in the school garden or foods sold at the school canteen (teacher sets a time limit for the observation activity so that students can return to the classroom to participate in a discussion).
4. Teacher asks each group to take turn presenting their discussion results to the class and moderates the question-and-answer session.
5. Teacher requests the students to make conclusions collaboratively, such as:
 - a. Do the foods (especially the main course) sold at the canteen/cooperative/food vendors satisfy the concept of healthy and varied food?
 - b. Could the crops in the school garden be used to complement the nutritional requirements of students?
 - c. What needs to be improved in the management of the school garden to complement the nutritional needs of students?

- 
6. Before concluding the meeting, teacher explains the group assignments for the next meeting, in which the students are required to bring any food that corresponds to the theme of “Rainbow Meal - My Nutritious Lunch”. Teacher also helps with the division of the tasks for each group. For example:
 - a. **Group 1:** Appetizer/snacks - tropical salad (must be made from local ingredients that can grow in Indonesia in at least 3 colors; they can be fruit, vegetables, or nuts)
 - b. **Group 2:** Colored carbohydrate sources (can be rice or tubers; these can be mixed with natural food coloring, if needed).
 - c. **Group 3:** Cooked vegetable dishes (at least 2 kinds of vegetables in different colors).
 - d. **Group 4:** Cooked side dishes (at least 2 different ingredients).
 7. Teacher gives appreciation to the students on their learning outcomes in this meeting with an applause or yells

Meeting II

1. Teacher asks the students to sit together with their respective group members and prepare the food they have brought according to the task assigned to their group.
2. Teacher determines the order of presentation for each group.
3. Teacher asks the students to present the foods they have brought. Students are asked to explain:
 - a. What foods did they bring?
 - b. Do the foods represent various kinds of food sources and ingredients?
 - c. What are the main nutrients contained in the foods they brought?
4. Teacher assists the presentation of each group and moderates the question-and-answer session.

- 
5. Teacher gives appreciation and constructive input on the foods brought by each group.
 6. Teacher allows students to eat their foods and asks them to share them with the other groups. If time does not permit, teacher can ask the students to store their food in a lunch box and eat it together during the break.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Understand the sources of nutrients from various foods types/meals in their surroundings.
- Plan a menu from food sources available in their surroundings.
- Consume nutritious and varied foods.

G Materials or tools to be prepared

- **Meeting I:**

Laptop and projector (if there is no projector available, we can use printed images to show visuals), flipcharts, large markers, crayons, school garden, school canteen, school cooperatives, food vendors around the school (where students frequently buy snacks from).

- **Meeting II:**

The lunch menu with the theme of “Rainbow Meal” is prepared from home according to the assignment for each group

Lesson Plan 15

Juice for You



Grade	: Junior High School, Grade 7 to 9
Implementation of Learning	: Intracurricular (Arts and Craft, English / National or Local Language, Economy)
Duration	: 2 class periods (@45 minutes)
Method	: Making fruit and vegetable juice

A Learning Objectives

Students will be able to:

- Understand that preparing healthy food and beverage can be affordable.
- Prepare their own food or drinks.
- Process school garden harvests into healthy drinks (fruit or vegetable juice).

B Precondition

If the vegetables and fruits in the school garden are not ready for harvest, students are asked to bring them from home to make juice.

C Summary of Learning Material

The series of gardening activities by students for several months deserves an appreciation from the school. One way is to utilize harvest from the school garden as supplemental food for students.

Students are welcome to enjoy the fruits and vegetables harvested. Fruits and vegetables can be processed into fruit juice, vegetable juice, or mixed fruit and vegetable juice. Drinking juice is a common way that people consume fruits. Meanwhile, mixed fruit and vegetable juice can be an alternative for children who have an aversion to vegetables. The taste will be more acceptable to the children as the taste of vegetables is disguised

as fruit. Furthermore, fruits and vegetables can be used as learning media linked to several subjects, such as fruit and vegetable processing in the subject of arts and craft as well as procedural texts in English and local language subjects.

The main messages to be delivered to the students


- Fruits and vegetables can be processed into fresh and healthy drinks.
- Consuming fruits and vegetables regularly can help maintain the immune system.
- As a variation, fruits and vegetables can be processed into fresh juices or other kinds of fresh drinks.



Source of photo: rimanews.com

D Students' activities

1. Students harvest fruits and vegetables from the school garden and then they make a plan to process them into fresh drinks or juices (name of drinks, tools, ingredients, and estimated costs).
2. Students note down the recipe of the fresh drink or juice, practice making it, and serves it.
3. Students write down the main nutritional content of fruit and vegetables used (a table of main nutritional content in vegetables and fruit will be provided by the teacher).

- 
4. Students document the making of their fresh drink or juice in videos or photos, completed with recipes and information on the nutritional content of the drink.

E Teacher's Guide

1. Teacher informs students about this activity a few days before the implementation.
2. Teacher ensures that the fruit or vegetable plants in the school garden are ready to harvest.
3. Teacher provides the information on nutrition of the fruits and vegetables to be processed.
4. Teacher lets students choose additional fruit or vegetables from outside the school garden if needed.
5. Teacher ensures the availability of space and tools to carry out the activity safely and comfortably.
6. Teacher determines the order of the groups to carry out this activity (randomly).
7. Teacher reminds students about the safety in using the tools.
8. Teacher assists students in documenting the activity.
9. After the activity ends, teacher allows the students to enjoy the drinks they have made and reminds them to clean the classroom

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Mention a variety of fruit and vegetables that can be processed into healthy and refreshing drinks.
- Make their own fruit and vegetable juices from local ingredients.
- Document the activity, add the correct information, and showcase it in an attractive way.

G Materials or tools to be prepared by the school

- **Learning Resources:**
Adolescent Nutrition and Health Book.
Articles related to the topic of discussion (health) from reliable sources.
- **Tools:**
Blender, knives, spoons, glasses, tissue/cloth, etc.
- **Ingredients:**
Fruit, vegetables, water, ice cubes (if necessary), sugar (no more than 1 tablespoon)

Follow-up activity

Encourage students to consume fruits and vegetables on a regular basis and process them into juices as an alternative menu. If possible, the school canteen can be encouraged to provide fruit juices without sugar or with less sugar.

Nutritional content in every 100 grams of vegetable

Crop	Protein (g)	Vitamin A (mg)	Vitamin C (mg)	Calcium (mg)	Iron (mg)
Wheat	11.6	0	0	68	2.8
Rice (white, polished, cooked)	2.2	0	0	7	0.4
Rice (white, polished, raw)	6.8	0	0	19	1.2
Pearl millet, combined varieties, raw	5.7	0	1	18	13.1
Custard apple	1.17–2.47	0.007–0.0018	15–44.4	17.6–27	0.42–1.14
Mangosteen	0.5–0.6	n/a	1–2	0.01–8	0.2–0.8
Persimmon	0.7	n/a	11	6	0.3
Wax apple	0.5–0.7	0.003–0.008	6.5–17	5.6–5.9	0.2–0.82
Jackfruit (pulp)	1.3–1.9	n/a	8–10	22	0.5
Rambutan	0.46		30	10.6	
Durian	2.5–2.8	0.018	23.9–25	7.9–9	0.73–1
Moringa (leaves)	8.6	19.7	274	584	10.7
Okra (fruit)	1.8	0.4	37	44	0.9
Kangkong (leaves)	2.4	0.4	40	220	2.5
Common cabbage	1.7	0.4	49	52	0.7
Mungbean (grain)	23.8	0.02	15	55	2.8
Tomato	0.9	0.2	30	9	0.6
Sweet pepper	4.4	2.5	93	188	2.1
Bird's nest fern (<i>Asplenium australasicum</i>)	2.8	n/a	Very high	Low	Low
Anemone (<i>Nymphoides hydrophylla</i>)	0.7	Medium	Low	Low	Low
Sesbania (<i>Sesbania grandiflora</i>) leaves	8	Very high	Very high	High	Very high
Chinese cedar (<i>Toona sinensis</i>)	6.3–9.8	Medium	Very high	High	High

Source: Hughes and Keatinge (2011), compiled from Australian Custard Apple Growers Association (ACAGA) (2011), Lim (1996), Morton (1987), Yang and Keding (2009), Lin et al. (2009), Institute of Nutrition, Mahidol University (2014), Stadlmayr et al. (2010)

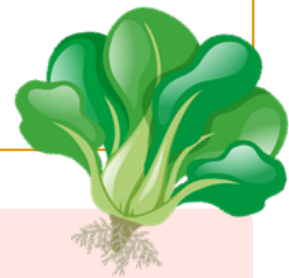
Appendix 1

Examples of fruit-like vegetable juice recipes

1. Avocado-Flavored Mustard Green Juice

Ingredients:

1. 4-5 pieces of mustard green leaves, make sure to wash them thoroughly.
2. 4-5 tablespoons of cleaned and mashed fermented cassava.
3. 1 tablespoon of sweetened condensed white milk
4. 1 teaspoon of sweetened condensed chocolate milk (for topping)
5. Sugar to taste (optional)
6. Ice cubes
7. Water



Instructions A (using raw mustard leaves):

1. Prepare a clean blender which is ready to use.
2. Put the mustard leaves in the blender.
3. Add the fermented cassava, sweetened condensed white milk, sugar (if needed), ice cubes, and boiled water.
4. Blend all the ingredients until smooth.
5. Prepare a clean glass and a clean strainer.
6. Once the blending is finished, strain the juice into a glass.
7. Top the juice with sweetened condensed chocolate milk.
8. Give garnish to taste (Oreo crumbles or other fruits that you like).
9. Avocado-flavored mustard green juice is ready to serve.

Instructions B (using boiled mustard leaves):

1. Prepare a blender which is ready to use.
2. Boil the mustard leaves until they are soft; make sure they are not overcooked.
3. Put the boiled mustard leaves in the blender.
4. Add the fermented cassava, sweetened condensed white milk, sugar (if needed), ice, and boiled water.
5. Blend all the ingredients until smooth.
6. Prepare a clean glass and a clean strainer.
7. After the juice becomes smooth, strain the juice into a glass.
8. Top the juice with sweetened condensed chocolate milk.
9. Give garnish to taste (Oreo crumbles, fruits, raisins or other ingredients that you like).
10. Avocado-flavored mustard green juice is ready to serve. It's best to serve cold.

2. Strawberry-Flavored Tomato Juice

Ingredients:

1. 2-3 slices of fermented cassava.
2. 2-3 tomatoes
3. 1 tablespoon of sugar
4. 1 teaspoon of sweetened condensed milk
5. 1 sachet of milk powder
6. Ice cubes



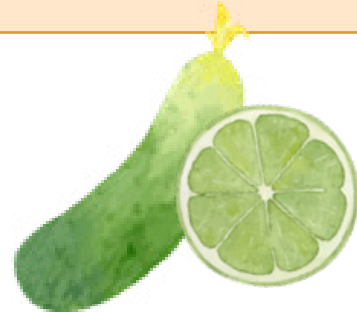
Instructions:

1. Blend all the ingredients until smooth (preferably without water)
2. After the blending is finished, pour the juice in a cup.

3. Cucumber and Lime Juice

Ingredients:

1. Half of cucumber
2. 2 limes
3. 500 ml of water
4. 1-2 tablespoon of sugar



Instructions:

1. Blend all the ingredients until smooth
2. After the blending is finished, pour the juice in a cup.

4. Tomato and Carrot Juice

Ingredients:

1. 1 tomato
2. 1 carrot
3. 500 ml of water
4. 1-2 tablespoon of sugar



Instructions:

1. Blend all the ingredients until smooth
2. After the blending is finished, pour the juice in a cup.

Appendix 2

Example of Student Worksheet

Names of Group Members :

1. _____
2. _____
3. _____
4. _____

Grade: _____

Name of juice recipe:

Tools and ingredients:

Instructions:

Result and Discussion

Ingredients	Nutritional Content

Conclusion

Lesson Plan 16

Slowmation in the School Garden... Let's Try



Grade	: Junior High School Grade 7, 8, and 9
Implementation of Learning	: Intracurricular (ICT/Arts and Craft)
Duration	: 2 class periods (@45 minutes)
Method	: Creating a slow moving animation (slowmation) video with the theme of the school garden

A Learning Objectives

Students will be able to:

- Document harvesting activities in the school garden in photos or videos.
- Present the list of nutritional contents of plants in the school garden through photos or videos.
- Combine the photos or videos into slow motion clips.
- Circulate the work on social media, such as Facebook, Instagram, TikTok, and Twitter.

B Precondition

To implement this lesson plan, the school must have a garden with vegetables and fruits that are ready for harvest

C Summary of Learning Material

Slow-moving animations (slowmation) offer a simple way that allows students to design and create narrated stop-motion animations. Slowmation is played slowly at 2 frames per second to convey a concept or a story. The explanation of the material may use text or music.



Slowmation is an interesting way to deliver a presentation because students are required to carry out an activity or a research project by using technology. In relation to the school garden, a slowmation can describe the nutritional content of vegetables and fruit grown in the school garden, as well as the way of harvesting these plants. The nutritional content to be discussed can be limited to a few nutrients, such as vitamins and minerals found mostly in vegetables and fruit.

Teachers or the student executive body can play the best slowmation clips during the orientation or health education activities.

The main messages to be delivered to the students

- Vegetables and fruits contain various nutrients, especially vitamins and minerals.
- Vitamins and minerals contained in vegetables and fruits vary. Therefore, we must consume a variety of vegetables and fruits to obtain the complete nutrients that our body needs.

C Students' activities

Meeting I

1. Students are asked to sit in groups of 4-5 people.
2. Students listen to the teacher's explanation about slowmation.
3. Students discuss the concept of slowmation that they will make.
4. Students go to the school garden to take pictures/videos as needed. If not finished, the activity can be continued outside the school hours.



Meeting II

1. In groups, students present and display their concept for the slowmation.
2. Students from other groups respond to and assess the result of the slowmation.
3. Students conduct a class discussion.
4. Students and teachers reflect on the learning outcomes in this meeting.

E Teacher's Guide

Meeting I

1. Teacher asks the students to sit in groups of 4-5 people.
2. Teacher explains the technique for creating a short video called slowmation (in the summary of learning material).
3. Teacher directs the students to discuss the concept of a short slowmation video that they will make.
4. Teacher guides the students in groups to prepare for a theme, a series of stories, music, the division of tasks for the group members, etc.
5. Teacher directs the students to the school garden to take the pictures/ videos needed



Meeting II

1. Teacher asks students to present and show their concept for the slowmation.
2. Teacher asks and helps the students to respond to and assess the slowmation of other groups.
3. Teacher assists students in a class discussion.
4. Teacher helps students to reflect on the learning outcomes in this meeting.
5. Teacher gives a reward (i.e., praise or other relevant forms of appreciation) to the well-performing groups.
6. Teacher delivers information on the material in the next meeting

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Carry out an initial documentation of harvesting activities in the school garden.
- Create a slowmation clip about the harvest or the nutritional content of the harvested products in the school garden.
- Present their slowmation to the class and publish it on social media.

G Materials or tools to be prepared

Each group needs to prepare.

- A digital camera or a mobile phone
- A laptop
- Stationery
- Other tools depending on the slowmation plan of the students

Lesson Plan 17

BYO (Bring Your Own) Potluck



Grade : Junior High School, Grade 7 to 9

Implementation of Learning : Habituation Session

Duration : 1 class period (45 minutes)

Method : Organizing a potluck

A Learning Objectives

Students will be able to:

- Express gratitude and appreciation for the food they consume.
- Bring meals from home routinely.
- Share food with one another.
- Apply table manners.

B Precondition

- The school garden has been planted with vegetables and/or fruits
- The teacher has previously explained to the students about the program of BYO (Bring Your Own) Foods a week or few days before the actual session.
- Students are asked to bring meals from home. One of the meals should be made from either an existing food source in the school garden, home garden, or local market.

C Summary of Learning Material

Two important things that need to be instilled in the minds of our students: a) that healthy food does not have to be expensive, and b) that they can prepare healthy food by themselves. Apart from its low cost, self-prepared food can ensure the cleanliness of the ingredients used. Although it has many benefits, bringing food from home has



not become a habit for many students in Indonesia. Various kinds of tasty food (both heavy meals and snacks) are sold anywhere, leading us to think that buying food is more practical than bringing it from home.

There are several things to consider when buying snacks, e.g., the way of serving (preferably in a sealed container to avoid contamination from dust, flies, etc.), the use of food coloring (which indicates the possibility of using dangerous dyes), the food aroma (an unpleasant aroma indicates that the ingredients are not fresh), repeated use of cooking oil, etc. In order to ensure the cleanliness and safety of the food we consume, preparing our own food is recommended.

The main messages to be delivered to the students

- In general, the food prepared at home is more hygienic and healthier compared to food purchased outside the home.
- Eating home-made meals with friends at school is very fun.

D Students' activities

1. Have lunch together (or adjusted to the school's conditions).
2. Students are divided into groups of 4-5 people.
3. Students sit together around the school garden. If it is not possible, choose a place that has a view of the schoolyard or garden. 1-2 students are asked to tell about their meals, including the proportion of the various foods they bring.
4. Students are allowed to exchange or taste meals of one another.
5. After eating together, students must ensure that no trash is found in the area.
6. Students return to the classroom to attend the next subject.



E Teacher's Guide

1. Preparation (before D-day).

- a. If this BYO program will be carried out daily, teacher can use 1 hour of the homeroom teacher's session to announce this program and explain the rules.
- b. If this BYO program will be scheduled for a certain period of time (e.g., once or 3 times a week), teacher can inform the students one day in advance. Teacher can also decide the menu that must be brought to school by the students.
- c. Teacher provides information on the type of food ingredients and the number of food servings recommended for adolescents.
- d. Teacher can also make a special-themed menu, such as vegetables grown in the school/home garden, all-around egg menu, processed tempeh and tofu, stir-fry non-green vegetables, and fish. An example of a BYO schedule for 1 month is available in the appendix. Teacher may invite students to decide on the BYO theme.

2. Potluck

- a. According to a predetermined schedule at the school, teacher guides the students to gather in a comfortable place around the school garden or another possible location.
- b. Teacher invites students to open their lunch boxes and pray before eating.
- c. Teacher asks 1-2 students to tell about the meals they bring (name of food, the rationale of bringing the food, how to cook it, who prepares it).



- d. Teacher reminds students to share with one another so they can try different foods.
 - e. Teacher mingles among students and eats together to establish a closer bond with the students.
3. Closing activity
- a. After eating, teacher reminds the students to clean the area and to make sure that no trash is left behind.
 - b. Teacher guides students to return to their classroom and prepare themselves for the next lessons.

Follow-up activity

- This BYO (Bring Your Own) activity can be continued with: The continuous provision of information on the nutritional value of meals brought by the students.
- A briefing for the canteen owners to provide healthy food that is free from dangerous food additives so that students who cannot bring home-packed meals can buy food in the canteen with guaranteed safety

Appendix 1

Example of Byo Schedule for 1 Month

NO	MENU	Tanggal																														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	Stir-fry green vegetables																															
2	Vegetables soup																															
3	Seafood																															
4	Tempe-based meals																															
5	Carrot-based meals																															
6	Tofu-based meals																															
7	Chayote vegetables																															
8	Corn-based meals																															
9	Egg meals																															
10	Vegetables and meat																															
11	Tubers as substitution to rice																															
12	Students choice																															

Notes:

- The schedule above is only an illustration.
- The implementation time can be adjusted to the school's conditions (daily or scheduled).
- The type of menu and time arrangement can be adjusted to the students' conditions.
- For menu of their choice, students still need to be given directions so that they will bring food in accordance with the guidelines for balanced nutrition or in a composition of food ingredients according to the recommendations of My Plate

Lesson Plan 18

My School Garden Experience



Grade	: Junior High School, Grade 8
Implementation of Learning	: Intracurricular (English Language)
Duration	: 12 class periods (@45 minutes)
Method	: Composing a recount text about the school garden

A Learning Objectives

Students will be able to:

- Understand what a recount text is and retell events that they have experienced in a recount text on the theme of "My School Garden Experience".
- Know the importance of balanced nutrition through a recount text titled "Family Lunch".

B Summary of Learning Material

Recount text is one type of texts introduced to grade 8 students in the English subject. Recount text is a text which retells a series of events that occurred in the past.

In this learning session, students will be given an example of a recount text titled "Family Lunch". Students are asked to read the text and identify any words related to healthy living. They are also asked to identify verbs in the past tense, which characterize a recount text.

Several questions related to the text are provided, along with a dialogue on the theme of food or health, to re-emphasize the importance of balanced nutrition to the students. After students learn from the text, they compose their own recount text about "My School Garden Experience".



The main messages to be delivered to the students


- In general, the food prepared at home is more hygienic and healthier compared to food purchased outside the home.
- Eating home-made meals with friends at school is very fun.

C Students' activities

1. Students receive a recount text titled "Family Lunch".
2. Students read the text carefully and identify any words related to health/ healthy food.
3. After marking the words, students look for the meaning of the identified words.
4. Under the teacher's guidance, students compose a recount text about "My School Garden Experience".

D Teacher's Guide

1. Teacher prepares a recount text for reading.
2. Teacher implements an apperception on the theme of "Family Lunch".
3. Teacher asks students to mark several words and look for their meaning in Indonesian.
4. The words that must be marked by the students are;
 - a. Verbs in the past tense
 - b. Words related to health/healthy food
5. Teacher guides the students in working on the reading comprehension questions.

- 
6. Teacher directs students to write a recount text titled “My School Garden Experiences” that describes the students’ experiences in taking care of the school garden.
 7. In this learning process, teacher may assess:
 - a. Students’ attitude (honesty, discipline, responsibility, cooperation, tolerance, politeness, responsiveness, confidence).
 - b. Any other appraisals according to the assessment required for the English subject

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Understand a recount text.
- Compose a recount text about “My School Garden Experience”.

G Materials or tools to be prepared

Learning Resources

- Adolescent Nutrition and Health Book
- Articles related to the topic of discussion (health)
- Online articles
- Photos/pictures from www.pinterest.com and www.google.com

Tool

- Laptop
- Projector
- Internet connection
- Worksheet



Follow-up activity

- Students' understanding about nutrition and health will continue to be improved after this English material is finished being taught. Education on nutrition and health will be integrated into other material if possible.
- Students might be given assignments related to nutrition and health issues, such as making posters, daily menus, or shopping lists in English.

Appendix 1

Read the text

FAMILY LUNCH

Last Sunday, I & my mother had rice and omelet for breakfast, but mother wanted to make something special for our lunch so she asked me to join her to the market.

We bought some fruits, vegetables, meat and other things for our family. The market was crowded with people. I saw many different stalls selling different things in the market.

We bought fruits in a fruit stall. There are many kind of fruits such as dragon fruits, oranges, watermelons, apples and star fruits. All member of my family love to eat fruits because they have lots of vitamins and minerals.

My mother wanted to make soup, so we went to a green grocer. We got many kinds of vegetables there. Similar to fruits, vegetables also contains a lot of vitamin and minerals.

We also went to a butcher who sold fresh meat. Meat is a good source of protein. Mother said that soup can make us warm, it is good for our body.

Our body have to be supplied with balance nutrition. Good nutrition can make our body healthy and strong.



After we had all stuffs that we need, I helped my mother to carry some of the shopping bags. We went home to prepare foods for our lunch. Mother cooked our favorite food, beef soup and tempe mendoan.

- A. Mark the word in the text above that relates to health/healthy foods.
- B. Write all the verbs you find in the text.
- C. Find the meaning of the words you find in part A and B.
- D. Practice this dialogue with your partner!

x : I'm thirsty. Can I have a glass of ice tea, please? y : Sure, Just a minute, please !

y : OK

x : Can I have some candies ?

y : Oh, sorry. No more candies. They are not good for your health

x : Thanks for your advice.

y : Ok

A. Exercise!

- 3. x : What do you usually have for breakfast ? y : I have
 - a. A plate of rice and eggs
 - b. A bowl of rice and omelets
 - c. A plate of rice and omelets
 - d. A bowl of rice and eggs
- 4. This fruit is orange or yellow. It has a green crown. It tastes sweet. It doesn't have seeds. People like to make jam from it. What fruit is it ?
 - a. Orange
 - b. Banana
 - c. Strawberry
 - d. Pineapple
- 5. Selly : Do you mind if I eat the ice cream now ?
Dilla : Just enjoy it.
 - a. Not at all
 - b. Of course
 - c. Sure
 - d. Wait a minute
- 6. Which one is the odd one out in this group ?
Lettuce Cauliflower Pear Cabbage
 - a. Cauliflower
 - b. Lettuce
 - c. Pear
 - d. Cabbage



7. x : Dika is Can he have one portion of meatballs with noodle and Chinese cabbage??
y : Sure.
a. Thirsty b. Hungry c. Sleepy d. Angry
8. This is a healthy food. It is a fruit. It is small and round. It is purple in color. We usually buy the fruit in a bunch. What fruit is it?
a. Pineapple b. Grapes c. Apple d. Star fruit

B. Exercise!

Write your own "My School Garden Experience".

Lesson Plan 19

Simple Food Technology



Grade	: Junior High School, Grade 9
Implementation of Learning	: Intracurricular (Science)
Duration	: 3 class periods (@45 Minutes)
Method	: Processing vegetables and fruits harvested from the school garden by using food processing technology

A Learning Objectives

Students will be able to:


- Acquire the skill in using a simple food processing technology for vegetables and fruit harvested from the school garden
- Describe the nutritional contents of food products
- Serve food products in a creative and interesting way.

B Precondition

- To implement this lesson plan, the school should have a school garden planted with vegetables and fruits that are ready for harvest.
- If the vegetables and fruits in the school garden are not ready for harvest, students are asked to bring some from home.
- Students are also asked to bring the tools and materials needed to process the food.

C Summary of Learning Material

There are many types of food technology, ranging from the simple to the sophisticated ones. One example of a simple food biotechnology is the production of pickled vegetables or pickled/sweet-fermented fruit. Processing vegetables and fruit into



sweets or pickles can extend the shelf life of the vegetables and fruit. The raw materials for making pickles can be a fruit and vegetable grown in the school garden, such as mangoes, mustard greens, cucumber, and cabbage.

The main messages to be delivered to the students

- A simple food processing technology can increase the shelf life and the variety of flavors of vegetables and fruit.

D Students' activities

Meeting I

1. Students listen to the teacher's explanation about food processing technology.
2. Students are divided into several groups of 4-5 students.
3. Students go to the school garden to harvest the vegetables and fruits.
4. Students prepare the tools and materials they bring from home, such as cooking utensils, fruit and vegetables harvested from the school garden, yeast, and other ingredients (based on the food recipe).
5. Students do the food processing.
6. After the food processing is finished, students clean the place and the tools.
7. On the worksheet, students write the name of the food, the materials and the tools used, and the steps to process the food.
8. Students bring the food products to their home for further storage/processing until the pickled/sweet-fermented fruit/vegetables are ready for consumption.
9. The food production process is documented as photos or videos.




Meeting II

1. Students present their processed food.
2. Students taste the foods made by other groups.
3. Students give a score or comment on the other groups' food.
4. Together with the teacher, students conclude the learning outcomes of this session.

E Teacher's Guide

1. Teacher asks students to sit together with their respective group members (arranged in the previous meeting).
2. Teacher informs students again about the activity to be conducted.
3. Teacher asks students to show and prepare the tools and materials they bring from home.
4. Teacher explains the instructions or procedures in making food products by using a simple food processing technology (see the example in the appendix).
5. Teacher assists and helps the students in processing the food.
6. Teacher requests and accompanies the students to clean up the place and tools after the food processing is finished.
7. Teacher asks students to write down the name of the food product, the natural preservatives (sugar, salt) used, the material and tools used, and the steps to make the food on the provided worksheet.

- 
8. Teacher asks students to present their processed food.
 9. Teacher asks and helps students to give a score or comment on the other groups' food.
 10. Teacher and students conclude the learning outcomes of this session.
 11. Teacher gives appreciation (e.g. praise or other relevant forms of appreciation) to the well-performing groups.
 12. Teacher encourages students to always be grateful for God's gifts in the form of various vegetables and fruits and asks students to consume vegetables and fruits every day and to be creative in processing food

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Make a food product from vegetables or fruits harvested from the school garden using a simple food processing technology.
- Mention the nutritional contents of the food products they processed
- Serve the food products in a creative way.

G Materials or tools to be prepared

- The recipe on how to make the food products
- The worksheet

Appendix

Examples of some recipes of simple food processing technology for vegetables and fruit



1. Sweet-fermented mangoes

Ingredients:

1. 500 grams of unripe mangoes, slice accordingly
2. Lime betel, dissolved it with water
3. Ingredients A
4. 125 grams of sugar
5. 75 ml of water
6. Salt to taste
7. Ingredients B
8. 150 grams of sugar
9. 300 ml of water

Instructions:

1. Soak the chopped mangoes in the solution of lime betel for about 30 minutes.
2. Wash the soaked mangoes until completely clean. If not thoroughly washed, the remaining lime betel may cause bitter taste.
3. Once they are clean, put the mangoes into a glass jar and seal it tightly. Set aside.
4. Mix ingredients A. Then bring it to a boil. Cool it down.
5. Once it is cool, pour solution A into the jar filled with the mangoes. Leave it overnight.
6. After one night, take out the mangoes in the jar and drain them.
7. Mix ingredients B. Bring it to a boil. Cool it down.
8. Prepare a new jar. Pour in the mangoes and solution B that has cooled down.
9. Put the jar in the refrigerator and wait for it to cool.
10. Sweet-fermented mangoes are ready to serve.

2. Sauerkraut

Tools and Ingredients:

1. Fresh cabbage
2. Knife
3. A clean, closed jar or container
4. Plastic
5. Salt and water



Instructions:

1. Prepare about 1-2 kg of fresh cabbage. Chop/slice it into pieces and place it in a clean, closed container, such as a jar. Make sure the jar is clean and dry.
2. Add 3 tablespoons of table salt per 2 kg of cabbage.

3. Stir the salt and cabbage while squeezing it until the water comes out.
4. Fill the plastic with enough water and tie it. Place it on top of the cabbage to add some weight and then close the container.
5. Store it at room temperature in a clean, dry place for 3–5 days. Measure the degree of acidity by using a pH paper. The process is completed when it becomes sour. More spices can be added as desired.

3. Pickled mustard

Ingredients:

1. Mustard greens
2. Fine salt and coarse salt
3. Sugar
4. Cooled boiled water



Tools:

1. plastic basin or another container made of clay soil, plastic, or glass.
2. bamboo tray or mat
3. ballast stone/plastic filled with water to add some weight
4. bamboo rope/hemp rope



Instructions:

1. Cut the mustard greens into pieces, slice by slice. Then wash and drain them on a bamboo tray or mat.
2. Dry the mustard greens under the sun for 2 hours. If the weather is cloudy, the mustard greens can also be placed on a bamboo mat for 12 hours at room temperature.
3. For perfect drying and to prevent the mustard greens from rotting, add coarse salt to the mustard leaf sheets. Then squeeze slowly until the salt is evenly distributed.
4. The squeezed mustard greens are then rolled with a bamboo rope. Then squeeze the water out of the rolls.
5. Prepare a soaking solution made of fine salt in the amount of 2.5 percent from the weight of mustard greens used and sugar in the amount of 1-3 percent. Dissolve the salt and sugar in cooled boiled water. Sugar acts as food for bacteria, while salt is used to speed up the fermentation process, improve the taste and texture, and act as a preservative.
6. Arrange the rolls of mustard greens in a jar or another container and then soak them in a solution of salt and sugar that has been prepared. Add some weight on it so that the mustard greens and all the rolls are soaked fully.
7. Close the jar tightly so that microbes, air, or dirt and dust do not get into the container. If the container is not tightly closed, the pickled mustard will rot.
8. Keep the fermentation process for 2-3 days. Then the mustard greens are ready to eat fresh or processed into a mixture of pickles, stir-fry with tofu, shrimp, meat, or meatballs, sweet and sour salted vegetables, etc. The salted mustard will last for 7 days after the end of fermentation. If it is soaked in the solution for a longer period, the fermentation process will continue, resulting in sourer taste and decreased smell of the alcohol.



Examples of some recipes of simple food processing technology for vegetables and fruit

Names of Group Members :

1. _____
2. _____
3. _____
4. _____

Grade: _____

▶ Name of Food

▶ Tools and ingredients

▶ Instructions

▶ Results and Discussion

Lesson Plan 20

Balanced Nutrition for Adolescents



Grade : Junior High School, Grade 7-9

Implementation of Learning : Habituation Session

Duration : 2 class periods (@45 Minutes)

Method : Creating a menu and cooking

The lesson plan refers to Indonesian context. Therefore you may need to adjust it with Food Pyramid or Food Guide of your country

A Learning Objectives

Students will be able to:

- Create a one-day menu in accordance with the principles of balanced nutrition
- Cook one of the prepared menus.

B Precondition

- The vegetable plants in the school garden are ready for observation activities.

C Summary of Learning Material

The Indonesian Ministry of Health defines balance nutrition as a daily food composition which contains an amount and type of nutrients that meet the body's needs to stay healthy. Balance nutrition considers the principles of food diversity, physical activity, hygiene practices, and the maintenance of a normal body weight to prevent nutrition problems (The Indonesian Ministry of Health, 2014). Optimal nutrition is essential for optimal growth as well as physical and cognitive development in all age groups. A school garden can be used as a source of various foods rich in different nutrients.

Reference: <http://gizi.depkes.go.id/download/Pedoman%20Gizi/PGS%20Ok.pdf>



The nutrition adequacy for adolescents can be fulfilled with a diverse diet and balanced nutrition. Menu modifications are made to processed food by taking into account the amount of intake to suit the nutritional needs of people in that age.

The benefits of balanced nutrition for adolescents are

- Supporting concentration in learning
- Doing various activities optimally (studying, socializing, etc.)
- Achieving optimum physical growth and development, including during puberty


The guidelines for balanced nutrition and the recommended dietary patterns are explained in the section of "Meeting the Nutritional Requirements of School Children through Balanced Nutrition" at the beginning of this module

The main messages to be delivered to the students

- During puberty, adolescents experience physical growth and sexual maturation, so the consumption of a balanced nutrition is crucial. A balanced diet includes sources of carbohydrates, protein, fat, vitamins, and minerals as advised.
- Consuming a variety of foods is highly recommended to achieve balanced nutrition.

D Students' activities

1. Students listen to the teacher's explanation on balanced nutrition and its importance for adolescents, and the potential of the school garden to be planted with food sources to provide balanced nutrition.
2. Students are divided into groups of 4-5 people.
3. Students gather information from books and the Internet about balanced nutrition for adolescents.

- 
4. Students create a one-day menu for breakfast, lunch, and dinner based on the principles of balanced nutrition with ingredients from the crops in the school garden.
 5. Students present their one-day menu.
 6. Students discuss the menu created by the other groups.

E Teacher's Guide

1. Teacher explains the material on balanced nutrition and its importance for adolescents, and the potential of the school garden to be planted with food sources to achieve balanced nutrition.
2. Teacher divides students into groups of 4-5 people.
3. Teacher assists the students in gathering information from books and the Internet about balanced nutrition for adolescents.
4. Teacher assists the students in creating a one-day menu for breakfast, lunch, and dinner based on the principles of balanced nutrition with ingredients from the crops in the school garden.
5. Teacher assists students in presenting their one-day menu.
6. Teacher moderates the class discussion

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Create a healthy one-day menu based on the principles of balanced nutrition with ingredients from the plants in the school garden.
- Cook one of the menus.

Appendix

Student Worksheet

Balanced Nutrition For Adolescents My Healthy Menu For A Day

Names of Group Members :

1. _____
2. _____
3. _____
4. _____

Work Guidelines:

1. Together with your group, make a healthy one-day menu for breakfast, lunch, and dinner based on the principles of balanced nutrition with ingredients from the plants in the school garden.
2. Cook one of the menus (breakfast/lunch/dinner). Attach the photo of your cooked dish in the following table
3. Provide the nutritional information contained in each menu served

Table of healthy and nutritionally balanced menu

Meal time	Name of Food	Ingredients	Photos of Food served	Nutrients contained in the menu
Breakfast				
Lunch				
Dinner				
Nutritionally balanced snack				



Nutrition Education Lesson Plans for Senior High Schools



Nutrition Education Lesson Plans for Senior High Schools

Lesson Plan 21

My Excellent Food, My Excellent Nutrition



Grade	: Senior High School, Grade 11 Math & Science / Cross-major
Implementation of Learning	: Intracurricular (Biology)
Duration	: 2 class periods (@45 minutes)
Method	: Identifying the nutritional contents of food crops in the school garden


A Learning Objectives

Students can explain the nutrients contained in food crops grown in the school garden and explain their functions for the body

B Summary of Learning Material

The consumption of various types of nutritionally balanced foods is necessary for adolescents to achieve optimal growth and development. Balanced nutrition consists of 3 main nutrients, namely energy substances (carbohydrates and fats), building blocks (proteins), and regulatory substances (vitamins and minerals).

1. Carbohydrate is a compound consisting of carbon (C), hydrogen (H), and oxygen (O). The general formula of carbohydrates is $C_nH_{2n}O_n$.
2. Fat is composed of carbon atoms (C), hydrogen (H), and oxygen (O). Fat/oil is a combination of glycerol and fatty acids.

- 
3. Protein is a macro-molecule consisting of long chains of amino acids bound to each other in peptide bonds. It is composed of carbon atoms (C), hydrogen (H), oxygen (O), and nitrogen (N).
 4. Vitamin.
 - c. Water-soluble vitamin, namely vitamin B complex, which consists of B1 (thiamine), B2 (riboflavin), B3 (niacin), B5 (pantothenic acid), B6 (pyridoxine), B11 (folic acid), B12 (cyanocobalamin), vitamin H (biotin), and vitamin C (ascorbic acid).
 - d. Fat-soluble vitamin, namely vitamin A (retinol), D (calciferol), E (tocopherol), and K (anti-diumrol/menadione).
 5. Mineral
 - e. Macro-minerals are needed in a large amount by the body, for example, Na, Cl, K, Ca, P, Mg, and S.
 - f. Micro-minerals are needed in a small amount by the body, for example, Fe, Zn, I, Se, Mn, F.


Some of the food crops which are sources of the above nutrients can be found around us, including in the school garden. Tubers, vegetables, fruit, etc. can be planted in the school garden.

The main messages to be delivered to the students

- A balanced diet consists of carbohydrates, protein, fat, vitamins, and minerals in a sufficient amount that fulfills the body's needs.

C Students' activities

1. Students are divided into groups of 4-5 people.
2. Students identify and collect various food crops from the school garden.
3. Students gather information from various literature about the nutritional contents of the food crops as well as their functions for the body.
4. Students design creative nutrition education messages, for example, pop-up cards in the shape of fruits and vegetables
5. Some groups present the results of their discussion, and the other groups give their responses. The group to present their discussion results can be randomly assigned by the teacher.

- 
6. Students discuss the presentations of other students and if there are any different opinions among the groups, students can discuss this with the whole class.

D Teacher's Guide

1. Teacher explains the learning objectives.
2. Teacher divides the students into groups of 4-5 people and explains the group assignment.
3. Teacher accompanies students when they are in the school garden.
4. Students are asked to make a pop-up card in the shape of a fruit or a vegetable which contains information on its benefits and nutritional contents to enrich students' nutritional knowledge and foster their creativity.
5. Teacher assists the students in designing creative nutrition education messages from the pop-up cards made previously to be handed to their friends.
6. Teacher guides the students in making conclusions.
7. Teacher ends the session by re-emphasizing the nutrient requirements for adolescents to stay healthy and achieve optimum growth.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Identify and explain the nutrients contained in various food crops and their functions for the body
- Design creative nutrition education messages.

G Materials or tools to be prepared by the school

- A variety of food crops planted in the school garden. If the school garden does not have that many food crops, the students are asked to bring some whichever is available from home
- The tools and materials needed to make pop-up cards (i.e. pencils, scissors, glue, cardboard, and colored paper) or other forms of nutrition education.
- Student worksheet.

Appendix

Student Worksheet on Nutrients

1. Fill in the following table with the type of food crops that you get from the school garden

No.	Name of food crop	Edible parts of the food crop (leaves/stems/fruits/tubers/flowers)	Nutritional contents	Its function for the body	Examples of dish that can be made from the food crop
1					
2					
3					
4					
5					
6					
7					
8					

2. Gather photos/pictures of the food crops and examples of dish that can be made from them.
3. Design an interesting nutrition education message, for example, a pop-up card. Here are the instructions to make a pop-up card:

- Prepare the necessary tools and materials.
- Make a frame for the pop-up card using cardboard; adjust the size accordingly.
- Make the pop-up card in the shape of various fruits or vegetables. Let's use red apples as an example.
- Cut out the shape of a red apple pattern. Make 2 patterns.
- Glue the two patterns together to form the red apple and then glue one side to the cardboard.
- Decorate the pop-up card with patterns of other parts of a red apple, such as a stalk, leaves, and seeds.
- Provide information at the bottom of the apple-shaped pop-up card, for example, the benefits of apples and the nutrients they contain.
- Add interesting nutrition education messages to convey to classmates.
- Once finished, make more pop-up cards in the shape of other fruits, such as pears, watermelons, and guavas, and various vegetables.

Appendix 2

Make a pop-up card:



Lesson Plan 22

My Self-Grown Fruit is Delicious



Grade : Senior High School, Grade 10 and 11

Implementation of Learning :

Duration : 2 class periods (@45 minutes)

Method : The practice of planting using the grafting technique

A Learning Objectives

Students will be able to:

- Learn and experience about grafting technique in propagating plants
- Know the health benefits of fruits and be encouraged to consume them regularly.

B Precondition

- In the school garden, there must be fruit plants in sizes that are ready to be used for grafting.
- There should also be spare wood or bamboo sticks to support the grafted plant. If the rootstock is too tall, grafting can also be done in a hanging position.
- During last class session, students have been assigned to bring the following tools: Knives/cutters, branch scissors, nails of 3-5 cm in size, hand saws, plastic rope, and thin plastic/cellophane tape



C Summary of Learning Material

According to the national survey results of Indonesian Basic Health Research in 2013, the consumption of fruits and vegetables among adolescents is still low. Fruits and vegetables contain vitamins and minerals that are highly beneficial for health. Despite this benefit and the appetizing taste of fruits, increasing the fruit consumption among children and adolescents is not easy. Oftentimes, their favorite fruit is not grown in their surroundings. In addition, the price and the availability of fruit in the market are considered among the underlying factors why fruits are rarely consumed by children and adolescents.

Thus, there is a need to make fruits more available and affordable. One strategy that can be done is to grow fruit plants in the school area or at home for those who have a yard. However, planting fruit trees is considered quite difficult so it is necessary to find a simple and quick technique for growing them. One of the fruit-planting techniques that can be done is the grafting technique.

The advantage of the grafting technique is that it can help shorten the fruiting period of a plant. Fruit plants, such as longan, star fruits, rambutan, and durian, have their first fruiting period of 5-7 years. With the grafting technique, the first fruiting period can be shortened to 1-3 years. Then, the grafted plants can be planted in pots (tabulampot), so they do not require large areas of land and can be used as ornamental plants. This technique can also help overcome the problem of pests and diseases in plants that can cause growth disorders or even plant death. In addition, with this technique, if the plant is attacked by pests and diseases, the plant does not need to be dismantled or replaced by a new plant.

The material in this lesson plan is expected to provide students with the experience of growing fruit plants with planting techniques that produce fruit more quickly. Thus, students are expected to like and be more interested in consuming fruit.

The main messages to be delivered to the students

- Growing fruit plants using the grafting technique will shorten the period for the plants to produce fruits.
- By consuming the fruits harvested from the plant tree they grafted, the students are expected to feel proud of their work and would be encouraged to consume fruits more regularly.



D Students' activities

Meeting I

1. Students are introduced to the general type of fruit plants that are quite challenging to plant in the area where they live (such as longans, rambutan, star fruits, watermelon, melon, guava, and oranges) and the factors behind the challenges, such as the availability of seeds and a long waiting period for the first fruiting to occur.
2. Students listen to an explanation on the nutritional contents and benefits of fruits for health.
3. Students are divided into several groups of 3-5 people.
4. Students prepare the tools and materials assigned to them to bring to school.
5. Students pay attention to the teacher's demonstration on how to prepare the wood to support the plant segments and how to select the segments for grafting, as follows:
 - Select two healthy plants to be grafted together, one to serve as the rootstock and the other as the source of stem to be used as scion. The rootstock and the scion should have similar diameter of ± 1 cm (see the precondition notes).
 - Cut the stem that would serve as scion from its mother plant, approximately 30 cm from the ground/base of the lower stem.
 - The rootstock to be selected shall be a young stem of a tree that has already produced fruit, with the same stem diameter as the scion.
 - Cut the side of the rootstock in a diagonal direction about 2-3 inches long using a sharp knife or cutter.
 - Make a wedge cut on both sides of the base of the scion to match the cut in the root stock.
 - Insert the scion in the cut portion of the rootstock and make sure that they fit well together.
 - After the rootstock and the scion are neatly/tightly connected, wrap the union using a thin plastic or cellophane tape.

- To prevent the grafted plant from being broken by the wind, we may support it with a round bamboo stem with a diameter of approximately 1 cm, which is tied to the stem of the scion or rootstock using cellophane tape.
6. In groups, students are assigned to practice the grafting technique on their own.
 7. Students are asked to provide identity labels, such as the date of grafting and the name of the group, on the grafted plant of each group.
 8. Each member of the group is assigned to take care of the grafted plant as scheduled, such as watering, cleaning the new buds that grow from the stem of the scion, etc. Students are also asked to fill out the Observation Table (see Appendix).

Picture 1. How to cut the plant segments (scion and rootstock) for grafting



Picture 2. Grafting process



Meeting II

1. During the growing period of the grafted plant, the students attend meetings to discuss the progress.
2. Students receive an explanation from the teacher about the variety, type, and quality of fruit harvested through the grafting technique, the nutritional contents and benefits of fruits and vegetables for health, and the recommended daily intake of fruits and vegetables.
3. Students are requested to deliver a group presentation regarding their grafted plant (e.g local fruit or fruit which is rarely found or difficult to grow in their area), the nutritional contents and benefits of the grafted fruit for health, the progress of the grafted plant, the problems faced, as well as their opinions about and impressions on doing the grafting technique and taking care of the plant
4. If necessary, students may receive a performance score to be shared with teachers of the relevant subjects.

Picture 3. Example of the grafting result between longan and star fruit plants




Picture 4. Longan potted plant that bears fruit



E Teacher's Guide


Meeting I

1. Before starting the learning session, teacher should prepare several kinds of fruit plants to be used as the rootstock, as well as the tools and materials needed as a supporting wood in the school garden.
2. Teacher introduces a variety of fruit plants which are generally difficult to grow in the area (e.g. longan, rambutan, star fruits, watermelon, melon, guava, oranges), along with the factors that make these plants difficult to grow, such as the availability of seeds and the long waiting period of the first fruit to produce.
3. Teacher explains in general about the nutritional contents and the benefits of fruit for health.
4. Teacher divides students into several groups of 3-5 people
5. Teacher requests the students to prepare the tools and materials previously assigned to them to bring to school and accompanies them to go to the school garden.

- 
6. Teacher demonstrates how to prepare the wood to support the scion and select the plant segments for grafting (see point 5 in the students' activities)
 7. Teacher distributes fruit plants to be used as the rootstock to each group (the plants are different for each group).
 8. Teacher asks and assists students to practice the grafting technique. Teacher must monitor students when they are using tools, such as hand saws, media-size hammers, nails, and cutters.
 9. Teacher asks students to give identity labels, such as the date of grafting and the name of the group, on the scion of each group's plant.
 10. Teacher assigns to students the task of tending the plant and requests each group to create a schedule for each group member, such as watering, cleaning new buds that grow from the stem of the scion, etc. The teacher explains how to fill out the Observation Table (see appendix).

Meeting II

1. Teacher asks the students to discuss the progress of their grafted plant.
2. Teacher explains the following information:
 - a. The type and quality of fruit produced using the grafting technique are similar to the fruit produced by the rootstock, yet the fruit is produced within 1-3 years, which is sooner than the period needed for the rootstock.
 - b. Fruit is the main source of vitamins and minerals which are essential nutrients for the growth and general health of adolescents.
 - c. The consumption of fruit and vegetables is an important dietary recommendation for Indonesians, especially adolescents. The recommended fruit consumption is 2-4 servings per day.
 - d. The practice of planting and grafting is expected to incite students' interest in consuming fruit at least once a day.

- 
3. Teacher asks students to deliver a group presentation about their grafted plant, its nutritional content and benefits for health, the progress of the grafted plant, the challenges faced, and their opinion about doing the grafting technique and taking care of the plant.
 4. If necessary, teacher may provide a performance score (see in the appendix of Guidelines for Observation/Performance Assessment) for students to be shared with teachers of the relevant subjects.
 5. Observations of the progress may continue until the harvest time, subject to the school's conditions (hopefully students who do the grafting have yet to graduate). Teacher expresses their pride towards the students' efforts in planting, tending, and harvesting the fruit from the grafted plant.
 6. Teacher invites the students to eat the fruits together and emphasizes the benefits of fruit for adolescents, while encouraging all students to consume fruit more regularly.
 7. If possible, the fruit can be further processed either into fruit juice or fruit salad.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Learn and experience about the grafting technique for propagating fruit trees
- Know the health benefits of fruits and be encouraged to consume them regularly.

G Materials or tools to be prepared by the school

- The plants for the rootstock (expected to be available at schools, depending on the conditions of each school).
- Planting media, i.e. soil and compost (this material could be produced by the Compost Working Group, if any) and manure.
- Plant-supporting tools (wood/bamboo).

- Tools that may be difficult for the students to bring by themselves (hand saws, medium-sized hammers, nails, cutters, scissors, cellophane tape of 1-2 cm wide).
- Polybag.

Picture 5. (A) Rootstock that has produced fruit; (B) Scion for the grafting;
(C) Some tools needed



Picture 6. Stem selection for grafting



Appendix I

Observation Table

(filled out by students)

Group :

Names of Members :

1. _____
2. _____
3. _____
4. _____

No.	Day, Date	Observation Result/Action	Name of Person on duty	Signature of Person on duty	Teacher's initial
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
Etc.					

Notes:

1. Observations can be carried out once every 2-3 days, not every day.
2. If the observer does certain treatment to the plants, it has to be recorded on this sheet.
3. Students' performance can be assessed from the participation of each group member.

Appendix II

Guidelines for Observation/Performance Assessment

(filled out by teacher)

No	Student's Name	Assessed Aspect				Total	Average	Notes
		Diligence and active role in every activity	Teamwork in group	Submit assignment in time	Assessment of work results			
1.								
2.								
3.								
4.								
5.								
6.								
7.								
Etc.								

Notes:

Very good (AB) = (90 – 100) = 4

Good (B) = (75 – 89) = 3

Fair (C) = (63 – 74) = 2

Poor (D) = (< 63) = 1

Lesson Plan 23

My Vegetables, My Work, My Health!



Grade	: Senior High School, Grade 10
Implementation of Learning	: Senior High School grade 10 and 11
Duration	: 2 class periods (@45 minutes)
Method	: Planting vegetables directly in plots or polybags

A Learning Objectives

Students will be able to:

- Plant vegetables directly in soil plots and in polybags with soil.
- Know the nutritional contents and benefits of vegetables for health.
- Be more interested in consuming self-grown vegetables to increase their nutrition intake.

B Precondition

In order to implement this lesson plan, planting plots have been done prepared before the session. Moreover, the planting media, manure (compost), and polybags, and vegetable plant seeds (in small polybags) should also be ready during the actual activity. For students, this activity may be considered as a hard work that may lower their interest in doing further gardening activities. Therefore, other school personnel are needed to do the land preparation, while the students will focus on sowing the seeds.

C Summary of Learning Material

Many students and adolescents do not like eating vegetables although they are packed with nutrients, such as vitamins and minerals, that are highly beneficial for health.



Green vegetables, for example, are rich in iron, which plays significant role in growth and concentration in learning.

Several studies show that giving the students an experience to grow vegetables can increase their enthusiasm about vegetables and results in higher interest for them to consume vegetables.

In Indonesia, students are generally not aware that growing vegetables is an easy and fun activity. Students can be introduced to simple techniques of vegetable cultivation. By growing their own vegetables with these simple techniques, they may feel proud of themselves and are encouraged to consume vegetables.

After students start the activity by preparing the land or polybags, students are invited to carry out the planting. Students will have their own area of planting according to their respective groups. Every day, students monitor the progress of their plants until the harvest time comes.

Taking care of the plants can nurture students' sense of responsibility, care about the plants, pride in the consumption of their self-grown vegetables. The experience and pride in their success of growing vegetables can be passed on to their families and, later on, may improve the family's awareness of and preference for consuming vegetables. Besides, planting vegetables at school or home can beautify and cool down the surrounding environment

The main messages to be delivered to the students


- Growing vegetables is simple and easy. Vegetables need to be taken care of to grow well and have good quality for consumption.
- In addition to being food sources, vegetable plants can be used as decorative plants in the school or home yard.
- The harvested products can be consumed to increase our nutritional intake.



D Students' activities


Meeting I

1. Students listen to the teacher's explanation about easily grown vegetable plants, their nutritional contents in general, and their benefits for adolescents' health.
2. Students are divided into several groups of 3-5 people.
3. All groups receive an explanation about the tools and materials, as well as the procedures before doing the planting.
4. Each group is assigned with a specific area of land or a polybag as media for planting vegetables.
5. Each group is provided with several kinds of ready-to-plant vegetable seedlings (in small polybags). If possible, students may choose the kinds of vegetable they prefer to plant.
6. Guided by the teacher, students prepare the soil as planting media in a polybag in the following procedure:
 - a. Mix the soil and fertilizer (compost or organic fertilizer) with a ratio of 2:1 (e.g., 2 kg of soil and 1 kg of fertilizer).
 - b. Put the soil and fertilizer mixture into a polybag or another container (e.g., plastic pots, used plastic buckets, used mineral water bottles, etc.)
7. Guided by the teacher, students start the planting in the following procedure:
 - a. Transfer the vegetable seedlings (in small polybags) to the soil planting media (point 6) in a larger polybag or another container. This transfer can be done by tearing or pulling the plastic polybag of vegetable seedlings and then move them along with the soil into the planting media in the larger container.
 - b. Take care of the plants until they are ready for harvest.

- 
8. Each group member is obliged to take care of, monitor, observe, and make reports on the progress of their plants. Students can decide to perform other necessary activities such as weeding the grass (if any), cutting dry leaves, or pruning new stems so that the plants will produce fruit quickly (for example, for cayenne pepper).
 9. If plants are attacked by pests, students are encouraged to use environmentally friendly pesticides, for example, the ones from fermented plants (can be made on their own in the Biology Laboratory). Students should be encouraged to have their plants grow organically by not using any chemical fertilizers or pesticides

Meeting II

1. During the growing period of the plants, students attend one meeting to discuss the progress of their vegetable plants.
2. Students are also provided with the following explanation:
 - a. Growing vegetables is not difficult and does not require a large area.
 - b. In taking care of the plants, students need to patiently water them, protect them from the pests, do weeding, do pruning of the growth of new stems on some plants, such as cayenne pepper, put up wood/bamboo to support the vines, and others. In addition, talking about something nice to the plants is believed to help the plants to grow well. All of these efforts are not difficult to do and worth trying.
3. Students may be invited to discuss the possibility of planting vegetables at home. Beautifully-arranged and well-grown vegetable plants can be used as decorative plants to make the school and home yard look good.
4. Students receive an explanation on the vitamins and minerals contained in some vegetables and their benefits for adolescents' growth, general health, and better concentration. Subsequently, teacher explains that the consumption of fruits and vegetables is highly recommended for Indonesians, especially adolescents. The recommended vegetable consumption is 3-4 servings per day. Teacher encourages students to consume vegetables regularly at least in every meal (3 times a day).

- 
5. Students share their experience of doing this activity, including the possibility to plant vegetables at their home. The teacher confirms the problems faced by students from the seeding, planting, through the maintenance stage. They can also be asked to deliver presentations in groups.
 6. If necessary, the students' performance can be evaluated using the provided evaluation sheet (appendix 2 on Guidelines for Observation/ Performance Assessment) to be shared to teachers of the relevant subjects

E Teacher's Guide

Meeting I

1. Teacher introduces some types of easily grown vegetables, such as water spinach, spinach, bok choy, mustard greens, curly lettuce, and cayenne pepper. If students already have an interest in gardening, they may be introduced to other plants which require more treatment, such as tomatoes, eggplant, bitter melon (all of these three are vine-type vegetables), celery and leeks (that require specific attention with regard to watering), and carrots (which generally grow well in highland areas).
2. Teacher also describes the general nutritional content and benefits of fruit for health.
3. Teacher briefs the students that gardening is a very fun activity and does not always require a large area. Apart from producing vegetables for own consumption or selling, the garden can make the school and home yard look green and beautiful. Gardening is also one kind of physical activity which is good for the students' fitness. Other than that, gardening is not a tough labor but, rather, a productive yet playful activity.
4. Teacher divides students into several groups of 3-5 people.



5. Teacher explains the tools and materials as well as the steps for planting in garden plots and in polybags with soil.
6. Teacher prepares garden plots or polybags with soil where the seedlings will be planted and assign them to the different student groups. . If possible, students can choose to plant the seedlings either directly in the plots or in a polybag. Container gardening such as using polybags is suitable in a vacant yet limited space within the school building.
7. Teacher distributes several kinds of ready-to-plant vegetable seedlings (in small polybags) for each group. If possible, students may choose the kinds of vegetable they prefer to plant.
8. Teacher explains the steps to prepare for the planting media and assists the students in doing so.
9. Teacher explains the steps to grow plants in directly in the soil plots and polybags and supervises the students in doing the planting.
10. During the maintenance of the plants, teacher reiterates the material on nutrition, benefits of vegetables, and the recommended daily vegetable intake.
11. Teacher gives an example on how to arrange the polybags (a dedicated shelf can be used) to also decorate the school yard.
12. Teacher asks each group to take care of, monitor, and make reports on how their plant grow. The teacher explains how to fill out the observation table (see appendix 1).

Meeting II

1. Teacher invites the students to discuss the progress of the vegetable plants based on their observation table.
2. Teacher re-emphasizes:
 - a. That planting vegetables is not difficult and does not require a large area.
 - b. The factors needed for the plants to grow well. Besides, well-grown vegetable plants can also serve as ornamental plants to beautify the school and home yard.



3. Teacher may also invite the students to discuss the possibility of planting vegetables in their own house
4. Teacher explains the vitamins and minerals contained in vegetables as well as their benefits for adolescents' growth, general health, and concentration in learning. Afterward, teacher explains that the consumption of fruits and vegetables is highly recommended for Indonesians, especially adolescents. The recommended vegetable consumption is 3-4 servings per day. Teacher encourages the students to consume vegetables regularly at least in every meal (3 times a day).
5. Teacher asks students to share their experiences of doing the activity. The teacher confirms the problems faced by students from the seeding, planting and until the maintenance stage. They can also be asked to deliver presentations in groups.
6. If necessary, the students' performance can be evaluated using the provided evaluation sheet (appendix 2 on Guidelines for Observation/ Performance Assessment) to be shared to teachers of the relevant subjects.
7. If students look interested in gardening, they can be encouraged to continue the activity until harvesting. In addition, the group that successfully produces ready-to-harvest and high-quality vegetable products will receive an acknowledgment/reward.
8. After this session, the activity may continue until the harvest time depending on the conditions in the school (hopefully the students who do the planting have yet to graduate). During the harvest time, teacher acknowledges the students' efforts in planting, taking care of, and harvesting the vegetable plants.
9. The teacher invites students to enjoy the harvested vegetables by cooking and eating together at school. Some ideas for the meals to be cooked are stir-fry water spinach/bok choy, tofu meatballs plus mustard greens, spinach soup, and others. To make the students more enthusiastic, they may bring simple and affordable side dishes, such as tempeh/fried tofu and boiled/fried/omelet eggs. The school can provide rice if possible. When eating together, teacher emphasizes the benefits of vegetables for adolescents and encourages students to consume vegetables more regularly



F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Plant vegetables directly in school garden soil plots or using polybags with the appropriate soil media properly and arrange them nicely in the schoolyard
- Understand the main nutritional contents and benefits of vegetables for adolescents' health
- Show an interest in consuming vegetables and meet the recommended intake every day.

G Materials or tools to be prepared by the school

- Land, for seeding and planting;
- Soil, husk, manure as planting media in polybags;
- Polybags;
- Shade for plants if the planting area is hot (can use paranet);
- Easy-to-use gardening tools.
- Vegetable seedlings;
- Shelf to place the polybags.

Photo: Students prepare vegetable planting media (personal documentation)



Picture: Arrangement of vegetables in polybags on the shelf



Appendix I

Observation Table

(filled out by students)

Group :

Names of Members :

1. _____
2. _____
3. _____
4. _____

No.	Day, Date	Observation Result/ Action Taken by the student	Name of Person on duty	Signature of Person on duty	Teacher's initial
1.					
2.					
3.					
4.					
5.					
6.					
7.					
Etc.					

Notes:

1. Observations can be carried out once every 2-3 days, not every day.
2. If the observer does certain treatment to the plants, it has to be recorded on this sheet.
3. Students' performance can be assessed from the participation of each group member.

Appendix II

Guidelines for Observation/Performance Assessment

(filled out by teacher)

No	Student's Name	Assessed Aspect				Total	Average	Notes
		Diligence and active role in every activity	Teamwork	Submit assignment in time	Quality of the work			
1.								
2.								
3.								
4.								
5.								
6.								
7.								
Etc.								

Notes:

Very good (A B) = (90 – 100) = 4

Good (B) = (75 – 89) = 3

Fair (C) = (63 – 74) = 2

Poor (D) = (< 63) = 1

Lesson Plan 24

Assessing Protein and Glucose Content in Oyster Mushrooms



Grade	: Senior High School, Grade 10
Implementation of Learning	: Intracurricular (Chemistry and Biology)
Duration	: 3 class periods (@45 minutes)
Method	: Testing protein and glucose content in oyster mushrooms qualitatively

A Learning Objectives

Students will be able to:

- Recognize the characteristics of mushrooms.
- Understand the nutritional contents of oyster mushrooms and their benefits for health.

B Precondition

To implement this lesson plan, the school must have an oyster mushroom cultivation facility with oyster mushrooms that are ready for harvest. In general, oyster mushroom cultivation can be learned such as from SEAMEO BIOTROP which provides materials and tools for mushroom cultivation. Visit the SEAMEO BIOTROP's website for more information

C Summary of Learning Material

Mushrooms are organisms with no chlorophyll, unlike the plants that can carry out the photosynthetic process to produce their own food. Mushrooms live by obtaining food substances, such as cellulose, glucose, lignin, protein, and starch compounds, from



other organisms. In nature, these substances are generally available brought about by the weathering process by the activity of microorganisms.

Other than not having chlorophyll, mushrooms possess the following characteristics; being unicellular and multicellular, being heterotrophs (saprophytes, parasites, mutual), having hyphae (insulated and non-insulated), having septa (part of the hypha that has insulation), having mycelium (collection of hyphae, m.vegetative, m.generative) and being coated with chitin substance. There are various ways for mushrooms to live. For example, saprophyte mushrooms obtain organic substances from dead organisms, parasite mushrooms obtain organic substances from living organisms, and the mutual ones establish a mutually beneficial relationship to the host.

Mushrooms can be used as a food commodity. The type of mushroom that is widely consumed is the oyster mushroom. There are ten kinds of oyster mushrooms with different shapes and colors of the fruiting body:

1. *Pleorotus citrinopileatus* (bright yellow)
2. *Pleorotus cystidiosus* (reddish white)
3. *Pleorotus djamor* (pink/flamingo)
4. *Pleorotus eryngii* (bluish)
5. *Pleorotus euosmus* (brownish)
6. *Pleorotus floridae* (pure white)
7. *Pleorotus flabellatus* (pink)
8. *Pleorotus ostreatus* (white, yellowish white, grayish white)
9. *Pleorotus pulmonarius* (gray)
10. *Pleorotus sajor-caju* (ashen)


The kind of oyster mushroom most frequently cultivated is the white oyster mushroom (*Pleorotus ostreatus*). This oyster mushroom has a white to beige fruiting body, a circular hood similar to an oyster shell, a hood, and a nearly smooth surface.

Picture. Oyster Mushroom (source: SEAMEO BIOTROP)



Picture. Oyster Mushroom (source: SEAMEO BIOTROP)





The nutritional contents in oyster mushrooms also vary including carbohydrates, protein, fat, thiamin, riboflavin, niacin, and calcium. Oyster mushrooms can be consumed as plant-based protein side dish. The protein contained in oyster mushrooms per 100 g can reach 27%, while the protein in soybean is only 18,3% per 100 g (Directorate of Nutrition, Health of RI in Muchtadi (2010)). The fiber contained in oyster mushrooms reaches 7.4% - 24%, so they are highly beneficial to be consumed to help in the digestive process (Alexs, M. 2011 in Suparti et al., 2014).

D Students' activities

Meeting I

1. Students listen to the explanation from the teacher about the kingdom of fungi, its characteristics, classification, way of living, the role of mushrooms, and the nutritional contents of oyster mushrooms.
2. Students are divided into several groups of 3 people. Each group receives 1 worksheet.
3. Students are requested to go to a specific room for mushroom cultivation and start to harvest mushrooms.
4. Then, the students go to the laboratory and conduct experiments to test the nutritional contents of oyster mushrooms.
5. Students record their observation results on the provided worksheet.

Meeting II

1. Each group presents the experiment and discussion results to the class.
2. After the presentation, the group answers questions from the teacher or other students.
3. Students and the teacher make conclusions.



E Teacher's Guide

Meeting I

1. Teacher collects literature about mushroom, prepares student worksheet (attached), ensures that the mushroom cultivation garden is ready to harvest, and prepares the experimental apparatus to test the nutrition content of mushrooms.
2. Teacher explains the kingdom of fungi, its characteristics, classification, way of living, the role of mushrooms, and the nutritional content of oyster mushrooms. The teacher can also add information on the benefits of nutritional contents in mushrooms, especially for adolescents' health. The teacher can enrich students' knowledge by giving ideas on the currently popular processed mushroom products, such as crispy mushrooms, mushroom satay, and mushroom burgers.
3. Teacher guides students to understand the steps to do the test that must be done according to the guidelines on the worksheet.
4. Teacher demonstrates how to pick mushrooms and supervises the mushroom harvesting in the mushroom cultivation facility.
5. Teacher explains the stages of the mushroom nutritional content test to be conducted in the laboratory. Furthermore, teacher supervises the activities in the laboratory and provides guidance in making proper recording of the test results.



Meeting II

1. Teacher facilitates the student group presentations regarding the results of the nutritional content test of the oyster mushrooms.
2. Teacher concludes the session by providing additional information on the benefits of the nutritional contents of oyster mushrooms, especially for adolescents' health. Teacher reminds the students about the availability of the currently popular processed mushroom products, such as crispy mushrooms, mushroom satay, and mushroom burgers.
3. To increase the students' interest, the teacher may end the learning session by suggesting ideas on cooking mushrooms together in other learning sessions.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Describe the characteristics of mushrooms comprehensively.
- Understand the nutritional contents of oyster mushrooms and their benefits for health
- Conduct an assessment of the nutritional content of oyster mushrooms.

G Materials or tools to be prepared by the school

- 10th Grade Biology Book
- Internet connection
- Worksheet
- Stationery
- Oyster mushrooms ready for harvest from the cultivation facility
- Laboratory apparatus to test the nutritional contents of mushrooms.



Appendix

Student Worksheet

Oyster Mushroom Content Test Senior High School Grade 10

Names :

Grade :

Purpose

To determine the protein and glucose contents in oyster mushrooms qualitatively.

Tools And Materials

1. Oyster mushrooms.
2. Biuret solution.
3. Benedict solution.
4. Label paper.
5. Drop pipette.
6. Test tube and the holder.
7. Tube rack.
8. Tripod.
9. Spiritus heater.
10. 500 ml beaker glass.
11. Mortar.

Work Procedures

Mushroom extraction

Take 5 pieces of cleaned oyster mushroom. Then mash them using a mortar, add water to half of the mortar, and make sure it is mixed well with fine oyster mushrooms. Transfer the oyster mushroom extract into a beaker glass.

Protein Test

1. Put 10 drops of oyster mushroom extract into a test tube.
2. Put 5 drops of the biuret solution on the extract.
3. Shake gently, observe the color change.
4. If the extract turns purple, it means the mushroom contains protein



Glucose test

1. Put 10 drops of the mushroom extract into a test tube.
2. Put 5 drops of the benedict solution on the extract.
3. Prepare a spiritus heater, a tripod, and a 500 ml beaker glass. Boil a half of glass of water in a beaker glass.
4. Put the test tube containing the mushroom extract which has been dripped with benedict solution into the beaker glass filled with boiling water. Heat the test tube for 15 minutes.
5. Observe the color change in the mushroom extract in the test tube. If it turns brick red, the mushroom contains glucose.

Observation Result

.....

.....

.....

.....

.....

.....

.....

.....

.....

Conclusion

.....

.....

.....

Lesson Plan 25

Balanced Nutrition for My Body



Grade	: Senior High School, Grade 11 Math & Science /Cross-major
Implementation of Learning	: Intracurricular (Biology)
Duration	: 2 class periods (@45 minutes)
Method	: Creating a one-day menu according to Balanced Diet Food Pyramid' and 'My Plate' using vegetables, fruits, or tubers harvested from the school garden

This lesson plan refers to Indonesian context. Therefore you may need to adjust it with Food Pyramid or Food Guide of your country.

A Learning Objectives

Students will be able to:

- Explain the concepts and principles behind Balanced Diet Food Pyramid and 'My Plate'.
- Prepare a balanced menu according to Balanced Diet Food Pyramid and 'My Plate' using vegetables and fruits harvested from the school garden.

B Summary of Learning Material

Nutritionally balanced food is food which contains nutrients in types and an amount that meet the body's requirements. The first principle of balanced nutrition is consuming a variety of food, as visualized in Balanced Diet Food Pyramid, which consists of 5 groups of food, namely staple food, animal protein, plant-based protein, vegetables, and fruits in the recommended amount for daily consumption.

While Balanced Diet Food Pyramid is the recommendation for one-day consumption, 'My Plate' is a visualization of a one-time meal. In 'My Plate', the serving plate of each mealtime should be filled with food sources of carbohydrates, protein, vitamin and minerals in the recommended number of servings. The recommended servings are 2/3 half plate for staple food, 2/3 half plate for vegetables, 1/3 half plate for side dishes, and 1/3 half plate for fruit.



Balanced Diet Food Pyramid and My Plate for Indonesian
developed by Indonesian Ministry of Health

A school garden can provide several food sources that can support the intake of balanced nutrition, such as vegetables, fruits, and tubers.

The main messages to be delivered to the students

The first principle of balanced nutrition according to Balanced Diet Food Pyramid and 'My Plate' for Indonesian is to consume a variety of foods because no single type of food contains all types of nutrients needed by the body (except breast milk for children aged <6 months). A school garden can provide vegetables, fruit, and tubers to meet these needs for balanced nutrition.

c Students' activities

1. Students are divided into groups of 4 people.
2. Students are asked to go to the school garden to observe what food sources are available in the school garden.
3. Students create food menus on the worksheet based on Balanced Diet Food Pyramid (for one-day menu) and 'My Plate' (for one meal) using vegetables, fruits, or tubers planted in the school garden as the ingredients.
4. The representative of each group presents the group's menu and receives responses/feedback from the other groups.



D Teacher's Guide

1. Teacher explores the students' knowledge on the principles of balanced nutrition, Balanced Diet Food Pyramid, and 'My Plate'.
2. Teacher explores students' daily food consumption patterns.
3. Teacher divides the students into several groups of 4 people (can be adjusted to the number of students in the class).
4. Teacher assists students in observing what food sources are available in the school garden.
5. Teacher assigns and guides each group to make a one-day menu according to Balanced Diet Food Pyramid and 'My Plate' using food sources in the school garden as the ingredients.
6. Teacher asks several groups to present their menus and then invites responses/feedback from the other groups. Teacher may choose the presenting groups randomly.
7. Teacher guides students to discuss the presentations from the other groups and share to the class if they have different opinions/ideas.
8. Teacher guides the students to conclude the discussion.
9. Teacher may give an appreciation to students at the end of the session with applause, yells, etc.

E Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Explain the concepts of Balanced Diet Food Pyramid and 'My Plate'.
- Create balanced food menus in accordance with Balanced Diet Food Pyramid and 'My Plate'.

F Materials or tools to be prepared by the school

- Student worksheet
- Projector
- Laptop
- Other presentation media.



Appendix

Example of Student Worksheet

Time	Menu	Source of Carbohydrates	Source of Protein	Source of Fat	Source of Vitamins and Minerals
Morning					
Noon					
Evening					



Nutrition Education Lesson Plans For Cross-Level



Nutrition Education Lesson Plans for Cross-Level

Lesson Plan 26

Colorful Campaigns



Grade	: Junior High School and Senior High School
Implementation of Learning	: Intracurricular (Civic Education)
Duration	: 3 class periods (@45 minutes)
Method	: Healthy Campaigns in School Garden Area

A Learning Objectives

Students will be able to:

- Ask and provide reliable information properly.
- Promote the consumption of vegetables and fruits to people around them.
- Know the nutritional content of vegetables and fruits based on their colors.

B Summary of Learning Material

Various vegetables and fruits contain vitamins and minerals that can fulfill our nutritional requirement if they are consumed regularly in sufficient quantities. The nutrients contained in fruits and vegetables are vitamins, such as vitamins A, B, C, D, E, and K, and minerals, such as calcium, potassium, magnesium, phosphorus, and iron.



Moreover, vegetables and fruits contain non-nutritive substances which are important for maintaining health, namely dietary fiber, which is good for digestion, and natural antioxidants, which function to prevent diseases caused by free radicals. To easily recognize the vitamins contained in vegetables and fruits, grouping them by their color can point out certain nutritional contents. According to their color, vegetables and fruits are classified into 5 groups:

1. White fruits and vegetables

White fruits and vegetables mainly contain the allyl sulfides pigment. They contain anthoxanthins, sulphoraphane, allium, flavonoids, etc. which are important to increase the body's immunity. Some examples of white vegetables and fruits are potato, cauliflower, banana, pear, soursop, radish, chicory, sprouts, garlic, and onion.

2. Green fruits and vegetables

The green color in some fruits and vegetables is due to the chlorophyll pigment they contain. Although chlorophyll does not appear to have a specific bodily functions, in general, foods that are high in chlorophyll also contain a high level of beta carotene which can boost the body's immune system. In addition, green leafy vegetables generally have a high level of iron content, which plays a role in the formation of red blood cells and is important to prevent anemia. Some examples of green fruits and vegetables are spinach, broccoli, kale, mustard, cassava leaves, pea, pepper, and kiwi.

3. Yellow or orange fruits and vegetables

The yellow or orange color in some fruits and vegetables is because they mainly contain the carotenoid pigment, which is also provitamin A that is important for eyes' and skin's health, as well as for the immune function. Some examples of yellow and orange fruits and vegetables are orange, pineapple, corn, manganese, carrot, apricot, papaya, pumpkin, and yellow pepper.



4. Red fruits and vegetables

The red color in some fruits and vegetables comes from the betalain pigment in the form of phytochemicals that can function as antioxidants to protect the body from free radicals. Some examples of red fruits and vegetables are tomato, beet, red apple, watermelon, red grape, cherry, strawberry, red spinach, and red pepper.

5. Blue or purple fruits and vegetables

The natural blue or purple color in some fruits and vegetables is obtained from the anthocyanin and flavonoid pigments. These substances act as antioxidants to ward off free radicals. Some examples of fruits and vegetables in this group are blueberry, raspberry, grape, eggplant, and red cabbage.

The main messages to be delivered to the students


- We have to observe the proper way of asking for and providing reliable information.
- Fruits and vegetables contain bioactive substances (both nutritive and non-nutritive) that are important for our bodies
- The colors of fruits and vegetables can indicate their nutritional values

C Students' activities

For the lesson on elections and democracy in Civic Education, students are introduced to the procedures of general elections through campaigns and voting. In this session, an election simulation is conducted, and the teacher asks students to make campaigns on the nutritional content and benefits of fruits and vegetables based on their color (for example, the fruits and vegetables group of a certain color is assumed to be a regional head candidate).

1. Preparation stage

- a. Students are divided into 5 groups of 4 people. The groups are named according to the color of the assigned fruits and vegetables: white group, green group, yellow/orange group, red group, blue/purple group.

- 
- b. The remaining students not listed in the five groups become neutral members and act as voters at the end of the campaign.
 - c. Students in the five groups are asked to draw several pictures of fruits and vegetables corresponding to their group's color on A4-sized cardboard/paper s(standardized size). The selection of vegetables and fruits can be based on the observation result of the school garden.
 - d. Students in the groups search for information on the nutritional content and benefits of the fruits and vegetables they have drawn and write down the information on the back side of the pictures. This search for information can be done through literature reviews in libraries and online media.
 - e. Students not included in any of the groups prepare questions related to the nutritional content and benefits of the fruit and vegetables selected by the five groups.

2. The campaign

- a. Students must take turn in carrying out their campaign (giving oration) by mentioning the various fruits and vegetables in their group's color, including their nutritional content and benefits as well as other relevant information.
- b. Two members of the group may also visit the other groups to explain about the fruits and vegetables they are campaigning for (using the Two Stray-Two Stay or Carousel learning model; a brief explanation of these learning models can be found in the Teacher's Guide).
- c. Students from the other groups and those not listed in any of the groups listen to the oration and get a chance to ask questions.
- d. Students who are campaigning must answer the questions with an interesting explanation as possible, according to the information they have.
- e. The campaign continues until all the groups have described their fruits and vegetables and answer questions from the other groups.
- f. Students are requested to return to their respective groups and discuss the campaign results by filling in the worksheet prepared by the teacher.

3. Closing activity

- At the end of the activity, each student is asked to vote for the most interesting group (other than her/his own group) in terms of the information delivery, the content of information, pictures, or anything related to the learning outcomes (any reasons are welcome).
- The election is carried out by putting a colored piece of paper in a box that represents the color of the group chosen. Each student only has one voting right.
- After completing the election, the votes are counted. The group with the highest number of votes will become the winner of "The Best Colorful Campaign of the Day".

D Teacher's Guide

1. Preparation stage

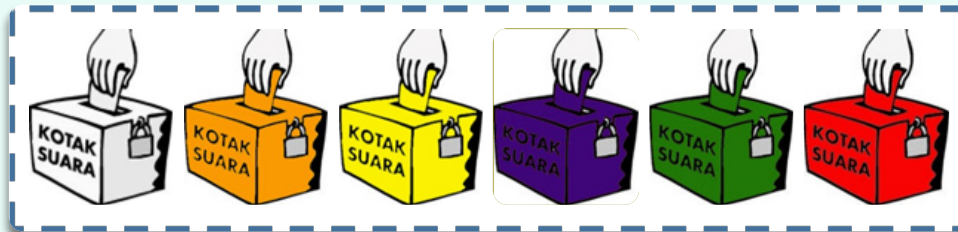
- In the previous session, teacher explains the activities to be carried out and divides students into 5 groups of 4 people. The groups are named based on the colors of vegetables and fruits. Meanwhile, the remaining students who are not part of any group will become neutral members.
- Teacher assigns the 5 groups to draw several pictures of fruits and vegetables corresponding to their group's color on A4-sized cardboard/ paper size (standardized size).



- c. Teacher also assigns the students to search for information related to the nutritional content and benefits of fruits and vegetables that they will promote in the campaign and write down the information on the back side of the pictures.
- d. Teacher assigns the remaining students (neutral members) to prepare for questions on the nutritional content and benefits of fruits and vegetables to be asked to the 5 groups.
- e. Teacher prepares and cut out colored paper according to the group colors. The pieces of paper will be used as ballots. One student has one voting right.



- f. Teacher prepares the ballot box according to the existing group colors.



- g. Teacher prepares a worksheet with questions on each fruit and vegetable in the campaign.

Questions that can be asked to students include:

- What are the nutritive and non-nutritive content of each vegetable or fruit in your group!
- What are the benefits of each vegetable and fruit for the body!
- What kind of dishes can be made using the vegetables or fruits?
- How can you prolong the shelf life of fruits and vegetables ?
- How much vegetables and fruits should be eat in a day?



2. Preparation stage

- a. Teacher provides guidance on how the campaign will be carried out.
- b. By using a Carousel learning model,
 - Teacher positions each group in a different area of the classroom.
Teacher requests two members of each group to stay and be prepared to get a visit from members of the other groups.
 - Teacher explains the tasks of the visiting group members, which are to convey information on the fruits and vegetables that the group has and to answer any questions from other groups visiting their group.
 - Teacher directs the remaining group members to rotate to each of the other groups in a clockwise direction.
 - Teacher asks the visiting students to stick their campaign pictures on the wall or hold them up, so the other students can easily read the explanation on the back side of the pictures.
 - Teacher provides sticky notes to the visiting students, so they can post questions or provide written comments on pictures in the groups they visit.
 - Teacher gives a sign (with a clap or another sign) for rotation so that the visiting students will immediately move to another group.
 - After all the visits are done, teacher asks the students to return to their respective groups and distributes a worksheet to each group.
 - Teacher asks each group to work together in filling in the worksheet (The worksheet can be adjusted according to the class level of students. The example can be found in the appendix).



3. Preparation stage

- a. Teacher reviews some interesting questions from the sticky notes written by the students.
- b. Teacher directs the students to conclude today's learning activities.
- c. Teacher reminds the students to tidy up the class after the activity.

E Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Behave well in asking for and providing reliable information.
- Promote the consumption of vegetables and fruit to people around them.
- Describe the nutritional content of vegetables and fruits based on their colors by completing the worksheet.

F Materials or tools to be prepared by the school

Learning Resources

- Adolescent Nutrition and Health Book
- Articles related to the topic of discussion (health) from reliable sources.

Tool

- Laptop
- Projector
- Internet connection
- Worksheet



Appendix

Example of Student Worksheet

After observing a variety of fruits and vegetables, complete the statements below.

1. Fruits and vegetables can be classified according to colors, which are
2. Examples of orange/yellow fruits and vegetables that are high in vitamin A are
3. Blue/purple fruits and vegetables contain a lot of
4. The benefits of orange/yellow fruits and vegetables for the body include
5. Radishes, onions, jicama, and oyster mushrooms are classified as vegetables and fruits with the color of.....
6. Examples of red fruits and vegetables are.....
7. Green vegetables and fruits are good for our body, because they
8. Blueberries are fruits with the color of..... and are beneficial for our body in
9. Name some processed foods from fruit and vegetables that you know!
10. Iron is contained in vegetables that have the color of, for example,

Lesson Plan 27

My Tubers



Grade	: Primary School - Junior High School - Senior High School
Implementation of Learning	: Habituation Session during breakfast at school (can be scheduled once a week)
Duration	: 1 class period (Primary School: 30 minutes; Junior and Senior High School: 45 minutes)
Method	: Bringing food from home

A Learning Objectives

Students will be able to:

- Get to know sources of carbohydrates other than rice.
- Appreciate and accept tubers as a substitute for rice for breakfast.

B Preconditions

To implement this lesson plan, the school must have tuber harvested from the school garden and have been processed/cooked. If the number of tubers harvested is insufficient, the students are asked to bring processed/cooked tubers from home.

C Summary of Learning Material

Indonesia has is blessed with fertile soil which is appropriate for cultivation of various plants. The country's different ethnicities also provide a diverse range of dishes using various cultivated crops. For instance, rice is not the only staple food in Indonesia. Corn, sago, and other tubers are widely utilized as staple foods in several regions in Indonesia.

Examples of tubers (a) Ganyong; (b) Walur; (c) Gembili; (d) Suweg (from various sources)

(A)



(B)



(C)



(D)





The main messages to be delivered to the students


- Breakfast is important.
- Tubers are good sources of carbohydrates other than rice.

D Students' activities

1. Students listen to the teacher's explanation on various sources of carbohydrates, such as tubers (potatoes, cassava, sweet potatoes, taro), cereals (rice, wheat), corn, sago, etc., as well as their benefits for health.
2. Students unwrap their home-packed meal of boiled tubers, as well as side dishes, fruits, and vegetables and eat their breakfast together.
3. Students explain the food they bring from home.
4. After the activity, students wash their hands, tidy up their cutlery, clean the table, and then prepare themselves to start the lesson.

E Teacher's Guide

1. Teacher explains various sources of carbohydrates, such as tubers (potatoes, cassava, sweet potatoes, taro), cereals (rice, wheat), corn, sago, etc. Teacher also emphasizes that rice is not the only staple food. Teacher provides examples of regions in Indonesia which consume sago or corn as staple foods and other alternatives, such as potatoes, cassava, sweet potatoes, and other tubers. Teacher introduces various kinds of tubers by using slides/pictures or bringing samples of the foods which have been labeled.
2. Teacher explains the nutritional content and benefits of those staple foods for the body and health.

- 
3. Teacher directs the students to follow eating etiquettes, such as praying before and after eating, sitting in a proper position, washing hands before and after eating, not talking while eating, not wasting any food, and tidying up their cutlery after finishing their meal.
 4. Teacher directs students to share their meal with their friends, especially those who bring different foods so they can taste other foods or tubers.
 5. At the end of the activity, teacher leads the students to wash their hands and tidy up the class to prepare for the next lesson.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Mention sources of carbohydrates other than rice.
- Bring home-packed meal of staple foods from tubers as a substitute for rice.

G Materials or tools to be prepared by the school

Learning Resources:

- Adolescent Nutrition and Health Book.
- Articles related to the topic of discussion (health) from reliable sources.

Lesson Plan 28

Veggie sticks



Grade	: Junior High School and Senior High School
Implementation of Learning	: Habituation Session
Duration	: 2 class periods (@45 minutes)
Method	: Making veggie sticks from vegetables harvested from the school garden

A Learning Objectives

Students will be able to:

- Explain the nutritional content and benefits of colorful vegetables.
- Process colorful vegetables into healthy snacks.

B Preconditions

To implement this lesson plan, the school must have grown colorful plants, such as red spinach, mustard greens, and carrots, which are ready for harvest in the school garden. If the number of colorful plants is not sufficient, students are asked to bring fresh vegetables from home as additional ingredients to make veggie sticks. Students must also bring the tools and materials needed to make veggie sticks.

C Summary of Learning Material

Red beets, spinach, and carrots are colorful vegetables that are easy to grow in the school garden even with limited space. The red color in beets comes from the betalain



pigment which also functions as an antioxidant that counteracts free radicals. Carrots that are yellow/orange in color contain beta carotene which functions to maintain eyes' health and increase the immune system. Spinach is a dark green vegetable that contains iron which is good for the formation of red blood cells beneficial to prevent anemia. These three kinds of vegetables, apart from being consumed as side dishes, can also be processed into healthy, nutritious, and, of course, delicious snacks in the form of veggie sticks. Veggie sticks are very easy to make and do not cost much.

The main messages to be delivered to the students

- Colored vegetables contain bioactive substances (nutritive and non-nutritive) that are important for our body.
- Vegetables can be processed into nutritious snacks.

D Students' activities

1. Students listen to the teacher's explanation on the beneficial nutritive and non-nutritive content of colorful vegetables, such as mustard greens (an example of green vegetables), red spinach (an example of red vegetables), and carrots (an example of orange vegetables).
2. Students are divided into 3 groups by the vegetable color, such as the 'red veggie', 'green veggie', and 'orange veggie' group.
3. Students prepare the tools and materials needed to make veggie sticks.
4. Students listen to the teacher's explanation about the steps for making veggie sticks before they cook in the school kitchen.
5. Teacher assists the students in making veggie sticks in the school kitchen.
6. Students eat the veggie sticks they make. Each group can taste the other groups' veggie sticks.

E Teacher's Guide

1. Teacher describes the beneficial nutritive and non-nutritive content of colorful vegetables, such as mustard greens (an example of green vegetables), red spinach (an example of red vegetables), and carrots (an example of orange vegetables).
2. Teacher divides students into 3 groups by the vegetable color, such as the 'red veggie', 'green veggie', and 'orange veggie' group.
3. Teacher explains the steps for making veggie sticks before students cook in the school kitchen (available in the appendix).
4. Teacher assists students in making veggie sticks in the school kitchen.



Photo source: Bukalapak.com

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Describe the benefits and nutritional content of red spinach, mustard greens, and carrots.
- Process red spinach, mustard greens, and carrots) into healthy snacks.

Appendix

Recipe

Veggie Sticks Recipe

Ingredients (for 5 servings):

5. 250 grams of low-protein flour
6. 1 egg
7. 75 ml of filtered juice of beetroot/spinach/carrots
8. Ground pepper, garlic, coriander to taste



Instructions:

1. Blend the beetroot/spinach/carrots and then strain it to produce 75 ml of liquid
2. In a bowl, strain the flour and then add the ground pepper, coriander, and garlic powder
3. Add the eggs and knead briefly
4. Add a small amount of the beetroot/spinach/carrot juice and knead
5. Divide the dough into 8 parts to make the grinding process easier
6. Grind the dough using a grinder or a rolling pan until smooth (set the thickness to be in the mill number 3/medium).
7. Cut the smooth dough into noodle shape,
8. Fry the sticks until golden brown
9. Remove the sticks from the pan, drain, and pack them.



Photo source: Resepmamanda.com

Lesson Plan 29

Making and Selling Processed Food from Corn



Grade	: Junior High School and Senior High School/Vocational High School
Implementation of Learning	: Intracurricular (Entrepreneurship); Extracurricular (Cooking Club)
Duration	: 2 class periods (@45 minutes)
Method	: Making 'jasuke'

A Learning Objectives

Students will be able to:

- Know the nutritional content of corn.
- Process corn into 'jasuke' (corn with condensed milk and cheese).
- Practice their entrepreneurial skills by marketing g the processed food from corn to the school canteen/cooperative or to teachers/parents.

B Preconditions

To implement this lesson plan, the school must have corn crops that are ready for harvest in the school garden. If the amount of corn harvested is insufficient, students are requested to bring fresh corn from home as an additional ingredient for processing corn. Students have also previously been asked to bring the tools and materials needed to process corn.

C Summary of Learning Material

Corn is a food source of energy as it contains a lot of carbohydrates in the form of starch and sugar. Besides carbohydrates, corn contains protein. The carbohydrate content in corn makes it an alternative staple food to replace rice. In some eastern parts of Indonesia, corn is indeed consumed as a staple food. In East Nusa Tenggara




and Maluku, a food that uses corn as its basic ingredient is known as 'Bose Corn'. Other processed foods from corn are also found in Java, namely corn fritters, and grits (or corn soup in Sulawesi). Apart from being a staple food, side dish or vegetable, corn can also be processed into desserts or snacks, such as '*jasuke*' (corn with condensed milk and cheese). *Jasuke* is very easy to make and can be sprinkled with various toppings according to taste, making it a best-selling food. Thus, there is an opportunity to market *jasuke* and foster students' entrepreneurial spirit at the same time. In addition, by making their own food, students can ensure the cleanliness and safety of the food from contaminants (germs, dirt, dust, etc.) or harmful food additives.

The main messages to be delivered to the students

- Corn is a staple food and a source of carbohydrates that can be used as a substitute for rice.
- Corn can be processed into nutritious and valuable snacks.


D Students' activities

1. Students are divided into several groups of 3-5 people.
2. Students are requested to look for information on the Internet about the nutritional content of corn and various dishes made from corn in different regions in Indonesia.
3. Under the teacher's guidance, students harvest the corn in the school garden.
4. Students listen to the teacher's explanation on the steps to make *jasuke*. Then, students prepare the corn harvested from the school garden by skinning, washing, and shelling the corn kernels.

- 
5. Students process the corn into *jasuke* following the recipe provided. Students can sprinkle the *jasuke* with different toppings. This corn-processing activity is carried out in the school kitchen or school canteen with a stove available. Students can use cooking utensils brought from their home.
 6. Students pack their *jasuke* in plastic cups provided by the teacher and label them with their own trademark as their group's identity marker.
 7. Students are asked to sell the *jasuke* in the school canteen/cooperative or on their social media.
 8. Students share their experiences and impressions of doing the activity of making and marketing the *jasuke*.

E Teacher's Guide

1. Teacher divides students into several groups of 3-5 people per group.
2. Teacher guides students to look information on the Internet about the nutritional content of corn and various dishes made from corn in different regions in Indonesia.
3. Teacher assists students in harvesting corn in the school garden.
4. Teacher explains the steps to make *jasuke*, starting from the preparation stage (i.e. peeling the skin, cleaning the corn, and shelling the corn) to the cooking stage (the processing guide is on the worksheet).
5. Teacher assists the students in processing *jasuke* and directs each group to use different toppings. In addition, teacher ensures that all of the processing activities are safe and follow food hygiene and safety standards.
6. Teacher distributes plastic cups for packaging and asks students to attach a label on the packaging with the product's name as the group's identity marker.

- 
7. Teacher asks students to sell the *jasuke* in the school canteen/cooperative or on social media, such as Instagram with a pre-order system (the *jasuke* is made once an order is placed).
 8. Teacher facilitates student group presentations and a class discussion about their experiences and impressions of doing the activity of making and marketing the *jasuke*.
 9. Teacher concludes the session by re-emphasizing the nutritional content of corn and its benefits for the body. Teacher also underscores that various Indonesian cuisines use corn as one of the ingredients.
 10. To find out the students' interest, teacher may end the learning session by suggesting a similar activity with other recipes using corn as the main ingredient.

F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Describe the nutritional content of corn.
- Process corn into '*jasuke*' (corn with condensed milk and cheese).
- Market the processed food from corn to the school canteen/cooperative or to teachers/parents.

G Materials or tools to be prepared by the school

- Recipe books with corn as the main ingredient.
- Student worksheet.
- The school kitchen and cooking utensils.
- Plastic/paper cup packaging with lids.
- Label stickers.
- Stationery.

Appendix

Student Worksheet

Making *Jasuke* (Corn With Condensed Milk and Cheese):

Preparation

1. Harvest some of the corncobs in your school garden.
2. Clean the corn from the skin, fibers/ hair, and corncob. Then wash it in clean running water and dry it.



Ingredients

1. 5 corncobs
2. Margarine to taste
3. Sweetened condensed milk to taste
4. Grated cheese to taste
5. Other topping ingredients (for additional variation): fresh cut fruit (such as strawberries, papaya, mango, pineapple, kiwi), shaved coconut, chocolate sauce, strawberry sauce, or chili sauce.



Instructions:

1. Shave the corn kernels from the cob and then boil them until cooked.
2. Once cooked, drain and then put them in a plastic/paper cup.
3. Add 1 tablespoon of margarine while kernels are hot.
4. Add a small amount of sweetened condensed milk and grated cheese to taste.
5. For variation, sprinkle with additional toppings to taste.
6. *Jasuke* is ready to serve and is highly recommended to consume while it is hot.

Lesson Plan 30

Processing and Selling Oyster Mushrooms



Grade	: Junior High School and Senior High School
Implementation of Learning	: Extracurricular
Duration	: 2 class periods (@45 minutes)
Method	: Cooking practice

A Learning Objectives

Students will be able to:

- Know the nutritional content of oyster mushrooms and their benefits for the body.
- Process oyster mushrooms into crispy mushrooms or mushroom seasoning powder.
- Practice entrepreneurship by marketing their self-made final products from mushrooms to the school canteen/cooperative or to teachers/parents.

B Preconditions

To implement this lesson plan, the school must have oyster mushrooms that are ready for harvest in the school garden. Oyster mushroom cultivation in general can be learned from SEAMEO BIOTROP, which also provides materials and tools for cultivating this type of mushroom. Visit SEAMEO BIOTROP's website for further information (<https://www.biotrop.org/>). If the quantity of the harvested oyster mushrooms is insufficient, students are requested to bring oyster mushrooms from home as additional ingredients for processing oyster mushrooms. Students have also previously been asked to bring the tools and materials needed to process the mushrooms.



C Summary of Learning Material

Oyster mushroom cultivation has started to gain wider attention. The nutritional content of oyster mushrooms that is more complete than other types of vegetables, as well as its easy processing and delicious taste, make oyster mushrooms an alternative food ingredient that is nutritious and favored by various groups of people. Oyster mushrooms have high levels of carbohydrates and protein, including betaglucan content as antioxidants that are needed for the body's health. In addition, oyster mushrooms contain vitamins B1, B2, and some mineral salts from the elements Ca, P, Fe, Na and K. Its fiber content ranges from 7.4 to 27.6%, so this type of mushroom is very good to aid digestion.


Oyster mushrooms can be processed into valuable dishes. Processed foods from oyster mushrooms that are currently widely marketed are crispy mushrooms. Crispy mushrooms have a delicious taste and are easy to process so that the idea of processing crispy mushrooms is worth trying and can serve as an entrepreneurial activity for students. Other processed products from oyster mushrooms are seasonings, which are still not widely marketed. In addition, by making their own food, students can ensure the cleanliness and safety of the food from contaminants (germs, dirt, dust, etc.) or harmful food additives. Thus, there is an opportunity to produce and market nutritious and safe food products, namely crispy mushrooms and mushroom seasoning powder, as well as to foster students' entrepreneurial spirit.

The main messages to be delivered to the students

- Oyster mushrooms contain a lot of nutrients.
- Oyster mushrooms can be processed into worth-selling food products, such as crispy mushrooms and mushroom seasoning powder.
- Entrepreneurship skill needs to be nurtured from an early age.


D Students' activities

1. Students are divided into several groups of 3-5 people; some will process crispy mushrooms, while others will process mushroom seasoning powder.

- 
2. Students listen to the teacher's explanation on the nutritional content of oyster mushrooms and its various utilization as food products. Students also listen to the success story of an oyster mushroom entrepreneur .
 3. Students listen to the teacher's explanation regarding the steps for making crispy mushrooms and mushroom seasoning powder (see the Appendix). Then, students prepare the tools and materials needed and process the mushrooms into crispy mushrooms or mushroom seasoning powder following the recipes provided.
 4. Students bring the harvested mushrooms to the pantry/school kitchen and process them into mushroom seasoning powder and crispy mushrooms by following the recipe provided.
 5. Students pack the crispy mushrooms and mushroom seasoning powder in paper packaging or bottles that have been labeled with a certain trademark as the group's identity marker.
 6. Students are asked to market the finished products in the school canteen/ cooperative or on social media.
 7. In a discussion session, students share their experiences and impressions of doing the activity of making and marketing crispy oyster mushrooms or mushroom seasoning powder.

E Teacher's Guide

1. Teacher divides students into several groups of 3-5 people; some will process crispy mushrooms, while others will process mushroom seasoning powder.
2. Teacher explains the nutritional content of oyster mushrooms and its various utilization as food products. Teacher also tells the success story of an oyster mushroom entrepreneur.
3. Teacher guides students in understanding the steps to make crispy mushrooms and mushroom seasoning powder, from harvesting, cooking preparation, to the processing (the processing guide is on the worksheet).

- 
4. Teacher assists the students in processing the mushrooms and ensures that all of the processing activities are safe and follow food hygiene and safety standards.
 5. Teacher distributes the packaging material that has been prepared and asks students to attach a label on it with the product's name as the group's identity marker.
 6. Teacher asks students to sell the crispy mushrooms and mushroom seasoning powder in the school canteen/cooperative or on social media, such as Instagram with a pre-order system (the product is made once an order is placed).
 7. Teacher facilitates student group presentations and a class discussion about their experiences and impressions of doing the activity of making and marketing crispy mushrooms and mushroom seasoning powder.
 8. Teacher concludes the session by re-emphasizing the nutritional content of oyster mushrooms and its benefits for the body. Teacher also underscores that oyster mushrooms can be processed into various highly nutritious dishes.
 9. To find out the students' interest, teacher may end the learning session by suggesting a similar activity with other recipes using oyster mushrooms as the main ingredient.


F Learning Outcome Indicators

After completing this activity, students are expected to be able to:

- Describe the nutritional content of oyster mushrooms.
- Make food products from oyster mushrooms.
- Market their food products made from oyster mushrooms.

G Materials or tools to be prepared by the school

- Recipe books on oyster mushrooms.
- Student worksheet.
- School kitchen and cooking utensils.
- Paper packaging and glass/plastic bottles.
- Label stickers.
- Stationery.



Appendix 1

Student Worksheet 1

Making Crispy Mushrooms

Preparation

Harvest oyster mushrooms in the school garden. Prepare the tools and materials for cooking in the school kitchen

Ingredients

1. 500 grams of oyster mushrooms.
2. Salt to taste.
3. Pepper to taste.
4. 2-3 cloves of grounded garlic.
5. 100 gr of fried chicken flour.
6. Water.
7. Cooking oil.
8. Seasonings, such as chilli powder, cheese, barbeque sauce, etc.

Instructions:

1. Clean and cut the mushrooms into a fan shape (or as preferred). Try not to cut the mushrooms too small.
2. Pour water into a bowl. Mix salt, pepper, and grounded garlic in the water.
3. Put the cut mushrooms in the seasoning water.

4. Leave them for about 5 minutes. Drain.
5. Coat the mushrooms in fried chicken flour.
6. Fry the floured mushrooms in hot oil (use low heat).
7. Cook until the mushrooms turn golden brown. Remove from pan and drain.
8. Divide the crispy mushrooms into 5 portions. Place each portion in one pack and label it.

Marketing

1. Sell the crispy mushrooms to the school canteen/cooperative (as arranged by the teacher)
2. Take pictures of the product and upload them on students' and/or the school' social media (e.g. Instagram, Facebook) and wait for any customers' responses. The crispy mushrooms will be produced and shipped according to the customers' orders.



Photo: momylicious



Appendix 2

Student Worksheet 2

Making Mushroom Seasoning Powder

Preparation

Harvest some oyster mushrooms in the school garden. Prepare the tools and materials in the school kitchen.

Ingredients

1. 200 grams of oyster mushrooms.
2. 25 cloves of garlic.
3. 2 tablespoons of salt.

Instructions

1. Grind oyster mushrooms in a blender and then toast them in a pan until they are dried or lose water.
2. Roast the toasted oyster mushrooms in the oven at 200 °C for 1 hour (during the roasting in the oven, the oyster mushrooms need to be flipped to make it dry evenly). If it is not dry enough, you can lengthen the roasting time. If an oven is not available, the oyster mushrooms can be dried under the sun until dry.
3. Once dry, mash the mushrooms using a blender until they become powder and then sift. If it is not smooth yet, roast, mash, and sift it again. Continue the process until all the ingredients are evenly smooth.
4. Pack the oyster mushroom seasoning powder in a dry jar and put a label on it.

Marketing

1. Sell the mushroom seasoning powder to the school canteen/cooperative (as arranged by the teacher)
2. Take pictures of the product and upload them on students' and/or the school' social media (e.g. Instagram, Facebook) and wait for any customers' responses. The mushroom seasoning powder will be produced and shipped according to the customers' orders.



Foto: Hello Sehat



Foto: Dreamstime

Bibliography



Bibliography

Adolphus K, Lawton CL, Dye L. The effects of breakfast on behavior and academic performance in children and adolescents. *Front Hum Neurosci*. 2013;7:425. doi: 10.3389/fnhum.2013.00425.

Alphonsa, Maria. Practical simple crispy mushroom recipe. 2015. <http://www.kerjanya.net/faq/14361-resep-jamur-crispy-praktis-sederhana.html>. Accessed on 12 September 2018.

Anggraini, Titis. Jasuke. <https://cookpad.com/id/resep/3323569-jagung-jagung-susu-keju>. Accessed on 12 September 2018.

Anonymous. Benefits and Nutrition Content in Oyster Mushrooms. 2013. <https://jamurtanjungpinang.wordpress.com/2013/03/18/manfaat-dan-kandungan-gizi-dalam-jamur-tiram/>, accessed on 12 September 2018.

Agricultural Research and Development Agency (Badan Litbang Pertanian). 2013, 17-23 April. "School Garden" Teach Children to Love Eating Vegetables (Ajarkan Anak Cinta Makan Sayur). *Sinar Tani*, 3503, 9.

Research Institute for Citrus Plants and Subtropical Fruits BALITBANGTAN Ministry of Agriculture, Republic of Indonesia. Grafting Technique in Citrus Plants. 2017. <http://balitjestro.litbang.pertanian.go.id/teknik-persusuan-pada-tanaman-jeruk/>. Accessed on 15 August 2018.

Briawan, Dodik. 2016. Balance Nutrition of School-Age Children. SEAFast Center IPB. Bogor.

BPS. 2010. Basic Health Research. Central Bureau of Statistics. Jakarta.

BPS. 2013. Basic Health Research. Central Bureau of Statistics. Jakarta.

California School Garden Network. 2010. Gardens for Learning: Creating and Sustaining Your School Garden. California: California School Garden Network.



- CNN. 2015, 28 September. The blossoming health and academic benefits of school gardens. <https://edition.cnn.com/2015/08/14/health/healthy-school-gardens/index.html>. Accessed on 16 July 2018.
- Delimasa G, Klara., Ngadino, and Samidi. 2012. Hand puppet media can enhance storytelling skills (Media boneka tangan dapat meningkatkan keterampilan bercerita). PGSD FKIP University of Sebelas Maret. *Journal of Didaktika Dwija Indria (SOLO)* Vol 2, No 2 (2012): September. Portal Garuda.
- Desmond, D., Grieshop, J., Subramaniam, A. 2004. *Revisiting Garden-based Learning in Basic Education*. Paris, France: FAO/UNESCO.
- Food and Agriculture Organization. 2006. *School Gardening a Horticulture and Nutrition Education Tool*. Rome, Italy: FAO.
- Food and Agriculture Organization. 2010. *A New Deal for School Gardens*. Rome, Italy: FAO.
- Food and Agriculture Organization. 2015. *Regional Consultation on "Promoting School Gardens and Home Gardens for Better Nutrition in Asia and the Pacific"*. Bangkok, Thailand: FAO.
- Herawati, Nani and Sudarmayanti, Arie. Several ways to prepare planting media, seedling of fruit and vegetable plants. 2014. http://ntb.litbang.pertanian.go.id/ind/index.php?option=com_content&view=article&id=916:beberapa-cara-mempersiapkan-media-tanam-perbenihan-tanaman-buah-dan-sayur-&catid=53:artikel&Itemid=49 . Accessed on 19 Agustus 2018.
- Huys, N., De Cocker, K., De Craemer, M., Roesbeke, M., Cardon, G., De Lepeleere, S. 2017. School Gardens: A Qualitative Study on Implementation Practices. *International Journal of Environmental Research and Public Health*. Doi: 10.3390/ijerph14121454.
- Science 5: for Primary school and grade V/ Heri Sulistyanto, Edi Wiyono; editor Robin Ginting,— Jakarta: Book Center, Education Department.
- Kammar, M., Biradar, A.P., Angadi, S.C., Vidyavathi, G.Y. 2017. Impact of School Nutrition Garden on the Nutrient Intake of Children. *Asian Journal of Agricultural Extension, Economics & Sociology*. 18(2): 1-6.



- Ministry of Health. 2014. Guidelines for balance nutrition. Ministry of Health. Jakarta.
- Kemal, Isthifa. 2013. Writing Poetry with Fun Learning. <http://guraru.org/guru-berbagi/menulis-puisi-dengan-pembelajaran-yang-menyenangkan/>. Accessed on 26 September 2018.
- Kunyah Bandung. Daily Fresh. 2014. <http://kunyahbandung.blogspot.com/2014/10/daily-fresh.html>. Accessed on 12 September 2018.
- Laird, H. 2016. Garden-Based Nutrition Education Programs: A Review of Impact and Evaluation Methods. [Thesis]. Pittsburgh: University of Pittsburgh.
- Morris, J.L. & Zidenberg-Cherr, S. 2002. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *Journal of The American Dietetic Association*. DOI: [https://doi.org/10.1016/S0002-8223\(02\)90027-1](https://doi.org/10.1016/S0002-8223(02)90027-1).
- Muchtadi, Dedy. 2010. Protein Nutrition Value Evaluation Techniques (Teknik Evaluasi Nilai Gizi Protein). Bandung: Publisher Alfabeta.
- Obor Berkat Indonesia. 2014, 23 December. School Nutrition Park that Has an Impact on Families. <http://www.obior.id/read/id/78/title/Taman+Gizi+Sekolah+Yang+Berdampak+Bagi+Keluarga.html>. Accessed on 5 July 2018.
- Obor Berkat Indonesia. 2018. School Nutrition Park that Has an Impact on Families. http://www.obior.id/gallery/photo_dir/29.html. Accessed on 16 July 2018.
- Product Development and Services Department SEAMEO BITROP. Oyster Mushroom, http://sl.biotrop.org/index.php?option=com_content&view=article&id=150&Itemid=138. Accessed on 31 August 2018.
- SEAMEO BIOTROP. 2016, 1 April. 53 Teachers from 9 Provinces in Indonesia participate in School Garden Training. <https://www.biotrop.org/news.php?id=525>. Accessed on 5 July 2018.
- SEAMEO RECFON. 2016. Handbooks and Collections of Lesson Plans for Primary School Teachers: Nutrition and Health of Elementary School-Age Children. Jakarta: SEAMEO RECFON.



- Suparti et al., 2014. White Oyster Mushroom Protein (*Pleurotus ostreatus*) in Media of Sawdust, Sugarcane Dregs and Husk Charcoal, Department of Biology Education, Faculty of Teacher Training and Education, Muhammadiyah University Surakarta.
- Somerset, S & Markwell, K. 2009. Impact of a school-based food garden on attitudes and identification skills regarding vegetables and fruit: a 12-month intervention trial. *Journal of Public Health Nutrition*. 12(2): 214-221.
- Yunus, Syahroni. How to grow tomato in polybag. <https://alamtani.com/cara-menanam-tomat/>. Accessed on 19 August 2018.
- Wiki How. How to Make Hand Puppet. <https://id.wikihow.com/Membuat-Boneka-Tangan>. Accessed on 30 September 2018.

A COLLECTION OF LESSON PLAN
FOR PRIMARY AND SECONDARY
SCHOOL TEACHERS

SCHOOL GARDEN-BASED NUTRITION EDUCATION



Contact Address :
SEAMEO REC FON
Jalan Raya Utan Kayu No. 1A
Kel. Utan Kayu Utara, Matraman
Jakarta Timur - Indonesia

Phone : +62 21-22116225, 22116934
Fax : +62 21 22116456
E-mail : information@seameo-recfon.org
Website : <http://www.seameo-recfon.org>



Southeast Asian Ministers of Education Organization
Regional Centre for Food and Nutrition
SEAMEO REC FON
2022

ISBN 978-623-7759-63-8 (PDF)



9 786237 759638