LifeTek-TLE 7

Practical Skills for Home and Livelihood

EDITION 1

techFactorsInc
Making learning a great experience

Maribeth C. Marollano
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FOREWORD

A livelihood is a necessity in life for adults anywhere in the world. While most people are content to earn a living as an employee, there are those who want to be self-reliant where their livelihood is concerned. Hence, the reason for the creation of the LifeTek-HELE and LifeTek-TLE courseware series by TechFactors Inc. (TFI)

TechFactors understands that it takes both knowledge and skill–applied knowledge–to be able to earn a living on one's own efforts. Without these, it won't be easy to make products or provide services for potential customers and clients. The LifeTek-HELE and LifeTek-TLE courseware teach livelihood education in a way that enhances both; adding information to knowledge that students may already know by way of discussion and using performance-based lessons to develop skills that students can employ later on in their work.

With the use of the Techfactors LifeTek-HELE and LifeTek-TLE courseware, livelihood educators would be able to focus on their ultimate goal for every Filipino student—to make them productive and contributing members of Filipino society.

About the Author

Maribeth C. Marollano

Maribeth graduated from Bulacan State University with a Bachelor of Secondary Education, major in T.H.E. She has been teaching at the Cecilio Apostol Elementary School for 15 years and currently handles MTB-MLE, at the same time serving as finance officer of the school. She is a recognized storybook writer who won 3rd place in the 2019 Division Search for Outstanding Learning Resource Materials for her story book titled, Ang Kompyuter ni Peter and Spokuwento, which won 2nd Runner Up in the Division Level.

About this Resource

The LifeTek-TLE 7 module teaches the skills needed for specific industries that can make students more proficient in these areas helping them acquire 21st century skills. This will enable the learners to be productive in daily aspects of life and work and improve their chances of succeeding in the future. Subjects include Home Economics, Agri-Fishery-Arts, and Industrial Arts.

Learning Outcomes

At the end of the course, the learners will be able to:

1. Acquire knowledge that provides opportunities to explore different livelihood fields.
2. Practice ways to acquiring 21st century skills.
3. Improve the chances of livelihood success by developing self-help habits.
4. Demonstrate the ability to produce products by providing learners a meaningful and productive learning experience.

HOW TO USE THIS RESOURCE

Learning Outcomes

Each lesson has its own set of learning goals. This informs the readers on what is expected to be learned by the end of the lesson.

Engage

This is a brief and fun activity that is related to the topic that can help in attracting the attention of the students.

Explore

This is an assessment tool that is administered before the discussion and is used to determine the student's prior knowledge on the subject matter.

Research

This is an activity for the student's additional knowledge and information before the lesson discussion.

Explain

This is where the main content of the lesson is found.

Exercise

This contains exercises after the discussion.

Summary

This is a synopsis of the lesson.

Lesson Output

This is an individual or group project to determine the student's practical mastery of the subject matter.

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LESSON 1 Basic Nutrition

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define nutrition.
2. Identify the nutritional needs of children by age level.
3. Determine the nutritional requirements needed for children's development.
4. Create a budget for a weekly meal plan.

Engage

Watch the following videos.

Fighting Malnutrition in the Philippines

https://youtu.be/DANtVInL6U0

Philippines: Nutrition crisis hinders children's performance in schools

https://www.youtube.com/watch?v=EiwYfk5QF2o

Trivia

Did you know that as many as 95 Filipino children die from malnutrition every day? That's why different government agencies have programs to lessen the malnutrition problem in our country. In 2018, the Department of Education, one of the agencies concerned with this problem, launched **Oplan Kalusugan** (OK) that focuses on "major school health and nutrition programs, specifically the School-Based Feeding Program".

The program's main objective is to improve the health and reduce absenteeism of severely undernourished students by serving free and nutritious meals. Teachers and volunteer parents are lending a helping hand to ensure that schoolchildren are eating healthy food.

source: https://www.unicef.org/philippines/child-survival

Explore

Directions: Choose the letter of the correct answer.

1. _____ is about eating a healthy and balanced diet.

    a. Nutrition
    b. Balanced diet
    c. Malnutrition

2. It is needed for building, repairing your body tissue, and supplying oxygen to the blood.

    a. Iron
    b. protein
    c. fats

3. _____ helps build strong bones and teeth.

    a. calcium
    b. protein
    c. fats

4. It prevents obesity, high cholesterol, and colon cancer.

   a. calcium b. protein c. fiber

5. A strategy used to know what you're going to eat for a day, a week, and for a month.

   a. meal plan b. planning c. fiber

Research

1. How does malnutrition affect learning?
2. What are the different kinds of food that you eat at home? Do you think they're nutritious?

Explain

Nutrition – it is about eating healthy food and keeping a balanced diet. The lack of a nutritious diet affects the health of our body.
We know that meals are important in our lives because they're the source of energy for us to get things done, but we also need to realize that getting good nutrition requires eating the **right kinds** and amount of food, aside from eating meals regularly.

The nutritional needs of our body differ by age level and change as we age.

Infants (from birth to 1 year old)

Nutrition during infancy is essential to ensure the full potential of infants' growth, health, and development.

- 0 to 4 months – the baby only needs breastmilk or baby formula.
- 4 to 6 months – they can eat soft food such as oats, porridge and mashed fruits and vegetables like potato, banana and apple.
- 6 to 10 months – you can add broccoli and cauliflower
- 10 to 12 months – all grains and cereals

Toddlers (1-4 years old)

Several developmental changes are happening to children at this age level. The growth rate slows down and with this comes a decrease in appetite. For children of this age, we need to offer foods with different tastes, textures, and colors. Breastfeeding is also recommended for this age level.

School-aged Children (6-10 years old)

Children in this age bracket are growing steadily, and can eat up to five times a day. Because of this, they need more healthier food and snack options. These children can eat all the foods from the five food groups.

Adolescent (10-19 years old)

This age group experiences the onset of **puberty**, which is the transition from childhood to adulthood. Aside from physical development, adolescents undergo psychological development during this stage. The right food, combined with the practice of healthy lifestyle choices, is important for adolescents because they tend to carry these habits into later in life.

Healthy food for infants, toddlers, school-aged children and adolescents includes a wide variety of fresh items from these food groups:

vegetables

grains

fruits

protein

dairy

A meal plan made up of selections from these five groups will give all the nutrients that your body needs.

Fruits and vegetables

Fruits and vegetables give us energy, vitamins, and minerals such as vitamins C and A, folate and potassium. They are also the best source of fiber, which helps prevent constipation and other digestion problems, as well as water that helps us to regulate body temperature. They also contain antioxidants that help reduce the risk of heart disease, high blood pressure, and certain cancers.

Grain foods

Grain foods include rice, which is a staple food in the Asian diet, as well as oats, corn and barley. This group also includes processed food, such as the different forms of bread and pasta.

Eating grain-based food is a quick way to gain energy because they are made up mostly of carbohydrates. Grains also have nutrients like the B vitamin group (thiamine or vit. B1, riboflavin or vit. B2, niacin or vit. B3, and folate or vit. B9), along with minerals like iron, magnesium and selenium, which activate the conversion process of food into a form of energy that bodies can use. Since grains come from plants, they are also a source of dietary fiber.

Protein

Protein-rich foods play a huge role in the proper functioning of the body. The protein we get from food is used to build and repair body tissue, such as the cells that make up skin, hair, organs, muscle and bone. Proteins also help in oxygenating blood, making **enzymes**, which power chemical reactions in the body, and **hormones,** which are used by the body's cells and organs to communicate with each other.

Protein-rich foods include chicken, mushrooms, nuts, fish, lean meats, beans, and many others.

Dairy Foods

The dairy food group is an excellent source of calcium, which is important for strong bones and healthy teeth.

Dairy foods include milk (including lactose-free milk), yogurt, and cheese. Dairy alternatives, like soy milk and soy yogurt can be consumed by people who have milk allergies and/or lactose intolerance.

Butter, cream, cream cheese and sour cream are also made from milk but are not included in the group because of their lower calcium and higher fat content compared to the other kinds of dairy food.

Here are some of the essential nutrients, their functions and ideal serving amounts per age level.

Nutrients	Function/s	Amount body needs
Calcium Sources: dairy and non-dairy products, leafy vegetables, milk	Helps build strong bones and teeth. Prevents osteoporosis.	**Infants:** 200-260 mg per day **Toddlers:** 700 mg per day (2-3 servings) **School-aged:** 1,000 mg per day (2-3 servings) **Adolescent:** 1,300 mg per day (4 servings) Source: Kidshealth.org
Fats **Saturated fats**: red meat, chicken skin, butter, lard **Unsaturated fats**: olive, canola oil, avocados, sesame seeds	Help the brain develop. Protect against infections. Keep skin and hair healthy.	**Infants:** 40-50% (breast milk and infant formula) **Toddlers:** 30-35 % **School-aged:** 25-35 % **Adolescent:** 25-35% Source: academic.oup.com

Iron Sources: fruits, nuts, shellfish, legumes, dark and leafy vegetables	Boosts the immune system Converts blood sugar to energy	**Infants:** 11 mg per day **Toddlers:** 7 mg per day **School-aged:** 10 mg per day **Adolescent:** 8 mg per day Source: kidshealth.org
Protein Sources: lean meat, fish, poultry products, milk, cheese, and beans	Builds and repair body tissue Supplies the body with energy	**Infants:** 1-1.5 g per kg of body weight **Toddlers:** 0.9 g/kg/day **School-aged:** 0.9g/kg/day **Adolescent:** 0.9 g/kg/day Source: ncbi.nlm.nih.gov
Fiber Sources: Fresh fruits, vegetables, legumes, and nuts	Normalize bowel movement. Prevents obesity, high cholesterol, and colon cancer.	**Infants:** 5g per day **Toddlers:** 5g per day **School-aged:** 5-10 g per day **Adolescent:** 15-20 g per day Source: intermountainhealth-care.org

Now that we know the nutritional requirements for different age levels, we are now ready to set a weekly meal budget. But before that, it's best to know what a meal plan is.

Meal plan – a strategy for what you're going to eat for a day, a week, and for a month. This may include the specific diet for your age group. It is useful for knowing how much you're going to eat and improving your choice in food.

How do you make a weekly meal plan?

1. **Make a menu**. Decide which recipes you will make for breakfast, lunch and dinner (much better if you will plan for a one-dish-meal).

2. **Avoid a recipe that needs a special ingredient**. Special ingredients are always costly so it's best to avoid these.

3. **Look for seasonal recipes**. Fruits and vegetables that are in season are cheaper than others.

4. **List your daily activities**. More physical activities would require more nutritious food.

Sample Weekly Meal Planning for Adolescent(10 – 19 years old)

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Breakfast	fried rice, egg, long-ganisa, milk	pandesal, cheese, milk	rice, fried tinapa and scrambled egg	arrozcal-do, papaya fruit	toasted bread, Milo	dried bangus (dinaing), rice	yogurt, poached egg
Snack	banana	grapes	mamon, juice	n/a	n/a	n/a	n/a
Lunch	plain rice, sinigang, orange juice	bread, water	ginisang ampalaya, plain rice	menudo, plain rice	fish fillet, salad, rice	pinakbet, rice, tilapia	chopsuey, rice, pork-chop
Snack	n/a	n/a	Tuna sandwich	Banana cue	n/a	n/a	n/a
Dinner	spaghetti, juice	plain rice, chicken adobo	fried galung-gong and leftover ginisang ampalaya	home-made burger steak	chicken curry, banana	sotang-hon, puto	roasted chicken, garlic bread, orange juice

The following safety precautions must be followed to minimize the risk of food-borne infections as well as the loss of nutrients in the food we eat.

1. **Clean**
   - **1.1** Wash hands before you start preparing foods.
   - **1.2** Sanitize the tools to be used in preparing food, as well as all work surfaces, utensils, and food containers.
   - **1.3** Wash fruits and vegetables before slicing or cutting it, as it will lose its nutrients when you wash it if already sliced.

2. **Chill and Store**
   - **2.1** Some kinds of dry food may be kept at room temperature.
   - **2.2** Keep uncooked wet food like meats and fish in the freezer to keep them fresh and free from rot.
   - **2.3** Keep vegetables in the bottom drawer of the refrigerator.
   - **2.4** Store cooked food in the refrigerator once it has cooled down to room temperature.

3. **Cook**
   - **3.1** Use the correct kind of cookware with a lid or covering to maximize heat from the stove.
   - **3.2** Cook food at the correct temperature to kill off microbes thoroughly.

IN BUSINESS

When you are entering the food business, you need to know the nutritional needs of your customers, not only their favorite foods. Our goal should not only be to earn money, but to take good care of their health as well.

Summary

Nutrition is important in our lives. Food affects the health of our body. We should only eat healthy foods.

We should remember the following:

a. Eat a variety of foods every day (from the five food groups).
b. Eat just enough food.
c. Eat clean and safe foods.
d. Eat more vegetables and fruits.

Exercises

Exercise 1

Directions: Write T if the statement is true and F if false.

_____ 1. Meal plan is used for planning ahead of your future needs.

_____ 2. Food rich in protein have a huge role in your body.

_____ 3. We should wash our hands before we start preparing foods.

_____ 4. The protein food group is an excellent source of calcium.

_____ 5. Grain foods which include bread, pasta, oats, barley, rice, and corn give you energy you need to develop, grow, learn, and also give long-lasting energy every day.

Exercise 2

Directions: Identify the following.

_____ 1. It boosts the immune system.

_____ 2. Helps us to develop our brain.

_____ 3. It is needed for the repair of your body tissue and oxygenation of blood.

_____ 4. It is also called the transition between childhood and adulthood.

_____ 5. It helps build strong bones and teeth.

Lesson Output

Make a spreadsheet budget for a weekly meal plan according to your age level. Your teacher will give you a due date for sending in this activity. Be prepared to present your output to your teacher. You will be rated based on the overall evaluation.

RUBRICS FOR MAKING A WEEKLY MEAL PLAN ACCORDING TO AGE LEVEL

Criteria	5	4	3	2	1	Points
1. Proper use of Tools and Equipment	Excellent in using tools and materials	Good in using tools and materials	Average in using tools and materials	Fair in using tools and materials	Poor in using tools and materials	
2. Time Management	Activity completed ahead of time.	Activity completed within allotted time.	Activity completed 1 day beyond allotted time	Activity completed 2 days beyond allotted time	No attempt made	
3. Safety work habits	Observes safety precautions at all times	Observes safety precautions most of the time	Observes safety precautions only sometimes	Most of the time not observing safety precautions	No attempt in observing safety precautions	
4. Follow steps in making a weekly meal plan	The student followed the steps in making a weekly meal plan excellently.	The student followed the steps in making a weekly meal plan properly and effectively.	The student adequately followed the steps in making a weekly meal plan.	The student followed the steps in making a weekly meal plan less effectively.	The student did not follow the steps in making a weekly meal plan properly.	
Total						

LESSON 2 Kitchen Safety and Sanitation

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define kitchen safety and sanitation.
2. Identify kitchen premises and basic tools in sanitation.
3. Demonstrate kitchen safety and sanitation.

Engage

Look at the pictures:

Question:

1. What do you see in each picture?
2. Do you think the kitchen in each picture is safe to use? Why?

Trivia

Did you know that the Philippines is one of many countries that use what is called a dirty kitchen? Many Filipino homes have this kind of kitchen, especially in subdivisions and areas with extra space in their yard. Despite the unappetizing name, a "dirty kitchen" is simply a second kitchen outside the main house where the messier part of food preparation commonly happens, in order to keep the "main" kitchen of the house clean for guests.

Some dirty kitchens have special cooking amenities, like concrete stoves or ovens that can use alternative fuels for cooking, such as firewood, charcoal, and wood shavings or "kusot". If the concrete stove is attached to the house, it can have a smokestack or chimney to funnel smoke away.

Explore

Let's see what you already know about kitchen safety and sanitation.

Directions: Choose the letter of the correct answer.

1. We use these to protect our hands while cleaning the kitchen.

    a. kitchen gloves
    b. waste can
    c. broom

2. This room is used as a stock room for food.

    a. storage room
    b. kitchen
    c. waste can

3. A room used in preparing food.

   a. storage room b. kitchen c. waste can

4. Temporary storage of kitchen waste.

   a. waste can b. storage room c. kitchen floor

5. This is the process of eliminating microorganisms except bacterial spores on inanimate surfaces using chemical methods.

   a. sterilization b. disinfectant c. disinfection

Research

Choose one of the questions below and answer it in 5-7 sentences.

1. What is the best thing to do to keep our kitchen safe?
2. Is your kitchen safe and free of germs?

Explain

Definition of terms

Kitchen – a room used in preparing food.

Sanitation – the science and practice of creating and maintaining the cleanliness and hygiene of a given place.

Kitchen safety – the use of precautionary methods to prevent diseases and accidents when preparing food items.

Disinfection – the process of eliminating microorganisms except bacterial spores on inanimate surfaces using chemical methods.

Disinfectant – a substance used in eliminating bacteria and other microorganisms.

Sterilization – the process of eliminating microorganisms (including bacterial spores) using heat or other methods.

Kitchen Safety and Sanitation

Kitchens are one of the busiest parts of any home, especially if you have family members that love to cook. However, anyone who's ever spent time in a kitchen would know that cooking is often a messy process — even more so if you are preparing a dish that includes raw meats. Because of this, kitchen surfaces are a common breeding ground for bacteria and parasites. Aside from those, kitchens are also filled with appliances and instruments that can cause injury if not used properly. This is the reason why aside from food safety, **kitchen safety** and **sanitation** play an important part in preventing accidents and avoiding diseases.

What is kitchen safety?

In March 2005, 28 grade school children in the town of Mabini in the island of Bohol died while 105 people were hospitalized after eating a fried pastry made from cassava root (also known as *kamoteng kahoy* or *balinghoy*)

Initially, authorities believed that the victims were affected by the natural toxicity of cassava — the roots of the plant used to make flour have very high levels of the deadly poison cyanide, but preparing and cooking cassava roots thoroughly makes it safe for people to eat.

After investigation and analysis of samples however, it was discovered that the cassava flour used for the pastry was contaminated with a pesticide called carbamate, which is commonly used in the area.

The unfortunate incident above could have been prevented if proper kitchen safety practices were observed, such as keeping toxic chemicals away from food preparation areas.

Kitchen safety practices take into account the use of open flame, cutting instruments and electric appliances during food preparation. You may recognize some of these practices being done in your homes.

When Cooking:

- Use the correct cookware for the job.
- Some kinds of cookware need special care. For example, non-stick cookware needs to be at room temperature before being washed to preserve the coating.
- As much as possible, do not wear loose clothes or dangling accessories which may come in contact with fire or get tangled in long pot handles.
- Keep long hair tied back and use a hair net.
- Always use pot holders when handling cookware from the stove, even if the cookware has rubber handles.
- Make sure that pot handles are out of the reach of children, and not hanging over the edge of the stove so adults won't bump into them.
- Clean up spills immediately.

- Make sure that the stove is completely shut off after cooking; some stoves can appear off because no flame is visible, but are actually leaking gas because the knob is not closed all the way. This can lead to a build-up of gas, which can ignite and explode if a spark happens.
- Keep gas hoses away from open flame, as the heat can make the material brittle and prone to cracking.
- Check gas tank fittings like regulators and hoses periodically, and replace them if they show signs of leaks or damage.
- Close the gas tank valve after cooking.
- Always have a fire extinguisher on standby for emergencies.

When using cutting instruments:

- Use the correct cutting implement for the job. Kitchen knives are for light cutting tasks, while cleavers or kitchen scissors are for heavy tasks like cutting meat with bone. Kitchen knife blades can get chipped, bent and lose their edge if used to cut bone.
- Do not use knives to open cans; use can openers instead.
- Store knives in drawers or blocks and away from children.
- Do not roughhouse when using cutting instruments.
- Keep your hands and fingers away from the edge of the blade when being used.
- Sharpen blades in order to cut with less effort.
- Use peelers instead of knives to remove skin from fruits and vegetables, but be careful as they also have sharp blades.
- Use a chopping board when cutting food items. Replace the chopping board regularly.

When using electric appliances

- Make sure your hands are completely dry when plugging or unplugging appliances from outlets.
- Do not use appliances with damaged cords.
- Do not use any kind of metal utensil, container or food wrapper when heating food inside microwave ovens.
- Use pot holders when retrieving food from ovens.
- Check for cracks before using blenders and other appliances that run at high speeds.
- Dry off the bottom side of rice cookers before using.
- Be careful when washing blenders, as the blades inside the pitcher are sharp and can cut your fingers.
- Wash accessories used in food preparation immediately after use.

Food preparation area

- Mop up spilled liquids immediately.
- Keep toxic chemicals away from food preparation areas.
- Rinse cleaning products off food preparation stations thoroughly.
- If you are cooking in an outdoors kitchen, make sure that the ingredients are inside covered containers to keep it from insects, mice, and dust.
- Clean up immediately after cooking.
- Keep garbage containers covered, and dispose of garbage regularly.

What is sanitation?

You may spend a lot of time observing food safety procedures before cooking, but preparing food in a dirty environment exposes it to the same risk of contamination from disease-causing microbes that safe food handling practices may have avoided. Keeping kitchens clean and sanitary lessens this risk. This practice is called kitchen safety, or sanitation.

In general, **sanitation** is the science and practice of cleaning and maintaining the hygiene and cleanliness of a place. Two words are commonly associated with sanitation practices: **disinfection** and **sterilization**. While commonly taken to mean the same thing, they actually refer to two different levels of cleaning.

Disinfection: This refers to eliminating the microorganisms on an object or surface through mostly chemical methods. This is the cleaning method usually done at home, using **disinfectants** (a chemical used to kill microorganisms) like bleach or anti-bacterial cleaning powder. Disinfection kills active bacteria on surfaces, but is generally ineffective if the bacteria is in spore form.

> **NOTE**: Ultraviolet (UV) radiation can also be used to disinfect items, but using it for anti-microbial purposes requires the use of UV type-C, the strongest kind of UV radiation. UVC can cause burns to skin and eye damage, degrade certain materials like plastics, polymers and dyed textiles, and in some cases, can generate ozone, a form of oxygen that can irritate the respiratory system.

Sterilization: This method kills off all kinds of microorganisms (even bacterial spores) and is done primarily in hospitals and clinics. Sterilization uses agents such as steam under pressure, dry heat, gases like ethylene oxide and hydrogen peroxide in plasma form, and some kinds of liquid chemicals to clean objects.

A simpler kind of sterilization can be done at home. Utensils can be boiled in water for at least 20 minutes to kill most active microbes.

What are bacterial spores?

Like other living things, certain kinds of bacteria have defenses in order for them to survive harsh conditions. One of these defenses is their conversion into **spores**. Bacterial spores have minimal levels of metabolism and respiration; however, they can survive lack of water and nutrition. With their thick cell walls, spores can also survive in heat and cold, chemicals, ultraviolet radiation, and acidic conditions. Once conditions get better, spores can revert back to active bacterial states. Spores can cause potentially life-threatening diseases like anthrax, tetanus and a food-borne illness called botulism.

If done on a regular basis, cleaning and disinfection does a lot to keep microbial numbers down and make kitchens safe for food preparation.

Kitchen areas that we need to clean

a. Kitchen floor and walls - prone to dirt and oil spatter.

Steps in cleaning floors

1. Use a clean mop and clean water.
2. Add detergent and disinfectant to water.
3. After mopping with a cleaning solution (detergent and disinfectant) rinse the mop cloth with clean water before mopping again.

Steps in cleaning walls

1. Dust the wall.
2. Use a clean cloth or sponge and clean water. You can make a detergent solution with soap and water if the wall surface is stained or greasy from oil spatter.
3. Rinse and disinfect the wall.

b. Work benches/working tables – prone to growth of different harmful bacteria because of leftover food matter from food preparation.

Steps in cleaning working benches and tables

1. Remove any visible materials.
2. Use a clean cloth or sponge and hot water with detergent.
3. Rinse with hot water.
4. Allow it to dry.

c. Storage room – should be clean and well-ventilated because it holds dry food items.

Steps in cleaning the storage room

1. First, empty your storage unit and start by cleaning the walls and floor. (follow the steps in cleaning kitchen floors and walls)
2. Allow it to dry completely before setting everything back.

d. Sinks and food disposal – prone to dirt, grease and bacterial growth.

Steps in cleaning sinks and food disposal

1. Scrub the sink with a soap-dispensing brush.
2. Clean all the nooks.
3. Disinfect it.
4. Let it dry.

e. Exhaust fans and filters – removes steam, smoke, heat, and cooking odor from enclosed spaces.

Steps in cleaning exhaust fans and filters

1. Remove the filter.
2. Soak it in the hot water with vinegar.
3. After 10 minutes, scrub it.
4. Rinse it and let it dry.

f. Garbage storage area – Wash food containers before disposal to prevent foul odors. Segregate garbage into recyclable and non-recyclable items, and dispose accordingly based on your local regulations. Make sure that the container holding non-recyclable items is covered to prevent insects (flies, cockroaches) and animals (stray dogs and cats, rodents) from getting to it.

Steps in cleaning garbage storage.

1. Empty the trash can.
2. Rinse it with clean water and detergent.
3. Scrub it.
4. Rinse and disinfect.
5. Place it under the sun to dry.

Basic tools for keeping the kitchen safe and clean.

1. Kitchen gloves – made of rubber or latex and used to protect your hands while cleaning.

2. Mop - usually made of plastic and metal with an absorbent cloth at the end. Used in drying the floor where a liquid has spilled.

3. Different types of brushes – usually used in cleaning floors, walls, and hard-to-reach areas like corners and spaces in between tiles.

4. Disinfectant and detergent – available in different stores and used as germ killers.

5. Broom and dust pan – cleaning tools usually made of plastic, wood, or steel. Sometimes the broom is made of stiff twigs or fibers.

6. Waste can – a temporary storage bin for waste and usually made of steel and plastic.

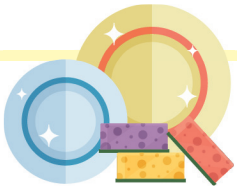
IN BUSINESS

The food business is one of the best ventures to enter here in the Philippines. If you want to earn money from food, one of the things you need is a sanitary permit. You will not be awarded one if you don't have a safe and clean kitchen that can guarantee that the food you prepare and serve customers is safe for consumption.

Summary

The kitchen is the most popular and favorite room in the house. So, we should keep it clean and safe for all. The best way to keep your kitchen clean is to make a habit of cleaning up as you cook. We should apply the "clean as you go," policy at all times.

Exercise



Exercise 1

Directions: Identify the following.

_____ 1. The science and practice of creating and maintaining the cleanliness and hygiene of a given place.

_____ 2. A substance used in eliminating microorganisms.

_____ 3. The use of precautionary methods to prevent diseases and accidents when preparing food items.

_____ 4. The process of killing germs using heat or other methods..

_____ 5. It is the process of killing or eliminating germs and diseases.

Exercise 2

Directions: Write **T** if the statement is true and **F** if false.

_____ 1. We don't need to disinfect and sterilize utensils and equipmentused in cooking foods.

_____ 2. Use dry hands in plugging electric appliances.

_____ 3. We need to wash our hands properly in preparing food.

_____ 4. Playing while using a sharp object is necessary.

_____ 5. Sanitizing the premises keeps us safe from harmful bacteria.

Lesson Output

Create a short video demonstration on kitchen safety and sanitation. Your teacher will give you a deadline for your activity.

Suggestion: The student may post the video on their YouTube or FB account.

RUBRICS FOR CREATING A SHORT VIDEO DEMONSTRATION ABOUT KITCHEN SAFETY AND SANITATION

Criteria	5	4	3	2	1	Points
1. Proper use of basic tools for keeping the kitchen safe and clean	Excellent in using tools.	Good in using tools.	Average in using tools.	Fair in using tools.	Poor in using tools.	
2. Time management	Activity completed ahead of time.	Activity completed within allotted time.	Activity completed 1 day beyond allotted time.	Activity completed 2 days beyond allotted time.	No attempt made to submit on time.	
3. Safety work habits	Observes safety precautions at all times.	Observes safety precautions most of the time.	Observes safety precautions only sometimes.	Most of the time not observing safety precautions	No attempt in observing safety precautions.	
4. Adherence to steps in cleaning different common kitchen premises	The student followed the steps in cleaning kitchen premises excellently.	The student followed the steps in cleaning kitchen premises effectively.	The student followed the steps in cleaning kitchen premises.	The student followed the steps in cleaning kitchen premises less effectively.	The student did not follow the steps in cleaning kitchen premises.	
Total						

LESSON 3 Cookery and Utensils

Learning Outcomes

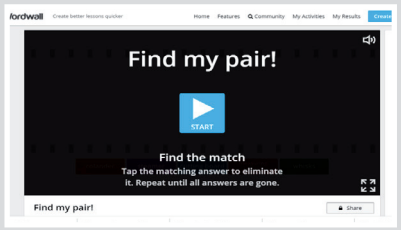
At the end of the lesson, you are expected to be able to:

1. Define what cookery is.
2. Identify the tools and equipment used in cooking.
3. Demonstrate different ways of cooking.

Engage

Click the link to access the interactive game. Enjoy!

Find my pair!



https://wordwall.net/play/10585/897/982

Trivia

Did you know that we are famous for not using knives, just a spoon and a fork, or just our bare hands, to enjoy our food? We Filipinos are known throughout the world as being a food-loving people, and because, traditionally, we do not use a knife to cut the food we eat. Moreover, food is also enjoyed when eaten using bare hands.

Explore

Let's see what you already know about cooking and the tools used to cook with.

Directions: Match column A with the correct answer on column B. Choose the letter of the correct answer.

Column A		Column B
_____ 1.		a. Mortar and Pestle
_____ 2.		b. Frying Pan
_____ 3.		c. Vegetable Peeler

_____ 4. 

d. Can Opener

_____ 5. 

e. Pressure Cooker

Research

Give at least 5 different methods or ways of cooking food.

Explain

Definition of terms

Cookery – the practice or skill of preparing and cooking foods for consumption.
Cooking – the practice of preparing food by using, combining and heating ingredients.
Kitchen utensil – a small, handheld tool used to help prepare food.
Cookware – pots, pans and other such vessels, such woks and steamers, which are used to cook food in.

Cooking everyday food needs some planning. These are some of the factors to consider.

1. **Food**. What kind of food do people want to eat?
2. **Budget**. Do we have enough money to buy the ingredients we need?
3. **Number of people/guests eating**. How many people will eat?
4. **Availability of ingredients**. What ingredients are available in our market or grocery store?
5. **Types of kitchen utensils and other cooking equipment available**. We need to identify and prepare the tools to be used in cooking dishes to save time and effort.

We don't need to be an expert chef to know the different functions and uses of the different kinds of kitchen utensils and cookware available to us. Such knowledge may or may not improve the taste of foods we are cooking, but knowing the basics can help us save time, money and effort when cooking.

CLASSIFICATION OF COOKING TOOLS ACCORDING TO USE

COOKWARE

1. Steamer – used to cook food using steam. It is, for example, used to heat food like *siomai* and *siopao*.

2. Pressure cooker – commonly used to soften different kinds of meat which are not easy to cook.

3. Wok – a large bowl-shaped pan used for such cooking methods as stir-frying.

4. Frying pan or skillet – also called *kawali* in the Philippines. It is a flat-bottomed pan used to fry, sear, and brown different kinds of food.

5. Double boiler – cookware that consists of two pots that use steam to melt or cook food. It is usually used to melt chocolate to create ganache for different kinds of dessert.

"double boiler" by Beth, licensed under CC BY 2.0 https://www.flickr.com/photos/laundry/4172846723

6. Kettle, or *takure* – used to boil water, and has a lid, spout and handle. Nowadays we can use electric kettles, which are easily available on the market.

Ordinary Kettle

Electric Kettle

MIXING AND BLENDING UTENSILS

1. Whisk – a cooking utensil used to smoothly mix ingredients together, and also to add air into a mixture. This process is called "whisking," or "whipping," and the utensil used for this – the whisk – usually consists of a long, wooden or plastic handle and wire loops.

2. Wooden spoon – used for stirring and is commonly used in cooking because wood does not heat up easily, acidic ingredients do not react to it, and it is soft enough to not scratch pots.

3. Mortar and pestle – also known as *dikdikan* or *almires*. Used to grind or crush ingredients such as pepper and garlic. It is usually made of ceramic, marble or steel.

4. Mixing bowl – a bowl used to mix dry and wet ingredients together. These can be made of plastic, ceramic, glass or copper.

CUTTING/OPENING/PEELING UTENSILS

1. Can opener – used to open canned goods.

2. Cutting board, or *sangkalan* – commonly used in chopping raw food. These are usually made of wood and plastic.

3. Graters – used to grate food. These are commonly made of metal, but also may be plastic or wood.

4. Kitchen shears/scissors – commonly used to cut herbs and poultry products. These are usually made of plastic and steel.

5. Kitchen knife – utensil commonly used to prepare food, which is why it is called "the chef's best friend."

Types of Knives

a. Paring knife – a small knife used to peel fruits and vegetables.

b. French knife or Chef's knife – used for most food preparation such as cutting, chopping and peeling.

c. Utility or salad knife – usually used to cut small fruits, vegetables or other small food ingredients.

d. Santoku knife – used to dice, mince, and slice food ingredients.

6. Vegetable Peeler – it is used to peel or remove the outer layers of fruits and vegetables.

SERVING UTENSILS

1. Serving spoon – a large spoon or ladle used to serve portions of food from the main dish. It is bigger than the spoon that we usually use to eat with.

2. Serving Tongs – these are used to grip or lift food.

3. Spoons – commonly used to eat food with.

4. Fork – commonly used to eat with, as well as for splitting food into smaller pieces. In fine dining, the fork is used to hold the food while it is being cut with a knife.

5. Plate – it is a flat vessel commonly used to serve food. Plain plates are used in most occasions. Nowadays, plates are made of plastic and sometimes, wood.

MEASURING TOOLS

1. Measuring Glass – commonly used to measure liquid ingredients.

2. Measuring cups – used to measure the volumes of liquid ingredients as well as large amounts of dry ingredients such as flour, sugar, and cocoa. These are usually made of plastic and stainless steel.

3. Measuring spoons – used to measure either wet or dry ingredients in standard amounts. Standard sizes are 1/8 teaspoon, 1/4 teaspoon, 1/2 teaspoon, 1 teaspoon and 1 tablespoon.

4. Household scale – used to measure the weight of food and ingredients.

5. Food Thermometer – used to measure the temperature of food such as steak and other thick roasted meat that is being cooked.

6. Digital scale or digital gram scale – used to measure the weight of an ingredients in pounds, grams or ounces.

STRAINING/DRAINING/SIFTING UTENSILS

1. Colander – used to rinse vegetables as well as to strain food such as pasta. It is commonly made of steel or plastic.

2. Fine Mesh Strainer – a metal sieve with a handle made of wood or plastic.

3. Flour Sifter – used on dry ingredients, such as flour, to break up any lumps.

AUXILIARY UTENSILS

1. Funnel, or *imbudo* – this is used as a guide so that powder or liquid can be poured through a small opening, such as the mouth of a bottle.

2. Potato Masher – this kitchen utensil is used to mash or puree soft food ingredients, usually potatoes..

3. Rubber scraper – also called a spatula, it is used to scrape food from a bowl, as well as to mix and stir ingredients.

4. Baster – used to spread butter or margarine on food.

Some Methods of Cooking

1. Baking – method of cooking food using dry heat. This method is regularly used for pastries, bread and dessert dishes.

2. Frying – one of the quickest ways to cook food. This method uses oil, butter or margarine to cook fish, meat, vegetables and poultry products.

3. Grilling – method of cooking which uses charcoal, wood, gas flame, or electric heating.

4. Steaming – cooking method which uses steam to heat or cook food over boiling water.

5. Poaching – cooking method which uses boiling water or broth, with the ingredient being dumped in for cooking when the water or broth has reached a temperature of at least 160 – 170 F. Eggs and fish are the most common poached food.

6. Simmering – method of cooking liquid in a pot or a pan. The liquid is cooked on a low heat. Bubbles will appear on the liquid's surface as the dish cooks.

7. Boiling – method of cooking food in water that has been heated to near its boiling point (100 °C).

8. Broiling – method of cooking that exposes food to direct heat.

9. Sauteing – method of cooking wherein a small amount of oil or fat is placed in a shallow pan, where food is cooked over high heat.

10. Blanching – method usually used for vegetables which are placed in boiling water for two minutes or until done, then immediately removed and then plunged into an ice bath to stop the cooking process.

Safety Measures When Using Kitchen Utensils

1. Make sure that the utensils to be used are all clean, both before and after using.
2. Disinfect the utensils every now and then.
3. All utensils should be stored in a cool dry place.
4. Be careful when handling and using fragile and sharp utensils.
5. Use kitchen tools properly.
6. Discard or dispose of any broken utensils.

IN BUSINESS

Cooking is one way to earn a living, but you should be knowledgeable about the basics of cooking and using the utensils available. Such knowledge, however simple, would be of great help for you to succeed.

Summary

Cooking is easy to learn, particularly if you have the heart for it and can be learned by careful study, as well as by exploring and experimenting with food.

Classification of tools and utensils according to use:

a. Cookware
b. Mixing and blending utensils
c. Cutting/opening/peeling utensils
d. Serving utensils
e. Measuring utensils
f. Auxiliary utensils

Exercise

Exercise 1

Directions: Identify the following.

_____ 1. Is the practice of preparing food for consumption.

_____ 2. It is a large bowl-shaped pan used for stir-frying.

_____ 3. This is a method of cooking where a small amount of fat or oil is placed in a shallow pan over high heat.

_____ 4. This is a method of cooking that exposes food to direct heat.

_____ 5. This is a cooking method which uses steam to cook food.

Exercise 2

Directions: Choose the letter of the correct answer.

_____ 1. It also called a rubber spatula and is used to scrape food from a bowl.

a. Funnel
b. Scraper
c. Mixing bowl

_____ 2. It is a flat vessel commonly used to serve food.

a. Plate
b. Scraper
c. Mixing bowl

_____ 3. A large spoon or ladle used to serve portions of food from the main dish.

a. Serving spoon
b. Serving tongs
c. Spoon

_____ 4. It is used to rinse vegetables as well as to strain food.

a. Colander
b. Strainer
c. Spoon

_____ 5. It is used to spread butter and margarine on food.

a. Colander
b. Baster
c. Spoon

Lesson Output

Create a slideshow on some of the methods of cooking. Your teacher will give you a deadline for your activity.

Lesson Output Rubrics

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student presented all of the different kinds of cooking methods covered in the lesson, as well as at least three more different ways of cooking or preparing food.	The student presented all of the different kinds of cooking methods covered in the lesson, as well as one or two more different ways of cooking or preparing food.	The student presented all of the different kinds of cooking methods covered in the lesson.	The student presented only six of the different kinds of cooking methods covered in the lesson.	The student presented less than four of the different kinds of cooking methods covered in the lesson.	
2. Creativity	The student managed to maintain the interest of the audience all throughout the slide show's presentation.	The student maintained the audience's interest except for minor parts of the slide show's presentation.	The student maintained the audi- ence's interest only throughout some parts of the slide show's presentation.	The student maintained the audience's interest only in the first part of the slide show's presentation.	The student did not maintain the audience's interest at all when the slide show was presented.	
3. Promptness	The activity was completed two or more days ahead of the given deadline.	The activity was completed one day ahead of the given deadline.	The activity was completed by the given deadline.	The activity was completed one to two days after the given deadline.	The activity was completed three days after the given deadline.	
Total						

LifeTek-TLE

Agriculture

Introduction to Horticulture

Preparing Land for Horticultural Production

Agri-crop production

LESSON 1 Introduction to Horticulture

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define what cultivation is.
2. Identify the tools and equipment used for cultivation.
3. Identify various horticultural disciplines (pomology, olericulture, floriculture).
4. List various native flowers, fruits, and vegetables.

Engage

Arrange the jumbled letters to form the correct word.

G	R	I	A	U	L	C	U	R	E	T

1. _____

G	Y	O	P	O	M	O	L

2. _____

H	R	T	O	I	C	L	U	U	T	E	R

3. _____

Trivia

Did you know that roses are not only for beautification but are also edible and nutritious? Yes, that is right. Roses contain phenolics, which are believed to have anti-inflammatory properties, are a rich source of vitamins and help reduce the risk of heart disease, cancer and diabetes.

Explore

Let's see what you already know about horticulture.

Directions: Multiple choice. Select the letter of the best answer.

_____ 1. Which tool is used to cut grass?

a. Shovel
b. Crowbar
c. Bolo

_____ 2. This is the basic and most popular handheld tool used in cultivation.

a. Hand trowel
b. Crowbar
c. Bolo

_____ 3. This tool is used to remove trash or soil, and is also used to mix soil and manure.

a. Hand trowel
b. Spade
c. Shove

_____ 4. This is used to break and pulverize hard soil.

a. Grab hoe
b. Hand fork
c. Shovel

_____ 5. Which of the following doesn't belong?

a. Grab hoe
b. Pick-mattock
c. Shears

Research

Give at least 5 different kinds of tools and equipment used for cultivation.

Define pomology, olericulture and floriculture.

Explain

Definition of terms

Cultivation - the act of preparing land to raise crops.

Horticulture - the practice or art of growing garden crops, which are generally fruits, vegetables and ornamental plants.

Floriculturist - a person who cultivates flowering and ornamental plants for gardens and for the floral industry.

Pomologist - a person who studies and practices fruit growing.

Olericulturist - a person who specializes in the processing, production, storage and marketing of vegetables.

Cultivation of soil requires the use of tools and equipment for making gardening easier and faster.

Tools

1. Hand trowel – this is a basic and popular hand-held tool used for cultivation. It is commonly used to dig, apply, smooth and loosen the soil around plants, as well as to apply small amounts of animal manure as fertilizer.

2. Hand sickle (*karet*) – a tool used for harvesting and for weed removal. It consists of a usually curved metal blade attached to a short wooden handle.

3. Grab hoe – this is used to break and pulverize hard soil.

4. Light hoe – this is used to dig out holes for planting, as well as for loosening and levelling soil.

5. Bolo – this is used to cut grasses and weeds. It can usually be seen hanging from the waists of farmers.

6. Crowbar – this is a metal bar with one flattened and curved end, which is used to make holes as well as to pry out big stones.

7. Pick-mattock (*piko*) – this is used for digging and breaking up hard soil.

8. Spade (*pala*) – this is used to move debris or soil, as well as to mix soil and manure.

9. Rake (*kalaykay*) – commonly used to clean the ground and to level the soil.

10. Spading fork – this tool usually has four sturdy tines, making it look like a fork. These are short, with a usually wooden handle, and has many uses, such as for loosening soil or digging out root crops.

11. Hand cultivator – this is a three-tined tool which is used to loosen soil before seeds are planted, as well as to help remove weeds.

12. Hand fork – this is used for inter-row cultivation where crops are planted in rows.

13. Pruning shears – these are used to cut branches.

14. Axe – used for cutting large-size wood, such as posts.

15. Sprinklers (*regadera*) – these are used to water seedlings and young plants.

16. Water pails – these are used to fetch water, manure and fertilizer.

17. Sprayers – these are used to spray insecticide and liquid fertilizer.

18. Wheelbarrows – these are used to move plants, seedlings, materials, debris and equipment from one place to another.

Farm Implements

These are the accessories which are pulled by working animals (carabaos, cows, horses) or mounted on machines (hand tractors, tractors) and which are usually used to prepare the land for planting crops.

1. Cultivator – this is used to loosen the soil where crops are already growing.

2. Plow – this farming tool is used to furrow the soil before seeds are planted.

3. Harrows – these are used to till and pulverize the soil. These may be mounted on tractors or pulled by carabaos.

Equipment

1. Hand tractor – this is a hand-held machine which is used to prepare land for wetland crops, such as rice. It usually is used to pull a plow or harrow.

2. Four-wheel tractor – This is a large, motorized kind of farm equipment used to which is used to pull a disc plow and disc harrow to prepare an area of land much bigger than that which could be prepared by a hand tractor.

3. Water pumps – these are used to draw irrigation water from a source to where the plants are.

The horticulture industry can be divided into three areas.

1. Pomology – deals with the production of fruit and nut crops. This includes planting, harvesting, storing, processing, and marketing.

2. Olericulture – deals with planting, harvesting, storing, processing and marketing of vegetables, which include edible roots, stems, leaves, flowers and seeds.

3. Floriculture – deals with the production of flowers and ornamental plants.

Here are some native flowers, fruits, and vegetables found in the Philippines.

Sampaguita 	Waling-waling 	Gladiola 
Chico 	Mango 	Guava 
Malunggay 	Sitaw 	Ampalaya 

SAFETY REMINDERS WHEN USING AND HANDLING TOOLS AND EQUIPMENT.

1. Be careful when handling tools, as some of these have sharp edges.
2. When using or handling a shear or a trowel, keep the pointed parts pointed away from you, especially while walking.
3. Use protective gear when operating machinery.
4. Be cautious at all times.
5. Focus on what you are doing.
6. Store tools properly.
7. Label all hazardous chemicals to avoid accidents.

IN BUSINESS

Did you know that knowing how to cultivate the land can be a source of income? You can offer your services to home growers or create tutorials for those who need assistance in growing plants on their property.

Summary

Farm tools and equipment are important to horticulture, as their use and availability make work easier.

Exercises

Exercise 1

Directions: Identify the following.

_____ 1. Deals with the production of fruit and nut crops.

_____ 2. Deals with planting, harvesting, storing, processing and marketing of vegetables.

_____ 3. Deals with the production of flowers and ornamental plants.

_____ 4. This is a large-sized piece of mechanical equipment which is used to prepare a large area of land.

_____ 5. These are used to bring water from a source to where plants are growing.

Exercise 2

Directions: True or False. Write **T** if the statement is true and **F** if false.

_____ 1. Tools need to be stored properly.

_____ 2. Running is necessary while holding a sharp-edged tool, such as shears.

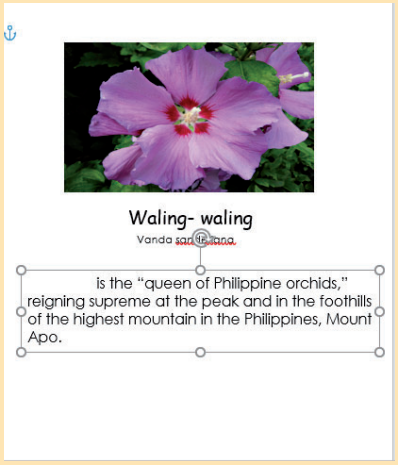
_____ 3. Hand tractors are accessories which can be pulled by working animals (carabaos, cows, horses) or mounted on machines (hand tractors, tractors) and are used to prepare land for planting crops.

_____ 4. Label all hazardous chemicals to avoid accidents.

_____ 5. Sprayers are used to fetch water, manure and fertilizer.

Lesson Output

Create a compilation of pictures on a document file of different native flowers, fruits and vegetables with a description of each one. Your teacher will give you a deadline for your activity.



RUBRICS FOR CREATING A COMPILATION DOCUMENT OF DIFFERENT KINDS OF NATIVE FLOWERS, FRUITS AND VEGETABLES.

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student presented more than twelve different kinds of native flowers, fruits and vegetables.	The student presented eleven to twelve different kinds of native flowers, fruits and vegetables.	The student presented seven to ten different kinds of native flowers, fruits and vegetables.	The student presented four to six different kinds of native flowers, fruits and vegetables.	The student presented less than four different kinds of native flowers, fruits and vegetables.	
2. Creativity	The presentation definitely caught the viewer's attention and maintained it all throughout.	The presentation was attractive enough for the viewer's attention for most of the time.	The presentation was attractive enough to catch the viewer's attention, but only partway.	The presentation was able to catch the viewer's attention, but was distracting from the content.	The presentation was basic and did not engage the viewers.	
3. Promptness	The activity was completed two or more days ahead of the given deadline.	The activity was completed one day ahead of the given deadline.	The activity was completed by the given deadline.	The activity was completed one to two days after the given deadline.	The activity was completed three days after the given deadline.	
Total						

LESSON 2 Preparing Land for Horticultural Production

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define soil cultivation.
2. Identify tools and equipment for soil cultivation.
3. Learn different methods in cultivating soil or in preparing land for horticultural production.

Engage

Go to the links to access the interactive games. Enjoy!

- https://wordwall.net/play/10979/900/402
- https://seedsurvivor.com/agrium-games/Feeding%20the%20Future/

Trivia

Edible Landscaping is the practice of decorative landscaping using organic vegetables, fruits, herbs and medicinal plants. Due to the COVID-19 pandemic, many people struggled with acquiring food because of unemployment and restrictions on leaving their homes. Researchers from the University of the Philippines - Los Baños (UPLB) pioneered the edible landscaping campaign as their answer to the food supply problem, advocating this type of sustainable gardening for people to do while stuck at home.

Explore

Let's see what you already know about horticulture.

Directions: Read the questions carefully and select the letter of the best answer.

_____ 1. Which activity is known as the backbone of agriculture?

a. Soil preparation
b. tilling
c. soil

_____ 2. A process of crushing and breaking big lumps, pieces of rocks and stones to prevent soil erosion.

a. levelling of soil
b. manuring
c. ploughing

_____ 3. We should fertilize the soil.

a. true
b. maybe
c. false

_____ 4. It is a type of tool used for opening and loosening of the soil.

a. Grab hoe
b. Ploughs
c. Shovel

_____ 5. It is to "till" or dig-up, mix, and overturn the soil.

a. ploughing
b. levelling
c. manuring

Research

What is the difference between tilling and ploughs?

Explain

Soil – is the backbone of agriculture.

Soil Preparation – it is the first step to be done before planting of crops. It helps to turn the soil and loosen it to allow the roots to penetrate into it.

Ploughs – implements used for opening and loosening of the soil.

Tilling – refers to preparing land for raising crops.

Levelling of ploughed soil – process of crushing and breaking big lumps, pieces of rocks and stones to prevent soil erosion.

Introduction

It is important to prepare the soil before planting. Abundant and high-quality plants can be harvested if the soil is well cultivated and suitable.

Here are the steps in preparing soil:

1. Clean the soil.
2. With a **hoe** or a **hand fork**, dig deep into the ground.
3. Fertilize the soil. Mix well until the fertilizer is evenly distributed.
4. Use a **rake** to smooth and level the soil.
5. Water the prepared soil.

Safety rules in preparing soil

1. Use tools that are in good condition. Avoid using rusty, dull, and damaged equipment.
2. Provide a proper and durable container for equipment and tools especially when not in use.
3. Use sharpened tools and equipment carefully. Make sure no one is behind or near you.
4. Focus on what is being done. Avoid talking or arguing and playing while working.
5. Put on work clothes and dress after work.
6. Clean and store equipment and tools in a safe place.
7. Wash hands and other parts of the body that came in contact with soil and/or fertilizers thoroughly after work.

Common Tools Used in Soil Preparation

	1. **Hand trowel** – it is the basic and most popular hand tool in cultivation. It is commonly used for digging, applying, smoothing, loosening the soil around the plants, and for adding small amounts of animal manure to serve as fertilizer.

	2. **Grab hoe** – used for breaking and pulverizing hard soil.
	3. **Light hoe** – used for digging out holes for planting, loosening and levelling of soil.
	4. **Crowbar** – used for digging holes and digging out big stones.
	5. **Pick-mattock** – or the so called *piko* in the Philippines, it is used for digging and breaking hard soil.
	6. **Spade** or ***pala*** – used for removing large amounts of trash or soil, and for mixing soil and manure.
	7. **Rake** or ***kalaykay*** – commonly used for clearing the ground and levelling the soil.

	8. **Spading fork** – used for loosening the soil, digging out root crops and turning over the material in a compost heap.
	9. **Hand cultivator** – used for cultivating the garden plot by loosening the soil and removing weeds around the plot.
	10. **Hand Fork** – looks like a big fork; it's used for inter-row cultivation.
	11. **Watering Can** or ***Regadera*** – used for watering the seedlings and young plants.
	12. **Water Pails** – used for fetching water, manure and fertilizer.
	13. **Wheelbarrow** – used for hauling/transferring plants, seedlings, materials, trash, and other equipment.

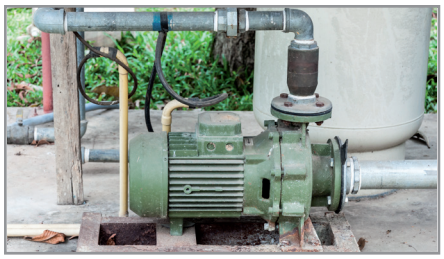
Farm Implements

These are accessories usually used in preparation of land, which are pulled by working animals (carabaos, bullocks, horses) or mounted to machineries (e.g., hand tractor, tractor).

	1. **Cultivator** – an implement for loosening the soil while crops are growing.
	2. **Plow** – specifically used for tilling large areas, making furrows and for inter-row cultivation.
	3. **Harrows** – are used for tilling and pulverizing the soil. It's either mounted in tractors or pulled by a carabao.

Farm Equipment

	1. **Hand tractor** – used to pull a plow and harrow in preparing a large area of land for planting.
	2. **Four-wheel tractor** – used to pull a disc plow and disc harrow in preparing a much bigger area of land for cultivation.



3. **Water pumps** – used to draw irrigation water from a source.

Methods in cultivating soil or in preparing land for horticultural production.

1. **Plowing** – "tilling" or digging-up, mixing, and overturning the soil.
2. **Harrowing** – breaking the soil fragments or "clods" into smaller mass and incorporating plant residue.
3. **Leveling the field** – flattening of the planting area which is achieved after harrowing.
4. **Manuring** – done to replenish the soil with nutrients that help in proper growth of the crop.

IN BUSINESS

Knowledge in soil preparation can be a source of income, especially with people interested in recreational gardening. You can use your well-prepared soil to cultivate your stock of plants, or you can simply sell it to gardeners, who will cultivate plants with it.

Summary

Healthy plants and a healthy environment start with proper preparation of soil. According to Frank Tozer, an author and respected gardener, "When building soil, you not only improve your plants' health, but also improve your own." Thus, it's a must to learn and follow the proper steps in preparing soil for plants and crops to grow well, and in return, produce high-quality crops.

Exercises

Exercise 1

Directions: Arrange the following steps in preparing soil chronologically. Write 1 for the first step, 2 for second, and so on.

_____ 1. With a hoe or a hand fork, dig deep into the ground.

_____ 2. Use a rake to smooth and level the soil.

_____ 3. Water the prepared soil.

_____ 4. Clean the soil.

_____ 5. Fertilize the soil. Mix well until the fertilizer is evenly distributed.

Exercise 2

Directions: True or False. Write **T** if the statement is true and **F** if false.

_____ 1. Don't clean and store equipment and tools in a safe place.

_____ 2. Wash hands thoroughly after working.

_____ 3. Talk or argue and play while working.

_____ 4. Use sharpened tools and equipment carefully.

_____ 5. Use rusty, dull, and damaged equipment.

Lesson Output

Make a short video tutorial no more than 3 minutes on how you prepare planting soil (e.g., in a pot) at home. Talk about the tools and materials that you're using and what you're doing.

RUBRICS

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The video is about preparing planting soil, is no more than 3 minutes long, and shows the student talking about the materials used and what is being done.	The video is about preparing planting soil, is more than 3 minutes long, and shows the student talking about the materials used and what is being done.	The video is about preparing planting soil, is more than 3 minutes long, and shows the student talking about either the materials used or what is being done.	The video is about preparing planting soil, is more than 3 minutes long, and shows the student working but lacks any explanation on what is being done.	The video is about gardening but is not about preparing planting soil, nor is it original.	
2. Creativity	The video uses creative visual, audio, and text elements.	The video uses generic visual, audio, and text elements.	The video uses visual and audio elements only.	The video is fairly creative.	The video lacks creativity.	
3. Promptness	The video was submitted ahead of the given deadline.	The video was submitted within allotted of time.	The video was submitted on time.	The video was submitted 1 day beyond the allotted time.	The video was submitted 2 days beyond the allotted time.	
Total						

LESSON 3 Agricultural Crop Production

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define what agricultural crop production is.
2. Identify agricultural crops that can be propagated at home.
3. Demonstrate propagation at home.

Engage

Play Break Enigma

Break the number codes to discover what this lesson's topic is all about. Each number in the code signifies a letter's place or number in the alphabet.

1-7-18-9-3-21-12-20-21-18-5

16-18-15-16-1-7-1-20-9-15-14

Trivia

Did you know that the top crops in the Philippines are coconut, rice, corn, and sugarcane? These are planted in farms for easy harvesting. Other high value crops are the following: mango, banana, pineapple, cassava, coffee, sweet potato, okra, cucumber, pechay, upo, peppers, water spinach (kangkong), tomato, sitaw, squash, ampalaya, and eggplant. In spite of the fact that the Philippines is an agricultural country, it still relies on imported crops to feed the population. The government's old target year for food self-sufficiency was 2013. Do you think we have succeeded in this regard by now?

Explore

Let's see what you already know about agricultural crop production

Directions: Select the letter of the best answer.

_____ 1. This refers to the process of growing crops, starting with the selection, sowing and taking care of seedlings.

a. Soil preparation
b. Tilling
c. Agricultural crops production
d. Animal husbandry

_____ 2. This process involves taking a part of a parent plant and having that part grow into a new plant.

a. Asexual propagation
b. Propagation
c. Sexual propagation
d. Meiosis

_____ 3. This is the process of removing unwanted plants from an area.

a. Weeding
b. Plowing
c. Sowing
d. Reaping

_____ 4. This refers to creating new plants from their floral parts.

a. Asexual propagation
b. Propagation
c. Sexual propagation
d. Mitosis

_____ 5. Garden gloves will help protect you from blisters, fertilizer, pesticides, bacteria, and sharp tools.

a. Maybe
b. True
c. False

Research

What are some of the different agricultural crops that can be propagated at home? What are the two types of propagation?

Explain

Crop – A plant that is grown and harvested as food for humans and livestock.

Germinate – The process by which a seed, after being dormant for a period of time, grows and puts out shoots.

Propagation – The process of breeding new plants by natural processes.

Sowing – The process of planting seeds into an area with soil.

Transplanting – The process of removing a plant from where it was originally grown to another place.

Weeding – The process of removing unwanted plants from an area.

Agricultural crop (agri-crop) production is the use of cultivated plants to produce products to be used by humans. It starts with selecting the crops to be grown, followed by sowing and taking care of any seedlings that grow. Seedlings should be given the proper amounts of fertilizer and nutrients, and should be transplanted if necessary, so they can grow properly. Once the plants are fully grown, these or their products are harvested and then stored properly so people can consume these.

There are two types of propagation.

1. **Asexual propagation** – this kind of propagation involves taking a part of a parent plant and then having that part regenerate into a new plant. Leaves, stems, roots and bulbs are used for asexual propagation.

2. **Sexual propagation** – this kind of propagation involves the floral parts of a plant to create the plant's seeds, which, once planted, become fully-grown plants.

The main agricultural crops in the Philippines are the following:

		
RICE	**CORN**	**SUGARCANE**
		
COCONUT	**BANANA**	**MANGO**

		
PINEAPPLE	**CASSAVA**	**SWEET POTATO**

In terms of harvest area, the most extensively grown crops are rice, coconut, corn, sugarcane, banana, cassava, coffee, mango and sweet potato.

These are some agricultural crops that can be propagated at home.

1. **Bananas.** These are propagated through pups or suckers, which are pieces of rhizome that form into miniature banana plants. These pups or suckers can be severed from the parent and then planted elsewhere to become a separate plant. In the provinces, the stem with roots is usually planted to produce another banana tree.

2. **Sweet potatoes.** These plants can be propagated asexually, by using the shoots or by using the bulbs. It is a crop that is easy to grow.

3. **Eggplants.** This can be grown from seeds and cuttings. They can be planted in pots or any plastic container with soil in it.

4. **Okra.** This is propagated from seeds and is easy to grow. Just as with eggplants, you can plant these in recycled containers.

5. ***Pechay* (Chinese cabbage).** This is sown directly in soil, and the seedlings can also be transplanted.

6. **Onion.** This is one of the easiest vegetables to regrow from scraps. Cut off the root end of an onion, leaving a 1/2 inch of onion attached to the roots. Place this in a sunny location in your garden and cover the top with soil. Make sure to keep the soil moist by watering when needed.

7. **Garlic.** These plants are propagated through their bulbils, which are small, bulb-like structures which can be grown into a new plant. Bulbils are located in the long, leafless flower stalk that shoots out from the root.

8. **Tomato.** The seeds of these plants can be planted and germinated in recycled containers, then transferred to soil proper so these could grow fully.

9. ***Malunggay* (moringa).** These can be grown from seeds, or from cuttings made from its branches or trunk which are then directly planted into the soil.

10. ***Sili* (chili).** As with eggplants and tomatoes, the seeds have to first be planted in a nursery such as a recycled container filled with soil, and then later transferred directly into soil.

Different kinds of vegetables can propagated at home which don't need a lot of space. Most people plant their crops in scrap laundering basins, empty cans and other recycled containers containing soil.

For more information, watch this video on how to propagate crops at home.
(https://youtu.be/y-VjvchRNKo)

1. **Choose the seeds or plants that you will plant.**
   Choose good seeds to plant. it is better to choose plants which are easy to grow.

2. **Prepare the soil where you will plant your seeds.**
   The soil and the pot (or any planting container) that holds the soil must be ready before the seeds are planted. The soil needs to be moist.

3. **If two individual plants are planted in one container, each plant must be sufficiently far from each other.**
   This is important so that the crops do not compete for the nutrients that they get from the soil.

4. **Water the crops regularly.**
   How often a plant needs to be watered, and how much water to give it, depends on each kind of plant. Some plants need a lot of water, while others don't need that much. Too much or too little water might make a plant wilt and for it to eventually die.

5. **Weed removal/weeding.**
   This is important because weeds will get nutrients from the soil that seedlings need to grow.

6. **Applying insecticide, pesticide and fertilizer.**
   insecticides are used to kill insects, while pesticides are used to kill pests, such as fungi, which may come from the soil. Fertilizer is used to add nutrients to the soil, so the plant has a better chance of growing to maturity.

Safety Measures to Take When Propagating Crops at Home

1. Wear gloves. Regular garden gloves will help protect you from blisters, as well as any adverse effects from fertilizers, pesticides and bacteria. Garden gloves can also give some protection from sharp tools.

2. Use the right tools for the work you will do.

3. Do not play around when holding or using a sharp object.

4. Wear a face mask when spraying insecticide, pesticide, and when applying fertilizer.

5. Wash your hands before and after planting/farming.

6. Clean and store equipment and tools in a safe place after using these.

IN BUSINESS

Planting agricultural crops can be a source of money. If you plant a lot of crops in your yard and work to make these grow to maturity, you can sell these for money.

Exercises

Exercise 1

Directions: Answer **A** in the blank if the crop is propagated asexually or **S** if the plant is propagated sexually.

_____ 1. Sweet potato

_____ 2. Tomato

_____ 3. Pechay

_____ 4. Okra

_____ 5. Banana

Exercise 2

Directions: Write **T** if the statement is true and **F** if false.

_____ 1. Any tool will do, when planting.

_____ 2. Wash your hands thoroughly after working.

_____ 3. Wear a face mask when applying insecticide, pesticide and fertilizer.

_____ 4. Play around when you're using a sharp object.

_____ 5. Wear gloves.

Summary

Agricultural crops production is about raising plants which can be consumed by humans and animals. Plants can be grown sexually or asexually, and the needs of the individual plants must be noted, so that these can grow properly.

Lesson Output

Make a short video no longer than two minutes showing how to propagate an agricultural crop at home.

RUBRICS FOR MAKING A VIDEO TUTORIAL ON HOW TO PROPAGATE AN AGRICULTURAL CROP AT HOME

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student's video is no longer than 2 minutes yet went into detail on how the soil is to be prepared and how the crop is to be grown. Tools used were mentioned, as well as how these tools would be maintained. The student also got input from a first-hand authority on the topic.	The student's video is slightly longer than 2 minutes and showed the basic process of how the soil is to be prepared and how the crop is to be grown. Tools used were mentioned, as well as how these tools would be maintained.	The student's video is much longer than 2 minutes and showed the basic process of how the soil is to be prepared and how the crop is to be grown. Tools used were mentioned, but no mention was made of how the tools would be maintained.	The student's video only showed the basic process of how the soil is to be prepared, or how the crop is to be grown; no mention of tools used.	The student's video is not original or showed only parts of how the soil is to be prepared, or how the crop is to be grown.	
2. Creativity	The student's output made good use of video elements and materials which made it pleasing to view.	The student's output used common video elements but still made the content easy to understand.	The student's output was not so artistic but still clear in delivery.	The student's output was plain yet only a few things were easy to understand.	The student did not attempt to be creative in any way in delivering the content of the project.	
3. Promptness	The project was completed 2 days ahead of the given deadline.	The project was completed a day ahead of the given deadline.	The project was completed by the given deadline.	The project was completed a day after the given deadline.	The project was completed 2 days after the given deadline.	
Total						

LifeTek-TLE

Industrial Arts

Introduction to Industrial Arts

1

Recycling

2

T-Shirt Printing

3

LESSON 1 Introduction to Industrial Arts

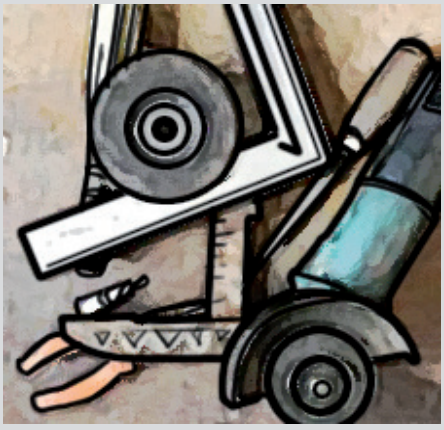
Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define industrial arts.
2. Identify the tools and equipment used in industrial arts.
3. Demonstrate different safety measures needed for working in industrial arts.

Engage

Look at the pictures. What can you see? Can you identify the tools used?



Trivia

Did you know that Antequera is the Basket Capital of the province of Bohol? Most of the residents of Antequera are into weaving baskets as their main source of income. Basket weaving has been the town's main industry for over many years.

Explore

Select the letter of the best answer.

_____ 1. A tool used to join or fasten materials together.

a. Fastening
b. Drilling
c. Sewing
d. Planting

_____ 2. It is an educational program which features creating wood or metal objects by using a variety of hand and power tools.

a. Woodworking
b. Industrial arts
c. Metal working
d. Paper making

_____ 3. Refers to useful and decorative things created by hand or with the use of simple tools.

a. Woodwork
b. Carpentry
c. Handicraft
d. Metalwork

_____ 4. It is a manual tool used to drill into wood and metal.

a. Hand drill
b. Auger bit in a rachet base
c. Scale
d. Chainsaw

_____ 5. The area of industrial arts wherein students can learn the basics about electricity, proper precautions and safety practices to avoid disaster.

a. Electrical work
b. Woodworking
c. Handicraft
d. Paper making

Research

What are at least five different tools and equipment used in industrial arts? List down their uses.

Explain

Industrial Arts – an educational program which features creating wood and metal objects by using a variety of hand and power tools. It also teaches methods people used in creating hand-crafted objects a long time ago.

Areas of Industrial Arts

1. **Woodworking.** This deals with creating objects using wood. This includes carpentry, which a person can learn not only for use in employment but also for personal needs, such as repairing broken chairs, tables and fences.

2. **Metalwork.** This deals with creating objects using metal. This is an area of industrial arts that is popular nowadays because there is plenty of scrap material available to create new metal objects, such as cans that can be turned into dustpans, graters and frames.

3. **Handicrafts.** This refers to making useful and decorative things by hand or with simple tools. This term is also often used for the traditional method of manufacturing products.

4. **Electrical work.** This is an area of industrial arts that involves the use of electricity, which is required for power tools, particularly for metalworking. Students will learn the basics about electricity, as well as the proper precautions and safety practices to take to avoid accidents.

Industrial Artist – a person who is trained in and produces products using industrial arts.

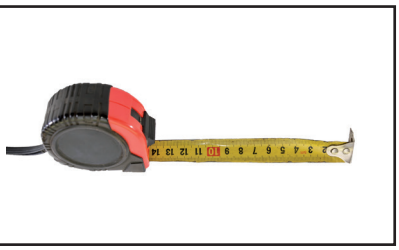
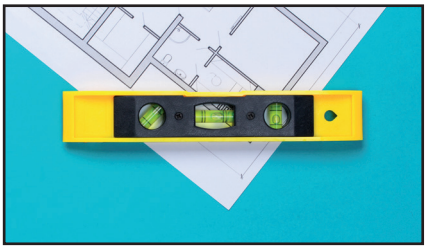
This is a short list of the jobs in the Philippines today which use industrial arts.

1. Automotive repair
2. Carpentry
3. Refrigeration and airconditioning
4. Electrical Installation and maintenance
5. Furniture making
6. T-shirt printing
7. Masonry
8. Plumbing
9. Machining

Tools

There are tools needed to create handmade items, whether these are made of wood, metal, rubber or native materials, we need the appropriate tools for each type of work. Make sure to the tools and equipment used properly.

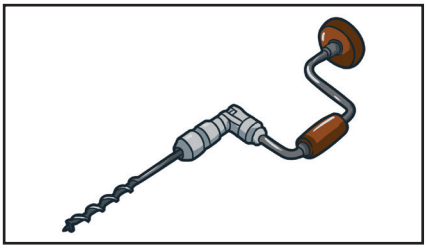
Measuring tools

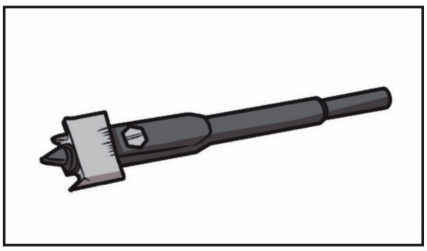
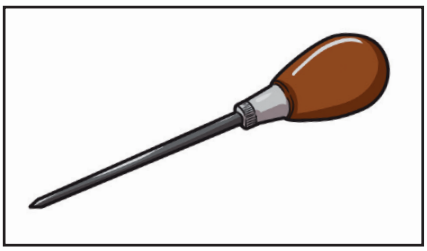
NAME OF TOOL	USE	IMAGE
1. Zigzag rule	It is used to measure height, width and thickness.	
2. Roll-up measuring tape *(metro)*	Used to measure relatively long lengths.	
3. Framing square (scale)	A 90-degree, L-shaped tool to ensure that parts of the work that should be at right angles are, indeed, at right angles.	
4. Spirit level	A tool use to show how parallel a surface is to the Earth. It is used to make sure that those objects that need to be level with the Earth are, indeed, so leveled.	
5. Plumb bob *(hulog)*	Use to make sure that what should be vertical relative to the ground is, indeed, vertical. It can also be used to mark a point some distance directly below another point above it.	

Hammers and Related Tools

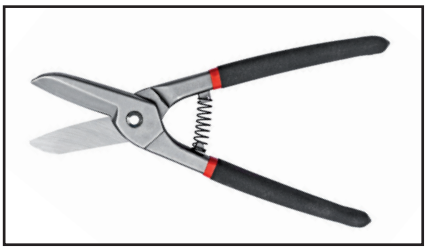
NAME OF TOOL	USE	IMAGE
1. Claw hammer	A handheld tool. One end of the head is used to hammer in nails, while the other end is used to pull nails out.	
2. Ball-peen hammer	A handheld tool. The rounded end is used to round off edges of metal pins and fasteners, while the other, flat end is used to hit punches and chisels.	
3. Mallet	This is a larger-sized hammer which is used for such jobs as hammering wooden parts together, or to use with a chisel.	
4. Claw bar	A tool used to pull out deep-lying or hard-to-get nails.	

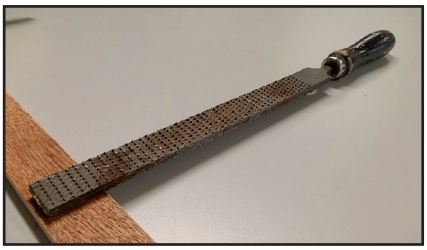
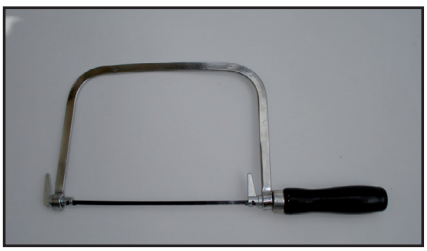
Boring Tools

NAME OF TOOL	USE	IMAGE
1. Auger bit in a rachet base	It is a manual tool used to drill holes into wood and metals.	

2. Electric hand drill	Uses electricity to drill holes into objects.	
3. Expansive bit	Used to bore holes of differing widths.	
4. Scratch awl	Used to mark points and scratch marks onto wood being worked on.	

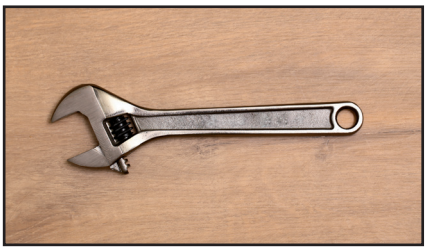
Cutting Tools

NAME OF TOOL	USE	IMAGE
1. Scissors	Used to cut fabric and thread.	
2. Tin shears	Used to cut tin and other soft sheets of metal.	

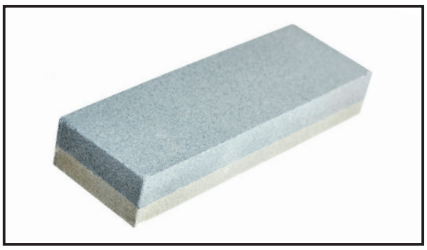
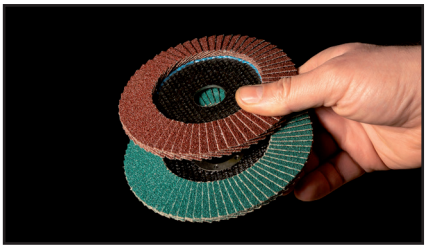
3. Jack plane	Used to shave wood down to a desired surface level.	
4. Rasp	A kind of file used to shape a piece of wood into a rough version of the final form it will take.	
5. Bolo	Used to cut bamboo or other plants. It is useful for opening coconuts.	
6. Spokeshave	Used to shape wood as well as to smoothen wooden surfaces.	
7. Crosscut Saw	Used to cut across the grain of wood.	
8. Coping saw	Used to cut exterior and interior shapes into wood.	

9. Dovetail saw	Use to make small, precise cuts into wood.	

Fastening Tools

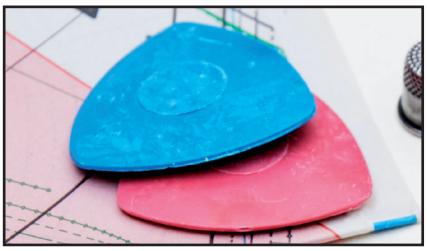
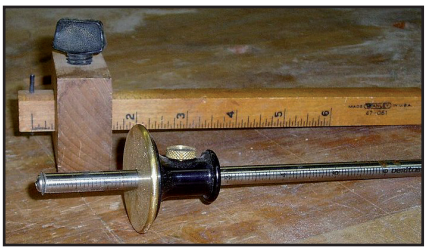
NAME OF TOOL	USE	IMAGE
1. Monkey wrench	It is a manual tool used to drill holes into wood and metals.	
2. Soldering Iron	Uses electricity to drill holes into objects.	

Finishing Tools

NAME OF TOOL	USE	IMAGE
1. Whetstone	Used to sharpen the edges of cutting tools.	
2. Emery wheel	Used to sharpen tools as well as to grind and polish surfaces.	

3. Sandpaper	Used to smoothen rough corners and surfaces.	

Lining or Marking Tools

NAME OF TOOL	USE	IMAGE
1. Pencil	Used to make marks on surfaces.	
2. Tailor's chalk	Used to make marks on cloth.	
3. Marking gauges	Used to mark out lines on wood.	
4. Marking knife	Used to draw marks on wood.	

Other Tools

NAME OF TOOL	USE	IMAGE
1. Pocket knife	A multipurpose tool which has a knife as well as other tools.	
2. Pliers	Used to cut and bend wires as well as to hold objects together.	

EQUIPMENT

NAME OF TOOL	USE	IMAGE
1. Work bench	A multipurpose tool which has a knife as well as other tools.	
2. Sewing machine	Used to sew fabrics and cloth together.	

Safety Measures in Industrial Arts

1. Wear proper clothes. Make sure to wear a short-sleeved shirt, so that it will not snag on any tools (particularly power tools) that you work with.
2. Use the right tools for your project/work.
3. When holding/using sharp or electrical tools, don't play around.
4. After using tools and equipment, always clean and store these in a safe place.
5. Walk, do not run, when in work areas.
6. Be alert at all times.

IN BUSINESS

Knowing industrial arts skills and tools can give you a regular source of employment. You can work as a carpenter or as a tinsmith, or even make simple handicraft items, such as the residents of Antequera, and make money out of your work.

Summary

Industrial arts refers to creating wooden and metal objects by using hand and power tools. There are many different kinds of tools used, and you should know what these are for, as well as how to be safe when working with these, so you can use the right tools for any project you work on.

Exercises

Exercise 1

Directions: Choose the letter of the correct answer.

_____ 1. This is used as platform for materials to be worked on.

a. Sewing machine
b. Work bench
c. Marking knife
d. Hammer

_____ 2. This tool is used to cut and bend wires.

a. Pliers
b. Hand drill
c. Marking knife
d. Emery wheel

_____ 3. This is used to smoothen rough corners.

a. Pliers
b. Hand drill
c. Sandpaper
d. Ball-peen hammer

_____ 4. This is a 90-degree L-shaped tool used to ensure uniformity of work.

a. Framing square
b. Roll-up measuring tape
c. Sandpaper
d. Marking knife

_____ 5. One end of this tool's head is used to pull nails out and the other is used to drive nails in.

a. Claw hammer
b. Mallet
c. Pencil
d. Tailor's chalk

Exercise 2

Directions: True or False. Write **T** if the statement is true and **F** if false, where safety is concerned.

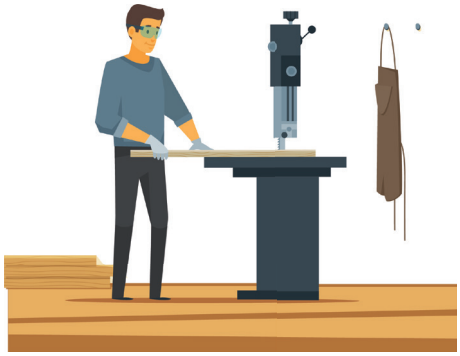
_____ 1. Use the right tools for the project you are working on.

_____ 2. Run, don't walk, while holding sharp tools.

_____ 3. Don't clean the tools and equipment after using these.

_____ 4. Be alert while working.

_____ 5. Clean and organize your workspace.



Lesson Output

Make a slideshow on safety measures in industrial arts.

RUBRICS FOR A SLIDESHOW ON SAFETY MEASURES IN INDUSTRIAL ARTS

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student presented a complete safety procedure. Explanations were given on how tools should used. It also showed what happens when the work isn't done properly (e.g., why running while carrying a saw is a bad idea).	The student presented a complete safety procedure. Explanations were given on how tools should used but it did not show what happens when the work isn't done properly (e.g., why running while carrying a saw is a bad idea).	The student presented a safety procedure, but there were no explanations on how tools should be used nor what happens when the work isn't done properly (e.g., why running while carrying a saw is a bad idea).	The student presented a safety measure but gave no explanatory comments or insights regarding it.	The student did not present any safety measure although the content showed a person or people working.	
2. Creativity	The student's output made use of unconventional media and creative elements which made it pleasing to look at.	The student's output used common media used creatively but still made the content easy to understand.	The student's output was artistic and fairly clear in delivery.	The student's output was plain yet was still easy to understand.	The student did not attempt to be creative in any way in delivering the content of the project.	
3. Promptness	The project was completed 2 days ahead of the given deadline.	The project was completed a day ahead of the given deadline.	The project was completed by the given deadline.	The activity was completed a day after the given deadline.	The activity was completed 2 days after the given deadline.	
Total						

LESSON 2 Recycling

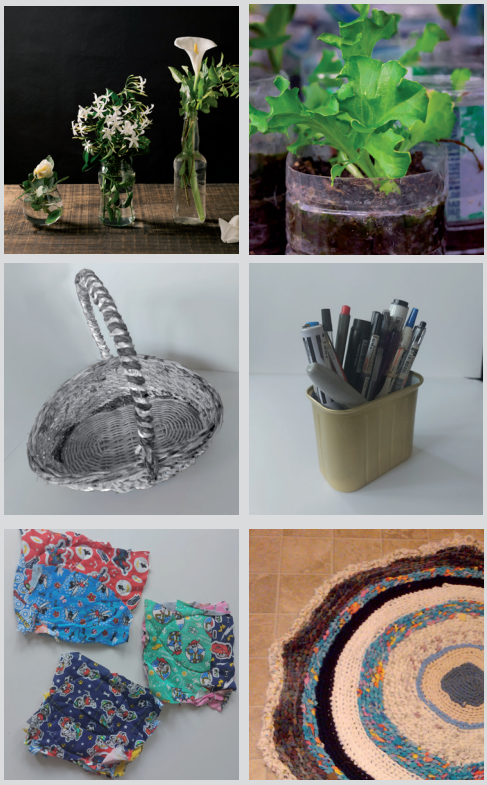
Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define what recycling is.
2. Identify the different recycling methods usable.
3. Produce a recycled product.

Engage

What can you say about the objects in the pictures? Do you think the materials used to make those objects are easy to find?



Trivia

The Philippine **Ecological Solid Waste Management Act of 2000**, or **RA 9003**, was put into effect in January 2001 to lessen solid waste without utilizing incineration technologies. The intention is to ensure people's health, to protect the environment, and to maximize the efficient use of scarce natural resources.

Source:http://nswmc.emb.gov.ph/wp-content/uploads/2018/03/Summary-of-Final-Report-_complete_.pdf

Explore

Directions
Choose the letter of the correct answer.

_____ 1. Which of the following cannot be recycled?

a. Milk cartons
b. Plastic water bottles
c. Glass containers
d. Napkins

_____ 2. What material is best for making such items as memo pads, paper flowers, photo frames and baskets?

a. Wood
b. Paper
c. Metal
d. Glass

_____ 3. Which product is the easiest to recycle?

a. Plastic
b. Metal
c. Paper
d. Wood

_____ 4. This waste product is highly saleable in junk shops.

a. Wood
b. Glass
c. Plastic
d. Metal

_____ 5. What is the best way to classify recyclable waste material?

a. The physical appearance of the materials.
b. The common characteristics of materials.
c. The color of the materials.
d. The size of the materials.

Research

What are some common materials used in recycling? List at least five of these.

Explain

Definition of Terms

Waste – material which, after being used for its original purpose, is unwanted.

Imaginative – creative

Recyclable – an object that can be used again, possibly for a purpose other than its originally intended purpose.

Waste disposal of garbage is one of the biggest environmental issues in the Philippines as well as throughout the world. We can help lessen the amount of garbage to be disposed by following and doing the 3Rs.

REDUCE	REUSE	RECYCLE

What is Recycling?

Recycling – the process of converting an item which has already served its original purpose but still durable enough to be used for another purpose. By using this object for another purpose, the amount of waste that needs to be disposed of can be reduced.

By being imaginative, creative, and resourceful, you can re-use different kinds of waste material.

Types of Recycling

1. **Internal Recycling** – involves the use of materials that are waste products of the manufacturing process. This is the kind of recycling done by companies. The trimmings of copper tubes, for example, are remelted and re-used to form part of new copper tubes.

2. **External Recycling** – reusing materials from a product that has been worn out due to constant use. Examples of materials which are externally recycled are newspapers, magazines, plastics, aluminum, and glass.

   External recycling involves three basic steps:

   1. Recovery – collecting used items that can be recycled. Many cities have drop-off centers or special curbside pickup programs to collect recyclables. Recovery may include sorting and separation of collected materials.

   2. Reprocessing – converting used items into reusable products.

   3. Marketing and sale of new items.

Types of Waste

1. **Biodegradable Waste** – this kind of waste is naturally broken down in nature; one example is food waste. This waste can be composted.

2. **Non-biodegradable Waste** – this kind of waste cannot be naturally broken down, or which takes a long time to break down. Examples of this kind of waste are glass, paper, metal, textiles, and plastic.

Common Materials Used in Recycling

1. Paper – this is the most abundant and available of all waste materials. It comes in many forms such as old newspapers and magazines and paper wrappers.




2. Plastic – this kind of waste includes beverage bottles and containers commonly used for liquid goods and body care products. Plastic objects can be recycled as planters, plant tags, plastic sculptures, and organizers.


3. Glass – this is one of the easiest materials to recycle because it can be easily crushed and melted to form new glass products.

4. Fabric – these are products made of cloth or goods produced by weaving. Recycled fabric can be used for quilting and patchwork projects, such as rags, doilies and collages.

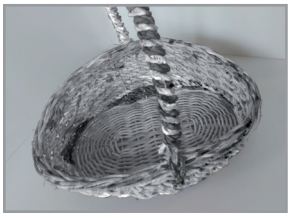

by: Gabe G., Mary H.

5. Wood – Many products that can be produced from recycled wood, such as plant boxes.

6. Tin cans – these are containers used to store goods for distribution. The metal is thin, which makes it easy for anyone to work with.

Some things that can be made from recyclable materials

1. Paper – woven basket, paper mache , paper beads, and paper sculptures.



by: Dodoïste

by: Handaculture

2. Plastic containers – planters, plant tags, plastic sculptures, and organizers.


3. Glass bottles – glass tiles and storage containers.

4. Fabric scrap – quilted and patchwork items, rags, stuffed toys.


Advantages of Recycling

1. Decreases the amount of garbage to be disposed of.
2. Conserves energy and other natural resources.
3. Enhances creativity and resourcefulness.
4. Can be a profitable venture for people to get into.
5. Makes people environmentally aware.

IN BUSINESS

As the saying goes, "there is cash in trash." All we need to do is be creative and have some business knowledge. All recyclable materials can be sold to junk shops. But if you convert the waste materials into something worthwhile, particularly if you make something that other people will want, you will earn more.

Exercises

Exercise 1

Directions: Match the items in column A with their corresponding recyclable objects in column B. Choose the letter of the correct answer.

	COLUMN A	COLUMN B
_____ 1.	Paper	a. Glass tiles
_____ 2.	Fabric	b. Paper mache
_____ 3.	Glass bottles	c. Canisters
_____ 4.	Plastic	d. Planters
_____ 5.	Tin cans	e. Stuffed toys

Exercise 2

Directions: Choose the letter of the correct answer.

_____ 1. This is the process of converting an item, which had already serve its purpose, into an item which serves another purpose.

a. Recycling
b. Biodegradable
c. Non-biodegradable

_____ 2. A type of product which can be made from fabric scraps.

a. Paper mache
b. Stuffed toys
c. Planters

_____ 3. Refers to the reuse of waste products in manufacturing processes.

a. External recycling
b. Internal recycling
c. Non-biodegradable

_____ 4. Refers to reclaiming materials from a product that has been worn out.

a. External recycling
b. Internal recycling
c. Non-biodegradable

_____ 5. Is it true that recycling makes people environmentally aware?

a. True
b. False
c. Maybe

Summary

Recycling is about reusing materials that would otherwise be discarded, for something else. This helps reduce waste pollution and can also be a possible source of income. The two types of recycling are internal and external, and the most common recyclable materials are glass, wood, plastic, fabric and paper.

Lesson Output

Produce a recycled product. Your teacher will give you a deadline for your activity.

RUBRICS FOR A RECYCLED PRODUCT MADE BY ANY OF THE RECYCLING METHODS

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student created a finished, workable product which was made of at least three different kinds of recyclable material.	The student created a finished, workable product which was made of at least two different kinds of recyclable material.	The student created a finished product which was workable and made from a recycled material.	The student created a finished product which recycled but was not workable.	The student did not create a finished product from recycled material.	
2. Creativity	The student's product was very pleasing to look at.	The student's product was reasonably pleasing to look at.	The student's product was somewhat pleasing to look at.	The student's product was plain looking.	The student did not attempt to be creative in any way in creating a recycled product.	
3. Promptness	The project was completed 2 days ahead of the given deadline.	The project was completed a day ahead of the given deadline.	The project was completed by the given deadline.	The activity was completed a day after the given deadline.	The activity was completed 2 days after the given deadline.	
Total						

LESSON 3 T-shirt Printing

Learning Outcomes

At the end of the lesson, you are expected to be able to:

1. Define t-shirt printing.
2. Identify some of the different kinds of T-shirt printing methods and the tools and equipment used in each method.
3. Demonstrate silkscreen printing.

Engage

Can you tell what is going on in the picture? Can you identify the equipment being used?

Trivia

Do you know where the natural dye capital of the Philippines is?

Abra, in northern Luzon, is the Philippines' "natural dye capital." The dyes used in Abra are created from different natural resources, such as plants, tree bark and fruit, and the traditional dyeing techniques are handed down in families, from generation to generation.

Explore

Directions
Choose the letter of the correct answer.

_____ 1. It is an article of clothing which is comfortable to wear on most occasions.

a. T-shirt
b. Leather jacket
c. Printer

_____ 2. The method to transfer a stenciled design onto a t-shirt using a mesh screen, ink, and a squeegee.

a. Vinyl cutting printing
b. Screen printing
c. Heat press printing

_____ 3. This is an essential tool used in screen printing.

a. Screen
b. Transfer paper
c. Emulsion

_____ 4. This is a method of t-shirt printing that was made famous in the 1990s.

a. Screen printing
b. Vinyl cutting printing
c. Direct to garment printing

_____ 5. What does DTG stand for?

a. Do the garment
b. Direct to garment
c. Do the go

Research

Research at least two different kinds of t-shirt printing methods, as well as the tools and equipment used for these methods.

Explain

The t-shirt is an article of clothing which is comfortable to wear on most occasions. Some people like to wear T-shirts whose design suits their personality, and this is why T-shirt printing is a very viable industry. With new design ideas and the right marketing strategies, you can take your business to the next level.

What is t-shirt printing?

T-shirt printing is a process of putting a particular design on a t-shirt. The goal is to make an otherwise plain t-shirt pleasing to the eye, as well as possibly making a personal statement. You can apply images, letters, or other elements on the design.

Different Kinds of t-shirt Printing

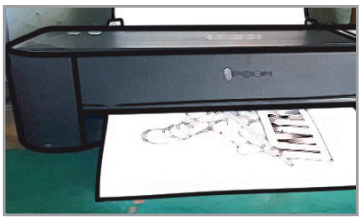
1. **Screen Printing**, or the **silkscreen method**, is a common t-shirt printing method used in the Philippines. A stenciled design is transferred onto a t-shirt using a mesh screen, ink, and a squeegee.

   Tools and equipment used in screen printing

   1. Image/design – This is what will be transferred onto the t-shirt. If an emulsion ink is used, the transferred image will be transparent.
   2. Screen – this is an essential tool for screen printing. It is made of a mesh stretched over a wooden or metal frame.
   3. Squeegee – this is used to press ink through the screen.
   4. Flash Cure Unit – this is an infrared heater where the T-shirt is placed under for a minute so that the layer of ink that has been pressed will stay fixed on the t-shirt.
   5. Belt Dryer – this is the final stop of the screen-printing process. After a T-shirt is flash cured, it is rolled along a belt heated to 190o C (380o F) to ensure the design's quality as well as to ensure that the ink binds to the t-shirt.

Step-by-Step Process of Screen Printing

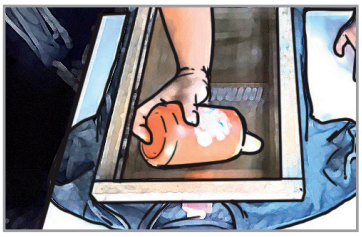


1. Create a design and print it using a printer.

2. Prepare the screen by attaching it to a frame.

3. Either expose the emulsion or apply photo emulsion onto the screen.

4. Wash off the emulsion, creating the stencil.



5. Place the t-shirt on a table with the screen and its stencil over it.

6. Press ink through the screen and onto the t-shirt.

7. Dry and check the finished product.

2. **Direct to Garment (DTG) Printing** – this is a T-shirt printing method that became popular in the 1990s. This method prints a design directly on the t-shirt. While it is one of the best methods of t-shirt printing around, particularly for colorful designs, it is also expensive.

   The following equipment is needed for DTG printing:

   a. DTG machine (printer)
   b. inks
   c. graphic design software.

3. **Dye Sublimation Printing** – this method of printing is a lot more fun and can be very enjoyable, because it makes use of a computer and printer to transfer dye directly onto a t-shirt.

The following equipment is needed for this method of printing:

a. Sublimation printer
b. Heat press
c. Computer
d. Transfer paper
e. Disperse dyes

4. **Heat Press Printing** – this is probably the most economical method to use, as it saves resources and time. This method combines a design printed on a special kind of paper, called transfer paper, to imbed a design onto a t-shirt.

   The following equipment is needed for this method of printing:

   a. Heat press machine
   b. Computer
   c. Transfer paper
   d. Cutter
   e. Heat tape
   f. Scissors
   g. Printer
   h. Ink

5. **Vinyl Cutting** – this method involves cutting printing vinyl into small shapes, and then transferring the designs onto the shirt.

   The following equipment is needed for this method of printing:

   a. cutting plotter or vinyl cutter
   b. computer
   c. vector software.

6. **Resist Dyeing** – this method is used for both tye-dyeing and batik-dyeing methods.

   In **Tie-Dyeing**, the t-shirt is bound with threads or rubber bands in the parts where the design is desired, after which the T-shirt is dyed.

   Batik-Dyeing is a technique where wax is applied to areas which you do not want colored, after which the T-shirt is then dyed.

   The following equipment is needed for this method of printing:

   1. Soda ash
   2. Rubber bands
   3. Zip ties
   4. Rack (to dye on)
   5. Plastic bin (to catch the dye)
   6. Fiber reactive dye
   7. Ziploc bag

How to Tie-Dye

Step 1: Prepare your work area.

Step 2: Tie the T-shirt with rubber bands.

Step 3: Immerse the T-shirt in dye.

Step 4: Rinse.

Step 5: Repeat as needed, to add more colors to the design.

Step 6: Dry.

Batik Printing Supplies

a. Canting – a pen-like tool which is used to apply hot wax.
b. Wooden printing blocks
c. Copper stamps
d. Wax
e. Fiber-reactive dye
f. Plain fabrics
g. Batik kits
h. Batik process sets and books

Caring for Your Printed Shirts

Caring for your shirts properly has an effect on both your budget and the environment. T-shirts that are well taken care of will last longer, which means that you're not likely to need to buy a new one for some time. You're also less likely to throw away the shirt, which means less solid waste in the environment.

Here is a guide on how to take care of your printed graphic shirts, no matter what type of printing method was used.

1. Wash the t-shirt inside out.
2. Avoid using hot water on the t-shirt.
3. As much as possible, do not tumble-dry the t-shirt.
4. Don't iron on the printed design, if possible.

General Safety Procedures when Printing

1. Each particular kind of machine has its own safety instructions. Make sure you know and follow these, to avoid accidents.
2. Keep hot or sharp tools and objects away from younger children.
3. Store your materials (tools, dyes) properly when these are not being used.

IN BUSINESS

The results of the methods of t-shirt printing noted in this lesson depend on the standard of the supplies and equipment used and the skill that is needed. If you are thinking of starting a t-shirt printing business, knowing about these can give you a lot of flexibility. That said, you cannot use all the printing methods in your business. You have to make a choice, and the factors you need to consider, when making that choice, are:

- The quantity you expect to produce
- The kind of design you want to produce
- The type of fabrics you have or can use

Summary

There are six different methods of t-shirt printing available today, all of which use different tools, equipment, and procedures. You can create a business based on printing t-shirts. Taking proper care of your t-shirts to make these last longer and so reduce waste.

Exercises

Exercise 1

Directions: Choose the letter of the correct answer.

_____ 1. This is a technique that applies wax on areas where color is not wanted, after which the t-shirt is dyed.

a. Batik-dyeing
b. Tie-dyeing
c. Dye sublimation

_____ 2. This process involves cutting printing vinyl into small shapes and designs, then transferring these onto the shirt.

a. Resist dyeing
b. Vinyl cutting
c. Dye sublimation

_____ 3. Which of the following is a tool or equipment which is not used in screen printing?

a. Images
b. Screen
c. Disperse dye

_____ 4. This method of printing is probably the most economical method to use.

a. Heat press printing
b. Screen printing
c. Vinyl cutting printing

_____ 5. In tie-dyeing, the t-shirt is bound with threads or rubber bands in those parts where a design isn't wanted, after which the T-shirt is then dyed.

a. True
b. False
c. Maybe

Exercise 2

Directions: Enumerate the following:

1. Tools and equipment used in screen printing
    a. _____
    b. _____
    c. _____
    d. _____
2. Ways to care for your printed t-shirts
    a. _____
    b. _____
    c. _____
    d. _____
3. Methods of t-shirt printing
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
4. Step-by-step process of screen printing
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
    g. _____

Lesson Output

Illustrate a method of t-shirt printing. Include a written explanation for the process. Your teacher will give you a deadline for this activity.

RUBRICS

Criteria	5	4	3	2	1	Points
1. Content/ Functionality	The student's illustration showed what's essential in the process and a written explanation was also given on the tools and equipment used.	The student's illustration showed a part of the process and an explanation was also given on what is was about.	The student's illustration showed a part of the process and labeled it with a little description.	The student's illustration showed t-shirt printing with a label but no explanation.	The student's illustration showed a printed t-shirt but not the process of printing.	
2. Creativity	The student's illustration was unique and original to the student and used various visual and text elements.	The student's illustration was original to the student and the visual and text elements were adequate.	The student's illustration was copied by the student from an existing image but still worthy of note with the proper description.	The student's illustration was copied by the student, including the description.	The student's illustration was copied by the student and only a label was included for the description.	
3. Promptness	The project was completed two days ahead of the given deadline.	The project was completed a day ahead of the given deadline.	TThe project was completed by the given deadline.	The activity was completed a day after the given deadline.	The activity was completed 2 days after the given deadline.	
Total						