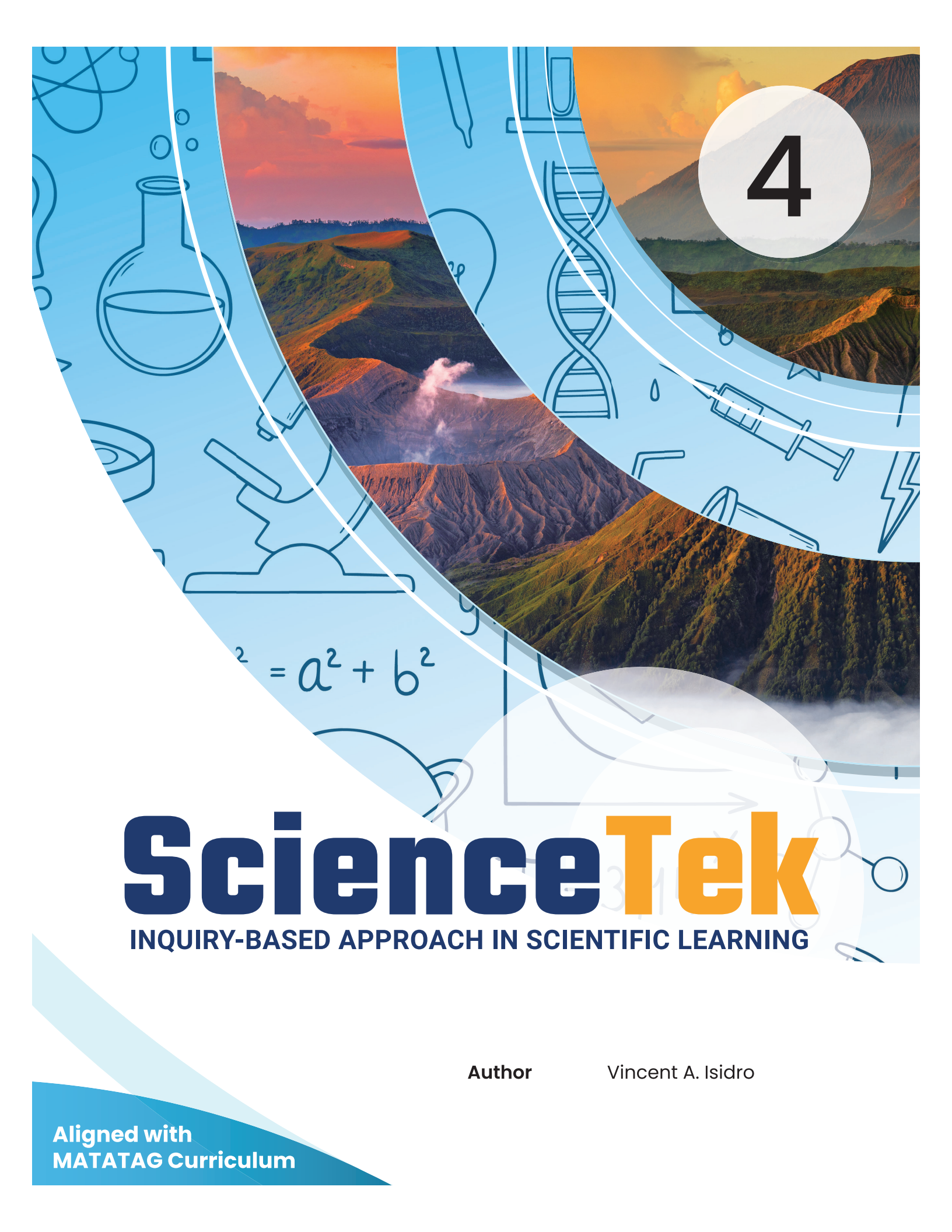


The cover features a vibrant landscape of rolling hills and mountains under a sunset sky. Overlaid on this are several light blue circular and semi-circular graphic elements. These elements contain white line-art icons representing various scientific fields: a chemistry flask with bubbles, a DNA double helix, a microscope, a syringe, a lightning bolt, and the mathematical equation $a^2 + b^2 = c^2$.

4

ScienceTek

INQUIRY-BASED APPROACH IN SCIENTIFIC LEARNING

Author

Vincent A. Isidro

Aligned with
MATATAG Curriculum

ScienceTek4

INQUIRY-BASED APPROACH IN SCIENTIFIC LEARNING

Second Edition

Vincent A. Isidro



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FOREWORD

ScienceTek: Inquiry-Based Approach in Scientific Learning

In the ever-evolving landscape of education, ScienceTek emerges as a beacon of innovation and excellence, meticulously crafted to align with the new DepEd Matatag Curriculum. This courseware is more than just a repository of scientific knowledge; it is a dynamic tool designed to resonate with the modern learner. By embracing the principles of the DepEd Matatag Curriculum, ScienceTek ensures that its content is not only relevant and comprehensive but also culturally responsive and inclusive, promoting a holistic understanding of science in the context of our rapidly changing world. This alignment with the latest educational standards underscores our commitment to providing educators and students with resources that are both current and pedagogically sound.

At the heart of ScienceTek is its inquiry-based learning approach, a method that transforms the classroom into a laboratory of curiosity and discovery. This approach encourages students to ask questions, formulate hypotheses, and engage in critical thinking, mirroring the real-world process of scientific inquiry. Moreover, the textbook integrates science process skills and an engineering approach, providing a unique blend that fosters problem-solving and analytical skills. These features are complemented by digital interactives, seamlessly integrating technology into the learning experience. These digital components not only enhance understanding but also cater to diverse learning styles, making ScienceTek an indispensable tool in the modern science classroom. This courseware is not simply focused on teaching science; it is dedicated to transforming science learning into a great experience.

TechFactors Inc.

How To Use This Book

The descriptions of each lesson section in this courseware will serve as a guide in understanding its content and purpose for a fun and meaningful journey in science.



Target

States the learning objectives for the lesson.



Engage

Contains an image that would spark the interest of the students and poses engaging questions to stimulate inquiry in student.



Explore

Presents a digital interactive or simulation to allow students to use their science process skills and serve as springboard to the key concepts presented in the lesson.



Explain

Discusses the key concepts and includes illustrations and graphic organizers to aid students in developing mastery.



Elaborate

Comprises an individual or collaborative activity that enables students to apply the knowledge and skills they have learned in various situations.



Evaluate

Contains an assessment activity that will check what students have learned from the lesson.



Extend

Includes a performance task that requires students to demonstrate their knowledge and skills by creating an output or product in a real-world context.

What's New?

We are excited to share the latest enhancements in our ScienceTek courseware, meticulously designed to enrich your learning journey:

- **Alignment with DepEd Matatag Curriculum:** Our content is now fully aligned with the latest DepEd Matatag Curriculum, ensuring relevance and up-to-date educational standards.
- **Enhanced Conceptual Depth and Breadth:** Dive deeper into key scientific concepts with our improved content, offering a more comprehensive understanding of each topic.
- **Revamped DepEd Matatag Curriculum-Aligned Interactives:** Engage with our interactives, now fine-tuned to align with the DepEd Matatag Curriculum, for a more immersive and effective learning process.
- **Improved Assessment Tools:** Test your knowledge with our assessment tools, standardized for easy administration and specifically designed to stimulate higher-order thinking skills.
- **New Processing Activities:** To reinforce learning, we have included novel processing activities aimed at boosting mastery and retention.
- **Fresh Layout and Design:** Experience our content in a new light with a revamped layout and design, making learning not just educational but visually appealing.
- **Vibrant New Illustrations:** Bring learning to life with our vivid, newly added illustrations, making complex concepts easier and more enjoyable to grasp.

Embark on a dynamic educational journey with ScienceTek's latest offerings, where learning is made a great experience!

ABOUT THE AUTHOR

Vincent A. Isidro

Vincent graduated *magna cum laude* from the University of the Philippines-Diliman with a Bachelor in Elementary Education Major in Science and Health. He is currently completing his Master of Arts in Education Major in General Science from the same university. He previously worked as a science teacher and is currently a content developer in TechFactors, Inc.

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QUARTER 1

In this quarter, you will apply science process skills and attitudes as well as your knowledge of the different properties of materials to solve different issues in waste management that your community faces. You will also explore the contributions of different Filipino and foreign scientists and inventors and appreciate the importance of being well-informed in science and technology. So, brace yourselves as we dive deep into the wonders of science!



LESSON 1

Science Process Skills and Attitudes



Target

At the end of this lesson, you will be able to:

- ◇ Describe science process skills and attitudes.
- ◇ Apply science process skills in investigating or solving a problem.



Engage



Have you tried investigating your surroundings?



Mix, Mix!

Objectives

1. Observe changes in an experimental setup.
2. Predict outcomes in an experimental setup.
3. Draw conclusions from observations and data recorded.

Instruction from the Interactive

A. Predict which substance will dissolve the fish cracker the most – water, rubbing alcohol, or vinegar.

B. Cracker and Water

1. Drop the fish cracker in the beaker filled with water.
2. Observe the change in the fish cracker after 5 minutes.
3. Click “Stir” and observe the change in the fish cracker.

C. Cracker and Rubbing Alcohol

1. Drop the fish cracker in the beaker filled with rubbing alcohol.
2. Observe the change in the fish cracker after 5 minutes.
3. Click “Stir” and observe the change in the fish cracker.

D. Cracker and Vinegar

1. Drop the fish cracker in the beaker filled with vinegar.
2. Observe the change in the fish cracker after 5 minutes.
3. Click “Stir” and observe the change in the fish cracker.

Observations

	Observations	
	After 5 minutes	After stirring
Water		
Rubbing Alcohol		
Vinegar		

Guide Questions:

1. Which substance broke down the fish cracker the most?
2. Was your prediction correct? Why did you make that prediction?



Explain

Science Process Skills

Science helps us uncover the secrets of the world around us. Whether you are examining a tiny ant or gazing at the stars, science process skills guide your way. Let us dive in and learn about these amazing tools that make every scientist's journey exciting and meaningful.

1. **Observing** - When you use your eyes, ears, nose, fingers, or taste buds to find out about things, you are observing. When scientists observe, they pay close attention to the world around them.
2. **Measuring** - When you measure, you use tools like rulers, measuring cups, or scales. Measuring gives us exact information, which helps scientists compare things and understand them better.
3. **Predicting** - In science, predicting means making a *hypothesis* or an educated guess about what will happen based on what you already know. For example, if you see dark clouds, you might predict it will soon rain.



A child using a magnifying glass

4. **Experimenting** - Experimenting is a fun way to test out your predictions. Scientists set up experiments to see if what they think will happen really does happen. For example, when you test if rainwater makes plants grow faster than tap water, that is an experiment.
5. **Analyzing Data** - After doing an experiment, scientists look at the information they collected, which is called *data*. Scientists look at the data to figure out what it means and if it supports their predictions.
6. **Drawing conclusions** - After analyzing data, scientists draw conclusions. When drawing conclusions, we summarize our findings and determine what they mean.
7. **Communicating** - Scientists are eager to share what they have learned. They talk or write about their observations, predictions, and the results of their experiments. By sharing, other people can learn from your discoveries too.



Scientists talk in seminars to inform people.

Science Attitudes

Did you know that doing science is not just about using tools or conducting experiments? It is also about having the right mindset and feelings towards our discoveries and explorations. These feelings and beliefs are what we call science attitudes.

1. **Curiosity** - When you are curious, you always want to learn and discover new things. Think about questions like, "*Why is the sky blue?*" or "*How do birds fly?*" Asking questions like these lets your curiosity shine through.
2. **Honesty** - Being honest means telling the truth about what you



Curiosity is shown by asking questions about our surroundings.

observe and the results of your experiments. Even if the results are not what a scientist expected, honesty helps everyone learn.

3. **Open-mindedness** – Being open-minded means being open to new information and ideas, even if they are different from what you first thought. Scientists need to be open-minded to understand new discoveries.
4. **Persistence** – Ever tried something difficult and felt like giving up? Persistence means keeping on going, even when things are tough. If an experiment does not work the first time, scientists try again or think of new ways to solve the problem.
5. **Teamwork** – Scientists often work with other people to share ideas, do experiments, and solve problems. Teamwork means working together and helping each other.

Remember, science process skills and attitudes helps you understand the world around you better. So, the next time you are curious about something, observe, ask questions, and maybe even try an experiment!



Researchers work together to find better solutions.



Elaborate

Form a group. Observe the school and its surroundings and identify at least five different objects that you can find. Write what you can observe about each object on the table below. Report your observations in class.



Object	Observations
Example: <i>plant pot</i>	It is colored brown. It is hard.



Evaluate

Write the letter of the answer on the space before the number.

- ____ 1. What do you do when you use your senses to find out about things?
 - a. Observing
 - b. Predicting
 - c. Measuring
 - d. Communicating
- ____ 2. Clarkson always want to know why things happen. Which science attitude is Clarkson showing?
 - a. Honesty
 - b. Curiosity
 - c. Teamwork
 - d. Persistence
- ____ 3. Kim believes that calamansi is the best source of Vitamin C. You showed her a research article that says the guava is the best source. Kim refuses to believe this information. What science attitude does she need to improve?
 - a. Curiosity
 - b. Teamwork
 - c. Persistence
 - d. Open-mindedness
- ____ 4. Why is honesty important in science?
 - a. To work better with others
 - b. To get the results you want
 - c. To make experiments easier
 - d. To show accurate results
- ____ 5. If a group of scientists try again after an experiment fails, which attitude are they showing?
 - a. Honesty
 - b. Curiosity
 - c. Teamwork
 - d. Persistence

- ____ 6. Many scientists work together to research and create vaccines for diseases. Why is teamwork important in these researches?
- a.** To share ideas and help each other
 - b.** To lessen the amount of money needed
 - c.** To make sure that data is being collected
 - d.** To communicate results better to the public
- ____ 7. When a student is curious, what are they most likely to do?
- a.** Ask questions and seek answers.
 - b.** Find a hobby to distract oneself.
 - c.** Keep all their thoughts to themselves.
 - d.** Find a famous person in social media.
- ____ 8. For a scientist to draw conclusions, what should they base their conclusions on?
- a.** Random guesses
 - b.** Their observations
 - c.** Their favorite color
 - d.** Evidence and data
- ____ 9. How can teamwork be beneficial when solving scientific problems?
- a.** It allows you to share ideas and solutions.
 - b.** It takes away loneliness that you may feel.
 - c.** It lessens the number of resources needed.
 - d.** It gives us more happiness when solving problems.
- ____ 10. How can you communicate your scientific findings?
- a.** By keeping it a secret
 - b.** By telling other people
 - c.** Be keeping an open mind
 - d.** By repeating the experiment

LESSON 2

Scientists Around the World



Target

At the end of this lesson, you will be able to:

- ◇ Differentiate primary and secondary sources of information.
- ◇ Identify famous Filipino and foreign scientists and their inventions or discoveries.



Engage



Have you taken antibiotics before when you were sick? Do you know how it is discovered?



Evidence of Brilliance

Objectives

1. Classify sources of information as primary or secondary sources.
2. Identify the discoveries and inventions of famous Filipino and foreign scientists.

Instruction from the Interactive

1. Hover around the different objects inside the room and read the description for each source of information.
2. Click on each object and read the information it shows about a Filipino or foreign scientist or inventor.
3. Drag the object into the correct shelf whether it is a primary source or secondary source of information.
4. On the table, write the primary sources and secondary sources that you have identified from the interactive in the correct column.

Observations

Primary Sources of Information	Secondary Sources of Information

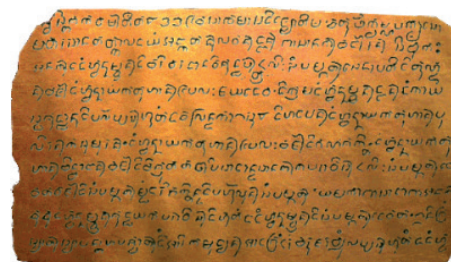
Guide Questions

1. What are the differences between primary and secondary sources?
2. Give at least two Filipino scientist and describe their discovery or invention.
3. Give at least two foreign scientist and describe their discovery or invention.

When you are trying to learn about something, you can use two main types of sources of information. Let us learn the differences between these main types of sources.

Primary Sources of Information

Primary sources give us firsthand information. They come directly from the time or event we are studying. No one has added their own thoughts or explanations. Some examples of primary sources are artifacts, fossils, diaries, letters, interviews, and photographs.



Plates with engravings of event from the past

Secondary Sources of Information

A secondary source is made by someone who did not directly experience or participate in an event, but instead relied on primary sources or other secondary source. Some examples of secondary sources of information are news articles, biographies, documentaries, and history textbooks.



Textbooks in the school library are secondary sources.

When we learn about famous Filipino and foreign scientist, we can use primary sources like their autobiographies or photographs of their invention. We can also use secondary sources like textbooks about their discoveries or documentaries detailing their research.

Do you know some famous Filipino and foreign scientists and their contributions?

Amazing Filipino Scientists

1. **Dr. Angel Alcala – Biologist.** He studied how to build artificial coral reefs to serve as home of fish and other marine life.
2. **Dr. Fe del Mundo – Pediatrician.** She developed a bamboo incubator to make sure even babies born too early is safe and snug. She also established the first children's hospital in the Philippines, known as Fe Del Mundo Medical Center.
3. **Dr. Gavino Trono – Marine Biologist.** He is the Father of Seaweed Diversity. His research helps us learn more about all the different kinds of seaweed in Asia and why they are so important in the ocean.
4. **Dr. Gregorio Zara – Engineer.** He was a brilliant inventor who invented the videophone and other communication devices.



Global Science Heroes

Now, it is time to expand your horizons and learn about foreign scientists from all over the world.



1. **Marie Skłodowska Curie – Chemist and Physicist.** She studied radioactive materials and was the very first woman to win a Nobel Prize.



2. **Alexander Fleming – Physician.** He discovered penicillin which helped people fight infections. His groundbreaking finding with penicillin played a role in advancing the medical field.



3. Louis Pasteur – Chemist and Microbiologist.

Pasteur helped us understand the causes of diseases. He is most famously known for introducing the process of pasteurization, which involves heating milk to kill harmful bacteria, ensuring they are safe to drink.



4. Wilhelm Conrad Röntgen – Engineer and Physicist.

He discovered X-ray and its application in medicine. His work earned him the first Nobel Prize in Physics in 1901.



Elaborate

Form a group and prepare a social media profile of a Filipino or foreign scientist or inventor. Identify the birthplace and birthdate of your chosen scientist. Include pictures or drawings of their famous discovery or invention and describe its importance. You may copy the template below and present your output in class.

A template for a social media profile, resembling a Facebook page. It includes a header with a search bar and navigation links. The main profile area has a large dashed box for an 'Image of famous invention or discovery', a smaller dashed box for a 'Picture', and a 'Name' field with an 'alias' sub-field. Below these are buttons for 'Like', 'Follow', 'Message', and a dropdown menu. The 'About' section is divided into two columns: the left column has dashed boxes for 'Date of Birth' and 'Country', and the right column has a dashed box for 'Short description and Importance of invention/discovery' and a text area for 'Event Name'. The 'Timeline' section is also visible at the bottom.



_____ 1. Which source of information tells us about a day in the life written by a person?

a. diary **c.** novel

b. documentary **d.** photograph

_____ 2. Miki wants to find a primary source of information about dinosaurs. Which of the following does she need?

a. biography **c.** fossils

b. documentary **d.** news article

_____ 3. Miki has several books about dinosaurs at home. Which kind of source does she have about dinosaurs?

a. Primary source **c.** Science source

b. Prehistoric source **d.** Secondary source

_____ 4. How does Dr. Angel Alcalá's discovery of artificial coral reefs help our seas and oceans?

a. It helps filter water for fish.

b. It provides a new habitat for fish.

c. It allows us to catch more seafood.

d. It helps sailors to navigate the seas.

_____ 5. How does Dr. Fe del Mundo's invention of bamboo incubator help people in the farthest villages of the Philippines?

a. It helps newborn babies keep warm and safe.

b. It helps children avoid getting deadly diseases.

c. It allows parents to work and take care of babies.

d. It allows mothers to spend less time feeding their baby.

- ____ 6. What did Dr. Gregorio Zara invent?
- a. electric fan
 - b. refrigerator
 - c. television
 - d. videophone
- ____ 7. How does Alexander Fleming's discovery of Penicillin help people all over the world?
- a. It gave people a healthier body.
 - b. It helped cure different infections.
 - c. It made people grow faster.
 - d. It allowed doctors to see the internal organs.
- ____ 8. How does Louis Pasteur's discovery of pasteurization improve the quality of milk?
- a. It made milk more nutritious with minerals.
 - b. It gave milk a better, more flavorful taste.
 - c. It made milk less expensive for poor people.
 - d. It allowed milk to be stored longer and safer.
- ____ 9. What did Wilhelm Conrad Röntgen's discover that helped doctors in treating people?
- a. antibiotic
 - b. bandage
 - c. herbal medicine
 - d. X-ray machine
- ____ 10. Why is it important to learn about Filipino scientists and their discoveries or inventions?
- a. To inspire Filipino students in learning science and be proud of our heritage
 - b. To teach students that we need to spend a lot of time to make discoveries or inventions
 - c. To learn trivia about Filipino scientist and inventors that we can share to other people
 - d. To show that discoveries of Filipino scientists are better than foreign scientists

LESSON 3

Science in Our Lives



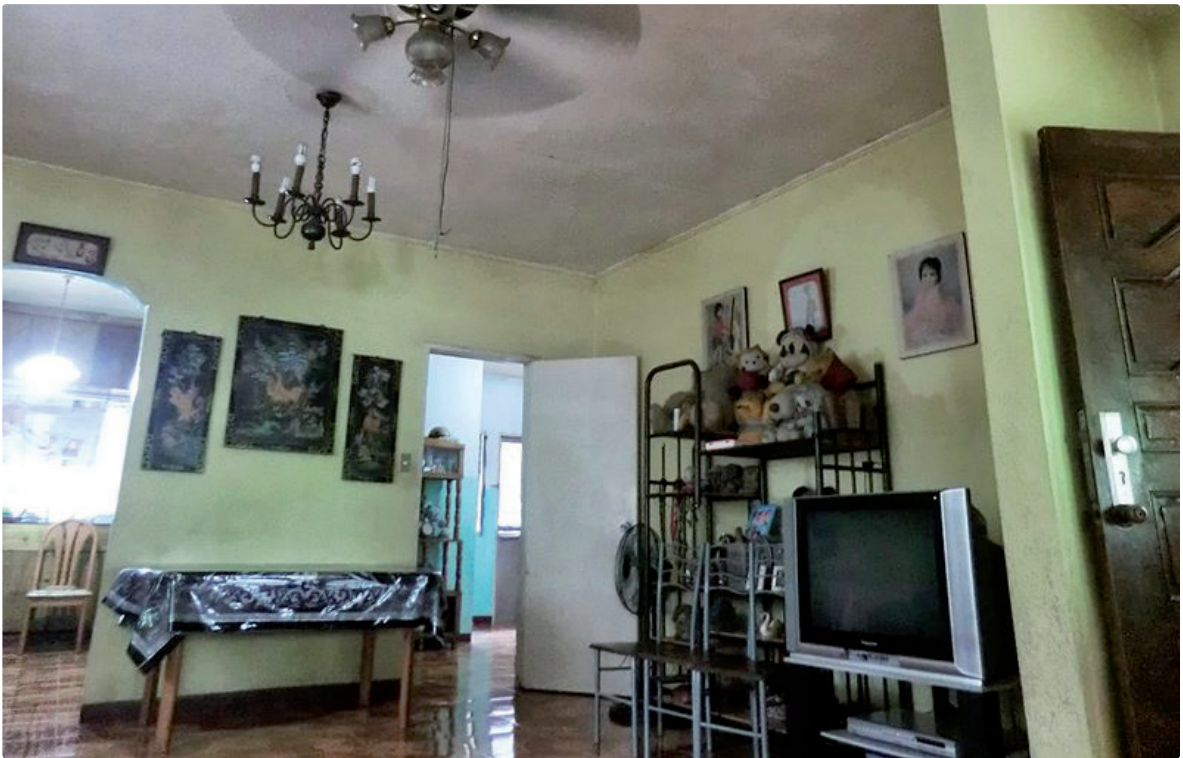
Target

At the end of this lesson, you will be able to:

- ◇ Explain the impact of science inventions on our everyday life.
- ◇ Describe a recent advancement in science, technology, and engineering that affects our life.



Engage



What are the appliances and gadgets that you use the most at home? How will life be without these objects?



Explore

Access the interactive
to perform the activity.



Science in Our Home

Objective

- ◇ Identify science inventions at home.

Instructions from the Interactive

1. Click on the appliances or gadgets at home and read the history behind its invention and its use.
2. Record the information you gathered into the table below.

Observations

Appliance/Device	Use in Everyday Life

Guide Questions

1. Which of the appliances or device shown in the interactive do you use the most? Why?
2. What would life be like without these appliances or devices?
3. What are some disadvantages of using these appliances or devices?

Explain

Were you amazed by the discoveries and inventions that you have encountered in the interactive? Throughout history, brilliant scientists and inventors have made amazing discoveries and inventions that transformed the way we live. Here are some remarkable innovations that have had a huge impact on our lives.

1. **Printing Press** – Johannes Gutenberg, a German inventor, introduced the printing press in the 15th century. The printing press made it possible to print books quickly and accurately. This invention sparked a reading revolution, making books more affordable and accessible to many people.



The Gutenberg Press. One of the earliest printing presses.

2. **Electricity** – Scientists like Benjamin Franklin and Michael Faraday worked hard to understand electricity. Eventually Thomas Edison along with other inventors developed the light bulb, which changed the way we light our world. Today, electricity powers our homes and gadgets.
3. **Automobiles** – In the late 19th century, brilliant minds like Karl Benz and Henry Ford created the first cars. Cars changed the way we travel, making it faster and more convenient. Today, they are everywhere, helping us get to school, explore new places, and visit our friends.
4. **Antibiotics** – You might still remember Sir Alexander Fleming from our previous lessons. He, along with other scientists, help develop antibiotics as we know today. Antibiotics are medicines that help our body kill harmful bacteria, helping us recover from infections and diseases.



We should only take antibiotics when the doctor says so.

5. **Internet** – Engineers like Bob Kahn and Vinton Cerf helped the development of the internet. The internet has made our world

smaller, and now we can learn about faraway places, meet new friends, and discover endless knowledge—all with just a few clicks through social media.

Into the Future

In recent years, we have seen new discoveries and inventions in science and technology that promise to reshape our world. Some of these new discoveries and technologies include the following:

1. **Artificial Intelligence** – This technology can think, learn, and even solve problems, almost like real person. In the coming years, AI will play a big role in making our lives better. It might help doctors find cures for diseases, teach us new things, and make our cars drive safer.
2. **Virtual Reality** – Virtual reality, often called VR, lets you step into new worlds and adventures. VR makes learning more exciting and fun, and it is also used by scientists, artists, and gamers to create amazing experiences.
3. **3D Printing** – 3D printing will serve as a fantastic tool for inventors, builders, and artists. You can design something on a computer, and this machine will turn that design into a real object you can hold.



A vase being printed with a 3D printer.

New discoveries and inventions in science and technology are exciting tools that help us make our lives better and our world a more interesting place. As members of our society, it is our responsibility to be familiar with these to make sure that we can use it properly to make the world a better, brighter, and more exciting place for everyone!



Elaborate

Have you ever thought of inventing a device that would solve an issue that you are experiencing every day? Might it be in cleaning your bag or arranging your notebook, there are many activities in our life that we can still improve on. Draw a device or object that would solve an issue you are facing. Then, explain how your invention works and how it can help people. Share your drawing and explanation in class.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Why is the printing press an important invention?
- a. It allowed for faster sharing of knowledge.
 - b. It allowed people to watch videos.
 - c. It made it easier to move to another place.
 - d. It created fun toys for children.
- ____ 2. How do automobiles impact the way we live?
- a. It allowed us to fly to different countries.
 - b. It allowed us to travel faster and farther.
 - c. It changed the kind of clothes we wear.
 - d. They made it possible to go underwater.
- ____ 3. Which scientist discovered penicillin helping people develop antibiotics?
- | | |
|----------------------|--------------------|
| a. Alexander Fleming | c. Thomas Edison |
| b. Karl Benz | d. Albert Einstein |

- ____ 4. Which of the following invention help us travel in faraway places across the oceans quickly?
- a.** airplane
 - b.** carriage
 - c.** space shuttle
 - d.** microphone
- ____ 5. How has the internet changed the way we communicate with others?
- a.** It allowed people to ignore their loved ones.
 - b.** It lets us send messages instantly to people far away.
 - c.** It made it necessary to use pens all the time.
 - d.** It slowed down how quickly we can send a message.
- ____ 6. How does the invention of the light bulb contribute to safety?
- a.** It brightened our streets during nighttime.
 - b.** It lets us make phone calls safely anywhere.
 - c.** It helped police officers patrol the streets.
 - d.** It stopped robbers from going out at night.
- ____ 7. What does the acronym AI stand for?
- a.** advanced intelligence
 - b.** artificial intelligence
 - c.** automatic intelligence
 - d.** all-purpose intelligence
- ____ 8. What does the internet allow us to do with people from different countries?
- a.** Change their beliefs.
 - b.** Help them get food.
 - c.** Share and exchange ideas.
 - d.** Travel instantly to their homes.

- ____ 9. If you wanted to design a toy on your computer and then have that toy made into a real object you can play with, which technology would you use?
- a.** AI
 - b.** 3D Printing
 - c.** Social Media
 - d.** Virtual Reality
- ____ 10. Which technology would help you feel like you are seeing the pyramids and walking next to the Nile River?
- a.** AI
 - b.** 3D Printing
 - c.** Social Media
 - d.** Virtual Reality

LESSON 4

Properties of Materials



Target

At the end of this lesson, you will be able to:

- ◇ Describe chemical properties of materials such as flammability, reactivity, and toxicity.
- ◇ Differentiate biodegradable and non-biodegradable materials.



Engage



How would you describe the substances and materials that you have at home?



Biodegradable and Non-Biodegradable

Objectives

1. Classify the materials if it is biodegradable or non-biodegradable.
2. Identify what are the materials that can be recycled and the materials that can be thrown to the compost pit.

Instructions from the Interactive

A. Waste segregation

Segregate each material according to its corresponding category (biodegradable and non-biodegradable) by dragging it on the table in the workspace: plastic bottles, banana peel, leaves, paper, leftover food, straws, plastic cups, glass.

B. Reduce, reuse, repurpose and recycle

Drag each material in the compost pit symbol or recyclable symbol and see the product produced by each garbage. Write your observation on Table 1.

Data

Materials	Compost Pit or Recycle?	Product
1. Plastic bottles		
2. Banana peel		
3. Leaves		
4. Paper		
5. Plastic straws		
6. Leftover food		
7. Glass		

Guide Questions

1. How are objects classified as biodegradable and non-biodegradable?
2. Why is it important to segregate waste?



Explain

Properties of Materials

Everything around you, from the air you breathe to the toys you play with, is made up of matter. Materials have **physical properties**, like its color, shape, mass, and size. Think of these as the things you can see or touch. But materials also have **chemical properties**. These are properties that we can observe when matter undergoes a change and becomes something different, like when a piece of paper burns and turns to ash.

Flammability

Flammability refers to how easily something can catch fire. Some materials, like paper or dry leaves, can catch fire quickly, so they have high flammability.



Paper burning

Reactivity

Reactivity is all about how substances react or respond when they meet other substances. Some substances react when mixed, like vinegar and baking soda, while others do not react much at all.



Mixing vinegar and baking soda

Toxicity

Toxicity tells us how harmful or poisonous a substance is. Some chemicals can be dangerous if they are touched, eaten, or breathed in. Always remember to stay away from toxic substances.

Biodegradability

You might have seen a banana peel turn brown and mushy over time. That is because it is biodegradable, which means it can naturally break down and return to the earth. Objects like plastic bags do not break down easily and can harm our environment because they are non-biodegradable.



Fruit and vegetable peelings and leftover food

Chemical properties give us clues about how different things will react under certain conditions. By having this knowledge, we can prevent accidents and injuries.



Elaborate

Form a group and think about the waste materials that you produce in one school day. List it on the table below and identify if the material is flammable, toxic, biodegradable, or non-biodegradable.



Waste Material	Is it flammable (Yes/No)	Is it toxic(Yes/No)	Is biodegradable or non-biodegrad- able?

Then, write a five-step plan to reduce the amount of waste that you produce. Present your five-step plan in class

My Five-Step Plan to Reduce Waste



Evaluate

Write the letter of the best answer in the space before the number.

- ____ 1. Which of the following materials is most likely to burn when set aflame by a candle?
- | | |
|--------------------------|-----------------------------|
| a. Broken glass | c. Metal paper clip |
| b. Dried branches | d. Rusted iron nails |
- ____ 2. When an iron nail is put aside exposed to air, it would develop rust as time passes by. Which chemical property is shown in this scenario?
- | | |
|----------------------------|----------------------|
| a. Biodegradability | c. Reactivity |
| b. Flammability | d. Toxicity |
- ____ 3. When an apple is sliced and left exposed to air, it changes color to brown. Which chemical property is shown?
- | | |
|------------------------|-----------------------|
| a. Flammability | c. Testability |
| b. Reactivity | d. Toxicity |

- ____ 4. Which of the following scenarios exhibits a chemical property of materials?
- a.** A log burning in a fire.
 - b.** Ice melting into water.
 - c.** Cutting a piece of paper.
 - d.** A ball bouncing on the ground.
- ____ 5. Which of the following objects is biodegradable?
- a.** Orange peeling
 - b.** Plastic straw
 - c.** Rubber shoes
 - d.** Stick of gum
- ____ 6. Which of the following objects is non-biodegradable?
- a.** Candy wrapper
 - b.** Dried leaves
 - c.** Fishbone
 - d.** Spoilt rice
- ____ 7. Which of these materials is most likely to break down naturally in a compost pit over a few weeks or months?
- a.** Aluminum can
 - b.** Banana peel
 - c.** Glass bottle
 - d.** Plastic straw
- ____ 8. Why do plastic products harm the environment?
- a.** They increase the soil's fertility.
 - b.** They release beneficial oxygen when disposed of.
 - c.** They naturally blend with the environment in a few days.
 - d.** They can take hundreds to thousands of years to decompose.
- ____ 9. Why should you be careful when using cleaning materials with reactive chemicals?
- a.** Because it might react strongly with other substances
 - b.** Because it might just make the task of cleaning harder
 - c.** Because we cannot use it again once we open the container
 - d.** Because the effectiveness of cleaning materials lies on its reactivity

____ 10. Why is it essential to learn about the chemical properties of objects we use daily?

- a.** To use these objects safely and responsibly
- b.** To be able to have the most fun in using them
- c.** To minimize the cost of buying ineffective materials
- d.** To make our tasks faster and our lives more comfortable

LESSON 5

Changes in Materials



Target

At the end of this lesson, you will be able to:

- ◇ Describe changes in materials when exposed to changes in temperature.



Engage



How does heat cause matter to change physically or chemically?



Explore

Access the interactive
to perform the activity.



Changes in Matter due to Application of Heat

Objective

- Demonstrate how matter changes its state due to heat

Instructions from the Interactive

Go from one page to another to discover the concept of chemical changes due to heat.

1. Coagulation
2. Denaturation
3. Gelatinization
4. Caramelization

Guide Questions

1. What happens to matter when heat is applied?
2. What are some examples of coagulation?
3. What are some examples of denaturation?
4. What are some examples of gelatinization?
5. What are some examples of caramelization?



Explain

Effects of Heat on Properties of Materials

Heat plays a significant role in changing the properties of various materials, especially when we are cooking food. When we expose materials to heat, several intriguing changes can occur, which are essential in our daily lives and the preparation of food.

Combustion

Combustion is a process wherein certain materials, when exposed to high temperatures, undergo a reaction with oxygen. This reaction results in the production of flames and the release of energy in the form of heat. Wood burning in a fireplace is an example of combustion.



Burning wood in a campfire

Coagulation

Coagulation occurs when proteins, a material in some food we eat, like egg white, get heated and change into a solid form. It is why we can have fried or boiled eggs for breakfast.



Frying egg

Denaturation

When we cook meat, the proteins inside it change their shape because of heat. This process is called denaturation. Ever noticed how a raw meat is soft and squishy, but once cooked, it becomes firm? That is denaturation in action.



Meat heated up in a pan

Gelatinization

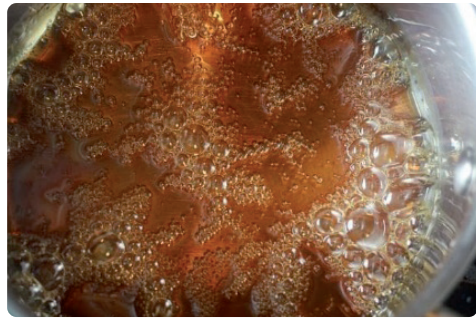
When we heat food such as rice or pasta in water, they soak up the liquid and become soft. This change is known as gelatinization. It is what turns hard rice grains into soft and warm rice.



Rice boiling in a rice cooker

Caramelization

When we heat sugar, it melts and turns brown, giving off a yummy, sweet aroma. This process is called caramelization. It is the reason why some desserts, like leche flan or caramel pudding, have that delicious brown layer on top.



Caramelizing sugar

The application of heat and its effects on materials is very interesting, especially in preparing our meals. Observing and understanding these changes can offer insights into the science behind every day cooking and food preparation.



Elaborate

Form a group and write a recipe for your favorite dish. You may use the recipe graphic organizer below and write the ingredients and steps. Then, explain in class your recipe and explain the changes that occur with the ingredients when it is heated.



Recipe

TITLE _____

PREP TIME _____

TOTAL TIME _____

Tips

INGREDIENTS

DIRECTIONS



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Which situation best shows the process of combustion?
- | | |
|--|-------------------------------------|
| a. A candle burning | c. Water turning to ice |
| b. A battery powering a toy car | d. Wind blowing from the sea |

- ____ 2. While watching a cooking show, you noticed that when the chef heated milk slowly, it formed a firm layer on top. Which change in matter due to heat did you observe?
- a.** Coagulation
 - b.** Combustion
 - c.** Denaturation
 - d.** Gelatinization
- ____ 3. Which process happens when cooking fish in a pan?
- a.** Conduction
 - b.** Convection
 - c.** Denaturation
 - d.** Gelatinization
- ____ 4. When cooking rice, which process occur?
- a.** Coagulation
 - b.** Combustion
 - c.** Denaturation
 - d.** Gelatinization
- ____ 5. Observe the image of the leche flan. What process is responsible for the golden-brown sweet layer on top?
- a.** Caramelization
 - b.** Coagulation
 - c.** Denaturation
 - d.** Gelatinization



- ____ 6. How does denaturation help us prepare and eat food such as meat?
- a.** It makes it easier to chew and eat.
 - b.** It makes it more flavorful and nutritious.
 - c.** It allows us to eat more meat than before.
 - d.** It does not help humans eat better food.

- ____ 7. Which process is involved when we are cooking pasta?
- a.** Coagulation
 - b.** Combustion
 - c.** Denaturation
 - d.** Gelatinization
- ____ 8. Which of the following materials will enable you to demonstrate the process of combustion?
- a.** Knife and cutting board
 - b.** Matchstick and paper
 - c.** Mobile phone and charger
 - d.** Water and glass
- ____ 9. Why is knowing how heat affects materials useful?
- a.** It gives insights on handling warm situations.
 - b.** It lets us see how heat changes things like food.
 - c.** It helps pick materials best for warm conditions.
 - d.** It educates on heat's downsides and how to manage them.
- ____ 10. What happens to food if it is heated in a pan for too long?
- a.** It tastes better.
 - b.** It starts to smoke.
 - c.** It gets smooth and soft.
 - d.** It ends up getting burnt.

LESSON 6

Harmful Changes in Our Surroundings



Target

At the end of this lesson, you will be able to:

- ◇ Identify changes in materials that are harmful.
- ◇ Describe ways to minimize harmful changes in our surroundings.
- ◇ Demonstrate ways of proper care and handling of materials.



Engage



How can the changes in matter affect the environment?



Effects of Changes in Matter to the Environment

Objectives

1. Explain how changes of matter affect the environment
2. Identify changes in materials that are useful or harmful to the environment

Instructions from the Interactive

Effects of Changes in Matter to Environment

1. Drag the following materials from the materials task pane to the working space: white cloth, meat, ash, water, plastic cup, plastic, wood, paper, biodegradable waste.
2. Using the materials in Step 1, do the following tasks (if the workspace is already crowded, remove the materials that were already used):
 - a. Put the white cloth in the clothesline and leave it for 3 days. Observe what happens to the cloth.
 - b. Put a slice of meat in the freezer and leave it for three days.
 - c. Mix a tablespoon of ash in a glass of clean water.
 - d. In a container, burn a combination of plastic, wood, paper, etc.
 - e. Put biodegradable materials such as fruits and vegetables in a compost pit or bin.
3. For tasks A to E, observe what happens to the materials. Record your observation on Table 1.

Data

Materials	Observations	Changes in Matter (Physical or Chemical)	Effects of changes in the material to the environment		How do these changes affect the environment?
			Beneficial	Harmful	
White cloth on clothesline					
Meat in the freezer					
Tablespoon of ash to water					
Burning of garbage					
Biodegradable waste to soil					

Guide Questions

1. What are the changes that occurred in the material that are useful or beneficial to the environment? What made them useful to the environment?
2. What are the changes that occurred in the material that are harmful to the environment? What made them harmful to the environment?
3. What can people do to prevent these harmful effects to the environment?



Explain

Harmful Changes in Materials Around Us

Changes in matter happen all around us, and sometimes they can harm our surroundings. It is important for us to understand these changes so we can make choices to help keep our surroundings safe and clean.

Food Spoilage

When food spoils, microorganisms, like bacteria, start to grow on the food, and they can produce substances that change the food's color, smell, or texture. These changes mean the food is not good to eat anymore, and if we do eat it, we will feel sick. To prevent food from spoiling, we should store it in cool places like the refrigerator, use clean containers to keep it, and make sure to eat or use it while it is fresh.



Spoiled food

Plastic Waste

When plastic waste breaks down, it undergoes chemical change. This means they slowly change and release harmful chemicals. We can help stop these harmful effects by reducing our use of plastics, recycling whenever possible, and making sure we dispose of them properly, so they do not end up in our oceans and rivers.



Plastic bottles are common plastic waste

Acid Rain

When certain harmful substances, known as pollutants, get released into the air, they can mix up with the rain clouds. This is called acid rain. Acid rain is harmful to plants and even the houses we live in may be damaged. We can prevent acid rain from happening by reducing our pollution. Use cars less and walk or bike more. Factories should also avoid releasing pollutants in our air.

Burning Garbage



Burning garbage can release harmful gases

When we burn garbage, it releases smoke and harmful chemicals into the air, which can be bad for our health and the environment. Instead of burning, we can choose better ways to get rid of our garbage like recycling, composting, or even reusing some items.

Proper Use and Handling of Materials

It is important to handle materials like pesticides, detergents, and flammable items with care. These materials can be dangerous if used the wrong way. They might harm us, our pets, or the environment. By being careful, we can avoid accidents like spills or fires. Always remember, safety first when using or storing these special materials.

Pesticides and Insecticides



Insecticides are commonly found at home

Pesticides and insecticides are chemicals used to get rid of pests and bugs that harm our plants and home. However, if we use them too much or in the wrong way, they can mix with our soil or water and hurt the environment, our food, and even us. It is important to remind our family to follow the instructions carefully when using them.

We can also use natural pesticides instead.

Cleaning Materials



Liquid detergent and dishwashing liquid are common in kitchens

Cleaning materials like detergent and bleach help us keep things clean, but we need to use them safely. Always read and follow the instructions on the label. Asks adults in the family to store it where children like you cannot reach them.

Flammable Materials

Flammable materials can catch fire easily, so we need to be careful with them. Always remember to never play with or near things that can start a fire.



Paint and gasoline are flammable materials at home



Elaborate

Form a pair and look for news article on newspapers or online news websites about the bad effects of plastic waste to people, animals, and our surroundings. Share to your classmates what you have learned from the news article.



Evaluate

Write the letter of the best answer in the space before the number.

- ____ 1. Which organisms cause chemical change in food that leads to spoilage?
- | | |
|-------------|-----------|
| a. Ants | c. Dogs |
| b. Bacteria | d. Humans |
- ____ 2. Which material can catch fire easily and needs to be stored safely?
- | | |
|----------|----------|
| a. Ice | c. Paint |
| b. Metal | d. Water |

- ____ 3. Why is it important to store flammable materials away from open flames?
- a.** To avoid starting a fire
 - b.** To make the materials cold
 - c.** To avoid it mixing up with food
 - d.** To stop from running out quickly
- ____ 4. Which method is environment-friendly for getting rid of garbage?
- a.** Burning all our garbage
 - b.** Burying it under the ground
 - c.** Recycling plastic waste
 - d.** Throwing it in the ocean
- ____ 5. What should you always do after using cleaning materials like detergent?
- a.** Leave it open.
 - b.** Wash your hands.
 - c.** Throw it in the trash can.
 - d.** Give it to someone else.
- ____ 6. Why do plastics cause harm when they break down?
- a.** It heats up water.
 - b.** It changes in color.
 - c.** It produces acid rain.
 - d.** It releases harmful chemicals.
- ____ 7. Which of the following is a safer method of reducing mosquitoes than using insecticides?
- a.** Burn dry leaves to produce smoke.
 - b.** Spray the surroundings with alcohol.
 - c.** Place bright lights around your home.
 - d.** Take care of plants that repel mosquitoes.

- ____ 8. What is a common sign that food has gone bad?
- a.** It becomes heavier.
 - b.** It multiple in number.
 - c.** It disappears altogether.
 - d.** It changes in color or smell.
- ____ 9. Why should we separate non-biodegradable waste from other kinds of waste?
- a.** To reduce the amount of waste
 - b.** To make sure all waste breaks down
 - c.** To recycle non-biodegradable waste
 - d.** To decide which waste will be buried underground
- ____ 10. Why should we avoid burning garbage?
- a.** It makes plants grow faster.
 - b.** It can make air hard to breathe.
 - c.** It can block canals and cause flood.
 - d.** It causes infectious diseases to spread.

LESSON 7

Waste Management in the Community



Target

At the end of this lesson, you will be able to:

- ◇ Identify waste management issues in the community.
- ◇ Apply science process skills in solving waste management issues in the community.



Engage



How can we better manage waste in our community?



Explore

Access the interactive
to perform the activity.



5Rs of Waste Management

Objectives

1. Explain the need for waste management.
2. Differentiate reduce, reuse, recycle, recover, and repair.
3. Explain the importance of reduce, reuse, recycle, recover, and repair in waste management.

Instructions from the Interactive

Go from one page to another to discover the 5Rs of waste management:

1. Reduce
2. Reuse
3. Recycle
4. Recover
5. Repair

Guide Questions

1. How can we reduce waste?
2. How can we reuse waste?
3. What objects can be recycled?
4. Write down how you might reduce waste by replacing these items with a reusable product: plastic wrap, paper napkins, disposable diapers, disposable batteries, and tea bags.

Waste Management Issues in Our Community

If we observe many places around the Philippines, we can find that we are facing a challenge with waste management. Have you ever seen piles of garbage on the side of the road, near rivers, or even on the beaches? This is not only unsightly but also harmful to our environment and health.

Trash in our Water



Piles of trash in the seashore

Many of our beautiful rivers, lakes, and oceans are becoming polluted with trash. When waste, especially plastics, enters these waters, it affects the fishes and marine animals. Some of them mistakenly eat small plastic pieces, thinking they are food. This can make them sick and affects the people who consume seafood.

Soil Pollution

Improper waste disposal does not just affect our waters. When trash is not disposed of properly, it can harm our land too. As waste breaks down, harmful chemicals can leak into the soil, making it less fertile and damaging plants.

Burning Garbage and Air Pollution

Burning garbage, a common practice in some parts of the Philippines, releases harmful smoke into the air. This can worsen air quality, making it harder to breathe, especially for people with health conditions like asthma or allergies.



Burning garbage can cause air pollution

Disease-carrying Pests

Garbage-filled areas can become breeding grounds for harmful pests like rats and mosquitoes. These pests can spread diseases to humans.

Towards a Solution

Despite these challenges, many communities are finding ways to manage waste better. Many communities segregate waste from biodegradable and non-biodegradable waste. Some communities encourage the 5Rs. The 5Rs are processes that help in making eco-friendly choices. **Reuse** means using things again, so they do not get thrown away quickly. **Reduce** is about using less to make less waste. **Recycle** is turning old stuff into new things. **Repair** is fixing things instead of throwing them out. **Recover** is finding ways to use or get back valuable materials from our waste. These ideas help us be kind to the planet by using things wisely and creating less trash.



Elaborate

Form a group and think about the area in your school that experiences a lot of waste pile up. Then, think of three solutions to lessen the amount of waste in that area that you want to suggest to your teachers and fellow students. Use science process skills such as observation, measurement, prediction, and data analysis. Present your solutions in class.

Area in School	Suggested Solutions to Lessen Waste in the Area
	1.
	2.
	3.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Which of the following is the best way to dispose empty glass bottles properly?
- a. Break it to pieces.
 - b. Melt it with fire.
 - c. Pour water inside.
 - d. Sell it for recycling.
- ____ 2. People in your area frequently burn leaves in their backyard. What waste management issue does this create?
- a. Air pollution
 - b. Soil pollution
 - c. Toxic waste pollution
 - d. Water pollution
- ____ 3. How can soil get polluted from improper waste disposal?
- a. Plants use the chemical in soil to grow.
 - b. Harmful chemicals can leak into the soil.
 - c. Animals may eat the waste that we throw.
 - d. Waste thrown in the soil can change its color.
- ____ 4. Why should we avoid throwing empty cans or bottles?
- a. It can be a breeding place for mosquitoes.
 - b. It can be a source of water for stay animals.
 - c. It can be added into a compost pit as fertilizer.
 - d. It can release harmful gases and cause pollution.
- ____ 5. Naomi has asthma and every time their neighbor burns garbage, she feels sick. What could have caused this?
- a. Her neighbor is disposing garbage properly.
 - b. The smoke from the garbage triggers her sickness.
 - c. Naomi lacks exercise which causes her to be sick.
 - d. The garbage is causing the environment to be unhealthy.

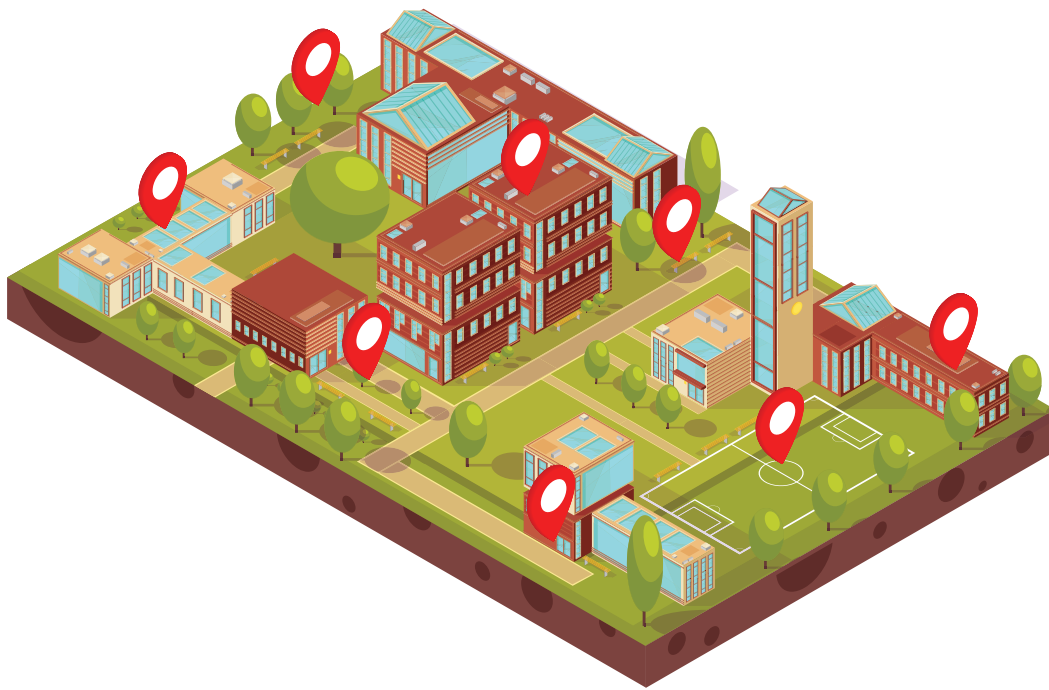
- ____ 6. How do pests in garbage-filled areas pose a risk to humans?
- a.** They clean up the garbage.
 - b.** They spread diseases to humans.
 - c.** They slow down growth of plants.
 - d.** They make the surroundings look unpretty.
- ____ 7. Why is it important to sort waste into categories like biodegradable and non-biodegradable before disposal?
- a.** To generate more jobs for waste collectors
 - b.** To promote mixed waste disposal methods
 - c.** To facilitate recycling and reusing of products
 - d.** To improve the quality of soil in landfills and dumpsites
- ____ 8. Which of the following waste materials can best be recycled?
- a.** Bottle of shampoo
 - b.** Used cooking oil
 - c.** Old batteries
 - d.** Old newspaper
- ____ 9. Which of the following is an example of hazardous waste that requires special handling and disposal?
- a.** Broken appliances
 - b.** Dry leaves
 - c.** Fruit peelings
 - d.** Leftover food
- ____ 10. Which of the following is an action a Grade 4 student can best do to help solve waste management problems in the barangay?
- a.** Help in cleaning up your neighborhood.
 - b.** Provide land for tree-planting programs.
 - c.** Remove waste materials in the oceans.
 - d.** Think of new policies for the barangay.



Extend

Finding the Best Spot!

Where are the garbage cans found in your school? Are they found in places where it is easy to find? In this performance task, form a group and use science process skills and attitudes to determine the best locations for garbage cans around the school campus to maximize waste collection and minimize littering. Follow the steps given by your teacher. You will also draw a map of the school marking where garbage cans are best to be placed. Present your map and suggestions to the teacher or the school leaders.



Rubric For Assessment

Criteria	4 (Excellent)	3 (Proficient)	2 (Approaching Proficiency)	1 (Needs Improvement)
Observational Skills	Systematically and frequently observed multiple locations. Precisely identified and recorded areas with litter and traffic patterns.	Observed most key areas and noted areas with litter. Some minor details may be missing.	Limited observations made. Noted only obvious litter spots, missing many key areas.	Minimal to no observations made. Lacks detailed notes or clear focus during observation phase.
Data Analysis	Comprehensive analysis of data with a clear connection between observations and proposed placements. Used all data to inform decisions.	Analyzed most data effectively and showed a clear rationale for garbage can placement. Some minor details may be overlooked.	Some analysis done, but missing connections between observations and placements. Decision-making may appear arbitrary at times.	Little to no data analysis evident. Decisions on placement lacks clear reasoning based on observations
Map Illustration	Map is clear, detailed, and accurately marks proposed garbage can locations. Each spot is justified with concise reasons.	Map is clear with most locations marked accurately. Most spots have justifications.	Map marks some locations but lacks clarity or precision. Some justifications are missing or vague.	Map is unclear, lacks details, or is inaccurately marked. Minimal to no justifications provided.
Presentation Skills	Communicates findings and recommendations with clarity, confidence, and strong rationale. Answers questions effectively.	Communicates findings clearly with some supporting details. Answers most questions with understanding.	Presentation lacks some clarity or detail. May struggle with some questions or deviate from key findings.	Minimal effort in presentation. Lacks clarity, detail, and understanding. Struggles with most questions.

QUARTER 2

When you go outside and observe your surroundings, you can see the different living things around you. These are all blessings in our lives that we should protect and cherish. In this quarter, you will explore the wonders of our body and the environment around us. You will learn about animals, plants, and their habitat. You will also explore the interactions between organisms that proves to us that we are all just one in this planet. Are you ready to start this exciting adventure?

LESSON 1

Muscular, Skeletal, and Digestive System



Target

At the end of this lesson, you will be able to:

- ◇ Identify the organs that compose the muscular, skeletal, and digestive system.
- ◇ Explain the function of the muscular, skeletal, and digestive system.
- ◇ Describe ways to keep the different organ systems healthy.



Engage



What parts of our body are involved when we are moving?

Where do we get the energy that we need to move?



The Muscular System

Objective

- Determine the components of the muscular system.

Instructions from the Interactive

A. Running Man

Learn how the muscular system aid in body movement.

B. Muscles

Discover the different types of muscles in our body as you go from one slide to another.

Guide Questions

1. Why is the muscular system important?
2. What do you think it would be like if we did not have a muscular system?
3. How many types of muscle tissues are there? Describe each one.
4. Can we control all of our muscles? Why?

The Skeletal System

Objectives

1. Explain the importance of bones in the human skeletal system.
2. Identify the location of bones in the human bodies.
3. Identify the specific roles and functions of bones.

Instructions from the Interactive

A. Framework

Drag the rib cage to protect the lungs and the heart.

B. Support to Body Movements

Discover how bones help us move.

C. Axial Skeleton and Appendicular Skeleton

Find out the bones belonging to the axial skeleton and the others belonging to the appendicular skeleton.

D. Joints

Find out the function of joints in our body

Guide Questions

1. What are movable joints? Give examples of movable joints in the body.
2. What is the primary function of skeletal system in our body?
3. What are the parts of the skeletal system?

The Digestive System

Objectives

1. Identify the key components of the digestive system.
2. Describe the path of food as it passes through the body.
3. Explain the function of the different organs of the digestive system.

Instructions from the Interactive

Eating can be a delightful experience for anyone. Food provides fuel to be able to have the energy to do all day's work. When you take in food, the nutrients are absorbed by your body so that the cells in your body can function properly. But how does your body break down the food into nutrients? Discover how the digestive system does this task.

Guide Questions

1. What are the parts of the digestive system?
2. What are the main functions of the digestive system?
3. What are two types of digestion? Explain each one.



Explain

Organ Systems of the Body

Every day, we run, play, eat, and breathe without giving much thought to how our body works. But did you know that inside us are systems that work together closely? From our muscles that enable movement to our stomach that breaks down the food we eat, each part of our body has a special role. Let us explore the amazing organ systems that make our daily activities possible.

Muscular System

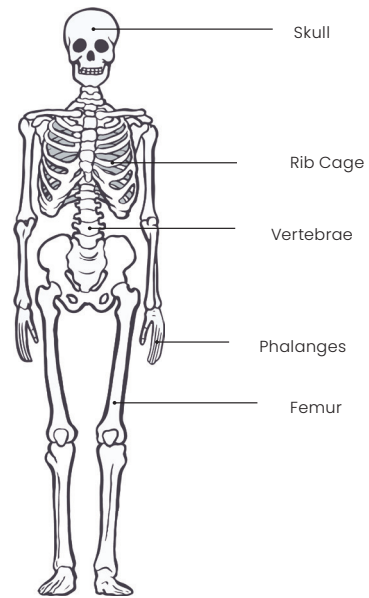
The muscular system is composed of **muscles** that serve important functions. Not only do they enable actions like running, jumping, and lifting objects, but they also play a role in maintaining our posture, helping us stand straight. Furthermore, these muscles produce heat as they move, ensuring our body remains warm.



There are about 600 muscles in the human body.

Skeletal System

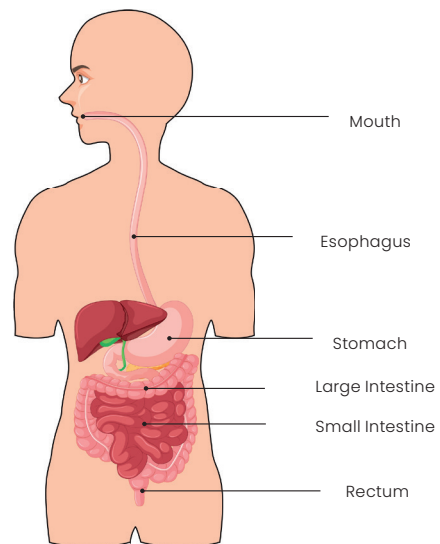
The skeletal system consists of **bones** of various sizes and shapes. From the long **femur** in our thigh to the small **vertebrae** in our spine, our bones give our body its distinct shape. They act as protective shields for our vital organs; the **skull** safeguards the brain, while the **ribcage** serves as a protective cage for the heart and lungs. When we perform actions like bending our elbow or flexing our knee, it involves teamwork between our bones and muscles, making movement possible.



The Skeletal System

Digestive System

Every time we enjoy a meal, our food takes a journey within our digestive system. It starts in our **mouth**, where our **teeth** grind it and enzymes in our saliva start the process of breaking it down. As the chewed food travels down the esophagus, it enters our stomach where it gets mixed with stomach acids. These acids further break the food. Following this, the food makes its way into our small intestines. Here, vital nutrients are absorbed, and the body converts them into energy to fuel our activities and support growth. Any leftover waste goes to the large intestine and is eventually excreted through the rectum. Through these processes, our body ensures we get the most out of every bite we take.



Organs of the Digestive System

Taking Care of Our Organs Systems

Caring for the Muscular System

Exercise Regularly: Activities like walking, cycling, or playing sports help strengthen our muscles.

Eat Protein-rich Foods: Foods like beans, eggs, and chicken help our muscles grow and repair.

Stretch: Remember to stretch before and after any activity. This helps our muscles relax and prevents injuries.



Doing sports activities can help our muscles stay strong.

Caring for our Skeletal System

Eat Calcium-rich Foods: Milk, yogurt, and green leafy vegetables provide calcium which keeps our bones strong.

Play Outdoors: Sunlight gives us vitamin D, which helps our body absorb calcium.

Stay Safe: Always wear protective gear like helmets and knee pads when playing to avoid injuries.

Keeping our Digestive System Healthy

Eat Fiber: Foods like fruits, vegetables, and whole grains keep our digestive system running smoothly.

Drink Plenty of Water: Water helps our body digest food and absorb nutrients.

Chew Properly: Take your time eating and chew each bite well. This gives our digestive system a head start.



A balance diet



Elaborate

Form a group. Choose one from the three organ systems discussed in this lesson. Perform a 5-minute role play showing the proper ways to take care of your selected organ system.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is the main function of the muscles in our body?
- a. To help us think
 - b. To move our bones
 - c. To digest food
 - d. To pump blood
- ____ 2. How can we keep our muscles healthy?
- a. By reading books
 - b. By getting plenty of sleep
 - c. By exercising regularly
 - d. By watching TV
- ____ 3. Which organ is a part of the skeletal system?
- a. Kidneys
 - b. Skull
 - c. Liver
 - d. Heart
- ____ 4. How can we keep our bones strong and healthy?
- a. By eating salty snacks and drinking sugary beverages
 - b. By getting sunlight and eating foods rich in calcium
 - c. By staying up late and waking up early
 - d. By sitting all morning and sleeping all night
- ____ 5. Which organ is a part of the digestive system?
- a. Brain
 - b. Intestines
 - c. Lungs
 - d. Muscles

- ____ 6. What is the main function of the digestive system?
- a.** To help us move
 - b.** To protect our body
 - c.** To pump blood
 - d.** To break down food into nutrients
- ____ 7. How can we keep our digestive system healthy?
- a.** By eating a balanced diet
 - b.** By eating a lot of candy
 - c.** By not exercising
 - d.** By staying up late
- ____ 8. What is the purpose of the rib cage?
- a.** To help us move
 - b.** To protect the heart and lungs
 - c.** To make blood
 - d.** To digest food
- ____ 9. Why is eating food rich in fiber important for our health?
- a.** It helps build muscles.
 - b.** It protects our bones.
 - c.** It helps in digestion.
 - d.** It makes us stronger.
- ____ 10. Why is calcium an important mineral in our diet?
- a.** It improves muscle contraction.
 - b.** It promotes bone strength.
 - c.** It makes digesting food faster.
 - d.** It helps our brain function better.

LESSON 2

Respiratory and Circulatory System



Target

At the end of this lesson, you will be able to:

- ◇ Identify the organs that compose the respiratory and circulatory system.
- ◇ Explain the function of the respiratory and circulatory system.
- ◇ Describe ways to keep the different organ systems healthy.



Engage



What changes do you observe in your breathing and heartbeat after doing an exercise?



The Respiratory System

Objectives

1. Give the importance of the respiratory system in the human body.
2. Explain the function of the respiratory system.
3. Describe process of respiration.

Instructions from the Interactive

Explore how air travel inside your body. Identify parts help in the process of respiration. Discover the answers to these questions with the interactive.

Guide Questions

1. What are the parts of the respiratory system and their functions?
2. What should we avoid to maintain our respiratory system healthy?

The Circulatory System

Objectives

1. Identify the main parts and functions of the circulatory system in the human body.
2. Describe the circulation process in the human body.
3. Differentiate the four components of our blood.

Instructions from the Interactive

1. Discover the parts of the circulatory system.
2. Accomplish a task as one part of the system appears. Each task will help you understand the function of each part of the circulatory system.

Guide Questions

1. What are the parts and functions of the circulatory system?
2. What role does the heart play in the circulatory system?
3. Differentiate the four components of our blood.
4. Why is your blood red?

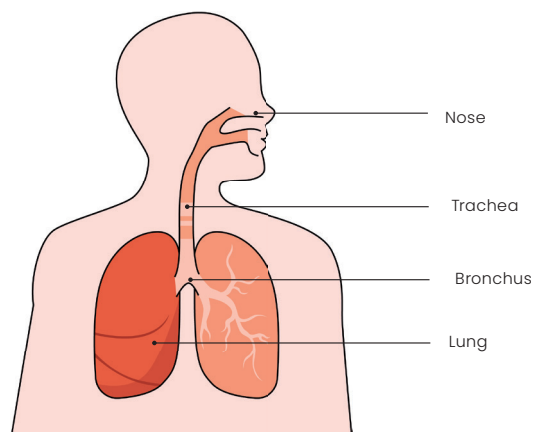


Explain

Respiratory System

The respiratory system consists of organs like the nose, trachea, bronchi, and most importantly, our lungs. When we breathe through our **nose**, it filters dust and other tiny particles. Then, air travels down the **trachea**, which splits into two **bronchi**, one for each lung. Inside our **lungs**, tiny air sacs called **alveoli** fill up with this incoming air. Here, oxygen from the air we inhale passes into our bloodstream, while carbon dioxide, a waste product from our body's cells, moves from the blood into the alveoli.

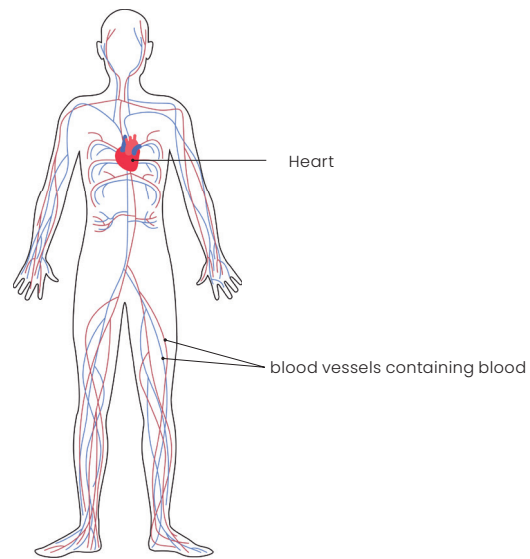
Then, as we exhale, this **carbon dioxide** is expelled from our body. This exchange of gases is crucial. **Oxygen** fuels our cells, allowing them to produce energy, while getting rid of carbon dioxide prevents it from building up and harming our bodies. So, every breath we take not only fills our lungs but also keeps our entire body energized and healthy.



Organs of the Respiratory System

Circulatory System

The circulatory system is a vast network consisting of our heart, blood, veins, arteries, and capillaries. The **heart** is a muscular organ that rhythmically pumps blood throughout our body. Blood which is rich in oxygen from the lungs and nutrients from the digestive system, travels through **arteries** to reach the different parts of the body. Our cells take in this oxygen and nutrients, giving them energy that they need. Afterward, **veins** carry the now oxygen-poor blood back to the heart. Along the way, **capillaries**, which are tiny blood vessels, connect arteries and veins and play a crucial role in exchanging gases, nutrients, and waste products between blood and our body's cells. Think of the circulatory system as our body's highway, ensuring that every cell gets the supplies it needs and takes away the waste.



The heart and the blood vessels

Taking Care of Our Organs Systems

Protecting our Circulatory System

Eat Healthy: Foods low in fat and sugar help keep our blood vessels clear.

Stay Active: Regular exercise keeps our heart strong and blood flowing smoothly.

Avoid Smoking: Even at a young age, we should know that smoking is bad for our heart and blood vessels.

Taking Care of our Respiratory System

Breathe Clean Air: Stay away from smoky areas and always play in open, clean spaces.

Avoid Infectious Diseases such as Colds: Wash your hands often and wear masks if there are infectious diseases in the community.

Practice Deep Breathing: Taking deep breaths now and then helps our lungs work better.



Exercising is good for our respiratory and circulatory system.



Elaborate

Form a group. Perform a 5-minute role play showing the proper ways to take care of your respiratory and circulatory system.



Evaluate

Write the letter of the best answer on the space before the number.

____ 1. Which is a major organ of the circulatory system?

a. Kidneys

c. Stomach

b. Heart

d. Liver

____ 2. What is the main function of the respiratory system?

a. To digest food

c. To eliminate waste

b. To circulate blood

d. To exchange gases

- ____ 3. What is the primary role of the circulatory system?
- a.** To break down food
 - b.** To transport nutrients and oxygen to cells
 - c.** To support body movements
 - d.** To control body temperature
- ____ 4. Which activity helps in keeping the respiratory system healthy?
- a.** Regular exercise
 - b.** Eating junk food
 - c.** Staying up late
 - d.** Drinking milk
- ____ 5. Which body function does the respiratory and circulatory system work together to perform?
- a.** Reacting to sensations that we feel
 - b.** Ensuring proper digestion and nutrition
 - c.** Providing oxygen to the body and removing carbon dioxide
 - d.** Strengthening muscles and protecting the vital organs
- ____ 6. Air enters the lungs through which organ?
- a.** Esophagus
 - b.** Intestines
 - c.** Trachea
 - d.** Stomach
- ____ 7. Which organ pumps blood throughout the body?
- a.** Brain
 - b.** Lungs
 - c.** Liver
 - d.** Heart
- ____ 8. Which system is working hard to supply oxygen to your muscles when doing sports?
- a.** Digestive System
 - b.** Respiratory System
 - c.** Nervous System
 - d.** Skeletal System

- ____ 9. What is a common symptom indicating a problem in the respiratory system?
- a.** Frequent headaches
 - b.** Increased appetite
 - c.** Persistent difficulty breathing
 - d.** Rapid growth of bones
- ____ 10. Living in a place with lots of trees can benefit your respiratory system because:
- a.** Trees produce oxygen and improve air quality.
 - b.** Trees provide shade and cool the air that we breathe in.
 - c.** Trees reduce noise pollution which affects our heartbeat.
 - d.** Trees make the scenery beautiful and lightens the mood of our heart.

LESSON 3

Root and Shoot System of Plants



Target

At the end of this lesson, you will be able to:

- ◇ Describe the function of the root system of plants.
- ◇ Describe the function of the different parts of the shoot system of plants.



Engage



What are the different parts of a plant?



Explore

Access the interactive
to perform the activity.



Parts of a Plant

Objectives

1. Determine the different parts of a plant
2. Identify the function of each part of a plant

Instructions from the Interactive

A. Types of Body Parts

1. Click the "Farm" category.
2. Drag the farmer to each plant or tree.
3. For the roots category on Table 1, identify the type of plant in the second column and determine what type of root it has in the third.
4. For the stem category on Table 1, identify if it is a plant or tree and determine what type of stem it has.
5. For the leaf category on Table 1, identify the type of plant and determine the parts of a leaf.
6. For the fruit or flower category on Table 1, identify the type of plant and determine if it has a flower or fruit.

B. Function of Body Parts

1. Go back to the category selection window.
2. Click the "Garden" category.
3. For Plant 1, click each body part of the plant and identify its function.
4. For Plant 2 and Plant 3, click each plant and identify if it has a fruit or flower. Identify the function of each.

Data

Table 1.

Category	Type of Plant	Describe the Body Part
Root		
Stem		
Leaf		
Flower or Fruit		

Table 2.

Plant	Body Part	Function
Plant 1	1.	
	2.	
	3.	
Plant 2	4.	
Plant 3	5.	

Guide Questions

1. What are the different body parts of plants?
2. How do these body parts work together for the survival of the plant?

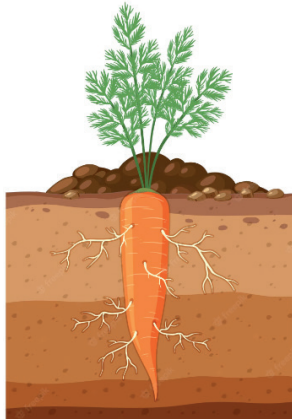


Explain

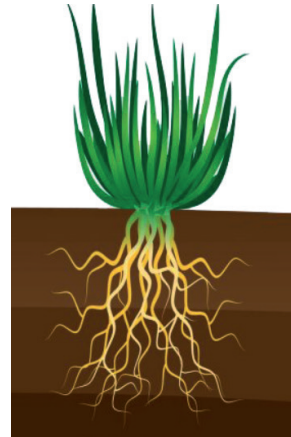
Root System of Plants

All plants, from the smallest flower to the tallest tree, have a part hidden beneath the ground: their root system. This part of the plant goes deep into the soil. Roots act like straws, soaking up water and essential nutrients from the soil for the plant. They also help anchor the plant, holding it firmly in place so it does not tip over or get washed away.

There are mainly two types of root systems. The first is called a **taproot system**, where one main root grows bigger and deeper than the others. It can absorb water from deeper layers of the soil. Think of a carrot; that is a taproot. The second is the **fibrous root system**, which is like a tangled web of many roots. Because of this, they can hold the top surface of soil well and can absorb water quickly. Grass has a fibrous root system. These root types allow plants to adapt and thrive in different environments, making sure they get all the nourishment they need.



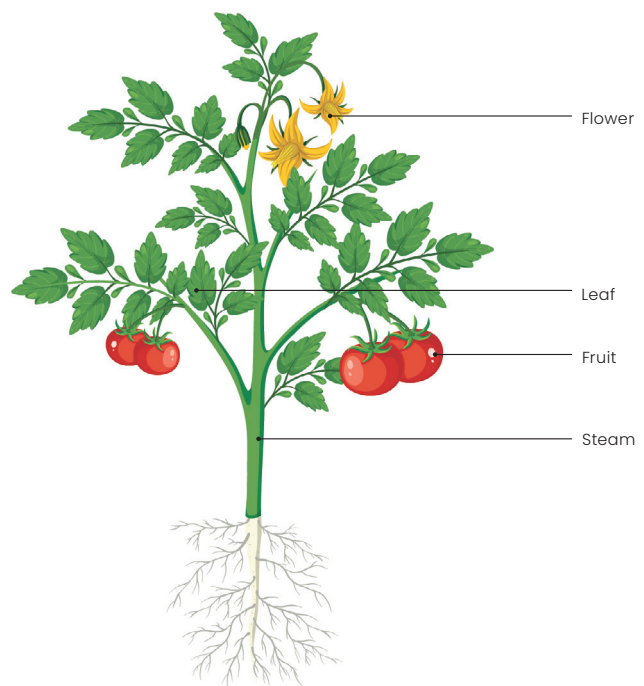
Taproot system as found in a carrot plant



Fibrous root system as found in grass

Shoot System of Plants

Above the ground, plants show off their impressive shoot system, which includes stems, leaves, flowers, and fruits. The **stem** plays a vital role in this system, acting as a plant's backbone. It provides support, holding the plant upright, and acts as a highway, transporting water and



Shoot System of Plants

nutrients from the roots to the rest of the plant.

Leaves are like the plant's kitchen, where food is prepared. Using sunlight, water, and carbon dioxide from the air, they create food in a process called **photosynthesis**. **Flowers**, on the other hand, help plants reproduce, creating seeds that can grow into new plants. **Fruits** are the packaging for these seeds, often enticing animals to eat them and spread the seeds to new locations.



Elaborate

Go around the school or in the community and look for a plant. You may take a photograph of this plant or draw it in a piece of paper. Then, label the different parts of the root and shoot system of the plant that your group has selected. Present your output in class and explain the functions of the different parts that you labeled.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. A carrot is an example of which type of root system?
- | | |
|------------------|----------------|
| a. Fibrous root | c. Ground root |
| b. Floating root | d. Taproot |
- ____ 2. Why is it crucial for plants to be anchored firmly in the ground?
- | | |
|---------------------------|----------------------|
| a. To grow flowers | c. To produce food |
| b. To not get washed away | d. To reach sunlight |

- ____ 3. Which statement best describes the fibrous root system?
- a.** It consists of one large main root.
 - b.** It consists of thin branched roots.
 - c.** It goes very deep into the ground.
 - d.** It is found in aquatic plants.
- ____ 4. What is the main role of leaves in the shoot system?
- a.** To attract birds and bees
 - b.** To make the plant look green
 - c.** To protect the flowers
 - d.** To prepare food for the plant
- ____ 5. Which part of the plant holds it upright and provides support?
- a.** Leaf
 - b.** Flower
 - c.** Stem
 - d.** Root
- ____ 6. Which part of the shoot system attracts animals for seed dispersal?
- a.** Fruit
 - b.** Leaf
 - c.** Root
 - d.** Stem
- ____ 7. Why are flowers often colorful?
- a.** To absorb more water
 - b.** To attract animals
 - c.** To get more sunlight
 - d.** To make plants beautiful

- ____ 8. If the roots of a plant did not soak up nutrients, what would likely happen?
- a.** The plant might wither and die.
 - b.** The plant would grow faster.
 - c.** The plant would become taller.
 - d.** The plant would produce more flowers.
- ____ 9. In a dry environment, why might a taproot system be beneficial for a plant?
- a.** It can attract more insects.
 - b.** It can better perform photosynthesis.
 - c.** It can produce more flowers and fruits.
 - d.** It can reach deeper sources of water.
- ____ 10. Which process occurs in leaves wherein it use sunlight, water, and carbon dioxide to produce food?
- a.** Digestion
 - b.** Photosynthesis
 - c.** Respiration
 - d.** Transpiration

LESSON 4

Animal and Plant Habitat



Target

At the end of this lesson, you will be able to:

- ◇ Describe the different animal and plant habitats such as terrestrial, aquatic, and aerial habitat.
- ◇ Classify some Philippine animals based on their habitat whether terrestrial, aquatic, or aerial.
- ◇ Identify animals and plants living in gardens, rice fields, seashores, and mangrove swamps.



Engage



Where do animals and plants live?



Animal Habitats

Objectives

1. Identify and describe the different habitats that animals live in.
2. Compare and contrast different animals in different habitats.
3. Differentiate freshwater from saltwater.

Instructions from the Interactive

A. Terrestrial

Drag the animal to its correct habitat.

B. Aquatic

Drag the images to the correct box: freshwater and saltwater.

C. Aerial

Drag the animals over the trees.

Guide Questions

1. What are the characteristics of each of the animal habitat in the activity?
2. What can you say about the animals in each habitat?



Explain

Terrestrial Habitat

Many kinds of animals and plants live on land. This habitat is called terrestrial habitat. Some of examples of terrestrial habitats are the following:

1. **Garden** – A garden is a man-made habitat where you can find different kinds of plants. You can also find animals such as snails, frogs, and birds in a garden.



Flowering plants are commonly found in gardens.

2. **Rice field** – These are areas that are wet, muddy, and perfect for rice plants. Birds like ducks and cranes love rice fields because they can find insects to munch on. Frogs might jump from paddy to paddy. You might also find carabaos cooling themselves with mud.



We can find many rice fields in the Philippines.

3. **Forest** – A forest is a vast area covered with tall trees. When you walk through a dense forest, you might see phytons, monkeys, and wild boars. In the forests of Mindoro, you may chance upon the tamaraw. You might also see ferns, palms, and vines that crawl from tree to tree.



Tamaraws can only be found in the forests of Mindoro.

4. **Desert** – Deserts are dry and hot. It rarely rains in deserts. We do not have deserts in the Philippines but other countries have. Some animals that you can find in a desert are camels, lizards, and insects. The cactus is the most common plant found in the desert but you can sometimes find palms as well.



Camels and cacti are found in deserts.

Aquatic Habitat

An aquatic habitat is any body of water where plants and animals live. Organisms in aquatic habitats have special ways to move, breathe, and stay safe underwater.

1. **Freshwater** – A river or lake has freshwater. These habitats contain freshwater fishes such as tilapia, catfish, carp, and eel. Water hyacinth, cattails, and hydrilla are some plants that you can see in freshwater habitats. The Laguna de Bay and Lake Lanao are some of the largest freshwater habitats in the Philippines.
2. **Saltwater** – The seas and oceans contain saltwater and it is home to many marine organisms. In the Philippines, you can find *alumahan*, *bisugo*, *dalagang bukid*, *galunggong*, and tuna as well as sea anemone, corals, shrimp, mussels, oysters, and crabs. You can also find plants like seagrass and kelp.



Coral reefs are home to a diverse group of organisms.

3. **Seashore** – The seashore is home to different kinds of organisms such as crabs, snails, and birds such as seagulls and hawks. The seashore is also called **intertidal zone** as it is greatly affected by the rising and falling of tides or the level of water. When the level of water is high, fish can come closer to the shore and feed.

4. **Mangrove swamps** – Have you heard the word ***bakawan*** before? It refers to the plant called mangrove. Mangrove swamps can be usually found in the mouth of rivers as it exits to the sea where saltwater and freshwater meet resulting to brackish water. Mangrove swamps are important place for fish to lay eggs and multiply. Crocodiles, egrets, and ducks also frequent mangrove swamps.



Mangrove swamps are disappearing due to human actions.

Aerial Habitat

An aerial habitat refers to the environment and conditions found in the air or on top of trees. You can find a lot of organisms in aerial habitat such as the Philippine eagle, Philippine dove, spotted wood-owl, and Luzon hornbill, among other birds that are found only in the Philippines. You can also find monkeys and snakes on top of the trees. Orchids and ferns can also be found on tree tops.



Birds build their nest on top of trees.



Elaborate

Form a group. Identify at least five animals and plants in the Philippines that can be found in terrestrial, aquatic, and aerial habitat. Write your answer in the table below and share your work in class.

Terrestrial	Aquatic	Aerial



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is a common feature of terrestrial habitats?
- a. They are always hot and dry.
 - b. They are found in the air.
 - c. They are found on land.
 - d. They are found underwater.
- ____ 2. Why are gardens considered a man-made habitat?
- a. Because animals create them.
 - b. Because people arrange and care for them.
 - c. Because they always exist near beaches.
 - d. Because they naturally grow in forests.
- ____ 3. Which habitat would be best described as wet, muddy, and suitable for crops?
- a. Desert
 - b. Garden
 - c. Forest
 - d. Rice field
- ____ 4. What would it feel like if you are stuck in a desert?
- a. Dry and hot
 - b. Moist and rainy
 - c. Cold and windy
 - d. Bright and loud
- ____ 5. In which kind of habitat are you most likely in if you are surrounded by trees and thick layers of plants?
- a. Desert
 - b. Garden
 - c. Forest
 - d. Seashore
- ____ 6. Which aquatic habitat is affected by the rising and falling of tides?
- a. Freshwater
 - b. Mangrove swamps
 - c. Saltwater
 - d. Seashore

- ____ 7. In which habitat would you find both fresh and saltwater mixing?
- a.** Tropical rainforests
 - b.** Coral reefs
 - c.** Mangrove swamps
 - d.** Rivers
- ____ 8. If you wanted to see a camel in its natural habitat, where would you go?
- a.** Desert
 - b.** Garden
 - c.** Rice field
 - d.** Zoo
- ____ 9. In which habitat would you mostly find orchids and ferns on tree tops?
- a.** Aerial
 - b.** Aquatic
 - c.** Terrestrial
 - d.** Underground
- ____ 10. How might plants and animals be affected if trees in the forest were cut down?
- a.** There would be more sunlight for animals.
 - b.** The forest surface would become a desert.
 - c.** Tree-dwelling organisms will lose their home.
 - d.** The animals and plants will increase in number.

LESSON 5

Life Cycles



Target

At the end of this lesson, you will be able to:

- ◇ Describe the stages of life in different animals.
- ◇ Describe the stages of human life.



Engage



What are the changes that you can observe when animals and humans grow?



Animal Life Cycle

Objectives

1. Identify the different stages in the life cycle of animals.
2. Differentiate the development of animals to adulthood.

Instructions from the Interactive

A. Different Stages in the Life Cycle of Animals

1. Butterfly
 - a. Drag the following pictures from the “materials task pane” to the appropriate box in the working space: egg, caterpillar, pupa, adult butterfly.
 - b. Record your answers on Table 1.
2. Praying Mantis
 - a. Drag the following pictures from the “materials task pane” to the appropriate box in the working space: egg, nymph, adult mantis.
 - b. Record your answers on Table 1.
3. Elephant
 - a. Drag the following pictures from the “materials task pane” to the appropriate box in the working space: zygote, baby elephant, adult elephant.
 - b. Record your answers on Table 1.

B. Development of Animals to Adulthood

1. Butterfly
 - a. Click “Procedure B” at the bottom left of your screen to proceed.
 - b. Drag the following pictures from the “materials task pane” in the working space and observe what happens: leaf, adult butterfly.

- c. Click "next" and observe what happens.
- d. Feed the caterpillar by dragging the leaf from the "materials task pane." Observe what happens.
- e. Click "next" and observe what happens.
- f. For tasks a to e, record your observations on Table 2.

2. Praying Mantis

- a. Click "reset" button to start this task.
- b. For this task, repeat the tasks you performed from the previous part about the butterfly (b to f) using the following pictures: leaf, adult mantis.

3. Elephant

- a. Click "reset" button to start this task.
- b. Drag the adult elephant from the "materials task pane" in the working space and observe what will happen.
- c. Click "next" to continue the process.
- d. Record your observations on Table 2.

Data

Table 1.

Organism	Stage 1	Stage 2	Stage 3	Stage 4
Butterfly				
Mantis				
Elephant				

Table 2.

Organism	Observations
Butterfly	
Mantis	
Elephant	

Guide Questions

1. Using your data from Table 1, explain how the following animals develops into adulthood:
 - a. Butterfly
 - b. Mantis
 - c. Elephant
2. Using your observations in Table 2, differentiate the development of each animal, using the following guidelines:
 - a. Were the animals born alive or hatched from eggs?
 - b. How many stages do they undergo? Is it considered as complete metamorphosis? Why or why not?

Stages of Human Life

Objective

- Identify the stages of human life.

Instructions from the Interactive

A. Life Stages

1. Drag the following pictures from the “materials task pane” to each box in the working space in chronological order (leftmost side as the first stage, rightmost as the last stage): Pictures A, B, C, D, and E
2. Drag the characteristics from the “materials task pane” that best describe the pictures in the working space.
3. For task 1 and 2, record your answers on Table 1.

B. Human Body Development from Infancy to Adulthood

1. Click “Procedure B” at the bottom left corner of the screen to proceed to the next procedure. You cannot proceed to this part of the interactive without completing the first one.

2. Using the same pictures from the first procedure, perform the following tasks:
 - a. Drag pictures from the “materials task pane” to the working space one at a time, again, in chronological order.
 - b. Click on the picture you dragged in the working space and observe the changes. Record your answers on Table 2.

Data

Table 1.

	Picture ____	Picture ____	Picture ____	Picture ____	Picture ____
Life Stages					
Characteristics					

Table 2.

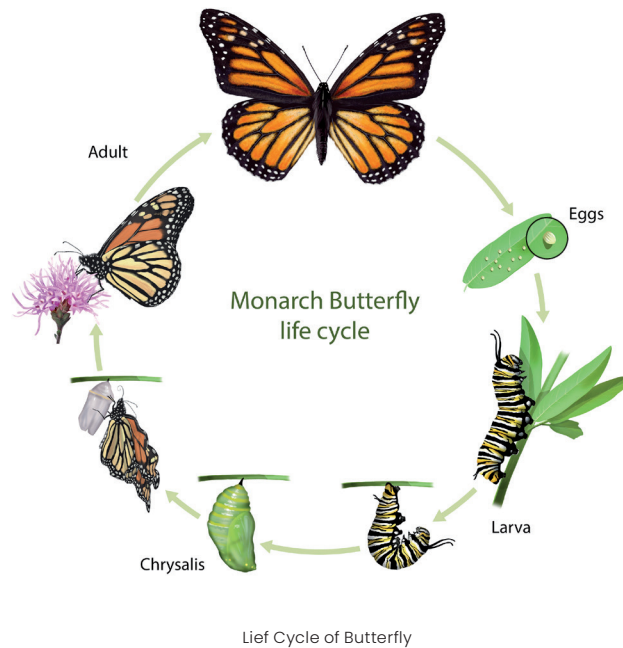
	Picture ____	Picture ____	Picture ____	Picture ____	Picture ____
Observations					

Guide Questions

1. What are the differences of each life stage from one another in terms of:
 - a. Characteristics
 - b. Physical body
2. Based on your activity, in which life stage are you right now? Explain your answer based on the data you have gathered during your activity.

Explain

As you have observed from the interactive, animals undergo different stages in their lives. Let us now explore the different life stages of some animals and explore the changes that happen in each stage that helps them survive in their habitat. But first, study the diagram below.



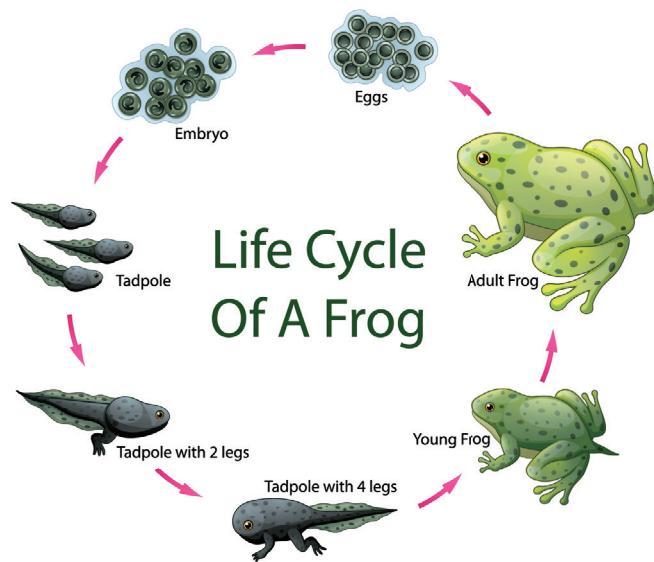
As you can observe from the diagram, the life cycle of a butterfly consists of different stages. The life cycle of a butterfly begins with tiny **eggs** laid on a leaf. After some time, the egg hatches and out comes a **larva** called caterpillar, which spends most of its time eating and growing. Once the caterpillar is fully grown, it goes into its **pupa** stage where it forms a protective casing around itself called a **chrysalis**. After several days, a beautiful adult butterfly emerges, ready to explore its surroundings and start the life cycle all over again by laying eggs.

Did you notice how the butterfly changes its form from one stage to another? This process is called metamorphosis. **Metamorphosis** is the process of growth and development of animals wherein it undergoes changes in form and structure until it reaches its adult stage.

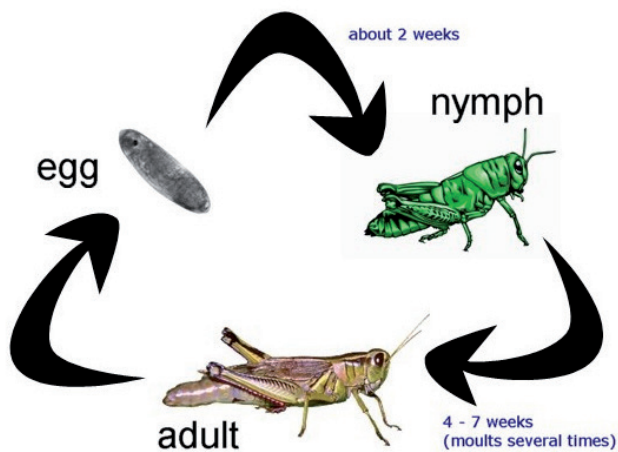
Complete Metamorphosis

Frogs are an example of animals that undergo complete metamorphosis. Adult frogs lay their eggs on a pond or other bodies of water. When the egg hatches, a **tadpole** comes out of it that resembles a fish. At this stage, the tadpole starts to develop its lungs to help in breathing outside the water. The tadpole eventually grows into a young frog or a froglet. Its tail becomes shorter as it develops into an adult frog.

Adult frogs can now breathe air and feed itself by eating insects on land.



Incomplete Metamorphosis



Some organisms also undergo metamorphosis but without drastic change between each stage. Grasshoppers are an example of an organism which undergo incomplete metamorphosis. They lay round eggs on the leaves of a plant. After some time, it will hatch into a nymph. A **nymph** resembles the adult form of the organism but significantly smaller and less mature

physically. After some time, the nymph will develop into a fully mature adult organism capable of reproduction.

Stages of Human Life

Just like other organisms, humans also grow and change through different stages of life. Every stage has changes that help us be ready for new adventures and responsibilities.



Different stages in human life from infancy to elderly age.

Infancy (0-2 years):

This is the time from when a baby is born up to their second birthday. Babies are tiny, delicate, and depend a lot on their parents. They drink milk, crawl, and then take their first steps. Babies also learn to recognize voices and start saying simple words.

Childhood (3-12 years):

Children grow taller, learn many things at school, and make friends. You start to discover the world around you, develop hobbies, and play lots of games.

Adolescence (13-19 years):

Teenagers experience lots of changes in their bodies and minds. They start to think about the future and make more decisions on their own.

Adulthood (20-64 years):

After the teenage years, people become adults. Adults have responsibilities like working, taking care of their families, and making important decisions.

Elderly Age (65 years and above):

Elderly people, like our grandparents, have lived long lives filled with experiences. They often share stories from their past, give advice, and enjoy spending time with their grandchildren.



Elaborate

Find a partner. Bring a picture of yourself when you are still in infancy stage. Paste it on a piece of paper then exchange it with your partner. Then, observe carefully and identify the changes in the physical features of your classmate from his or her baby picture. Write it around the picture and share your answers in class.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is the process by which animals undergo changes throughout their growth called?
- | | |
|-------------------------|-------------------------|
| a. Adaptation | c. Morphing |
| b. Metamorphosis | d. Transmutation |
- ____ 2. Which stage directly follows the egg in the butterfly life cycle?
- | | |
|-----------------|---------------------|
| a. Adult | c. Chrysalis |
| b. Larva | d. Pupa |
- ____ 3. Which of the following stages of the butterfly's life cycle is characterized by protection within a casing?
- | | |
|-----------------|----------------|
| a. Adult | c. Egg |
| b. Larva | d. Pupa |
- ____ 4. During which stage of a frog's life cycle does it start to develop lungs?
- | | |
|-----------------|-------------------|
| a. Adult | c. Froglet |
| b. Egg | d. Tadpole |
- ____ 5. Nymphs can be found in which animal's life cycle?
- | | |
|---------------------|-----------------------|
| a. Horses | c. Frog |
| b. Butterfly | d. Grasshopper |

- ____ 6. What primarily differentiates a nymph from its adult form in animals with incomplete metamorphosis?
- a. Lifespan
 - b. Feeding habits
 - c. Functionality
 - d. Size and maturity
- ____ 7. What characteristic of tadpoles allows them to thrive in aquatic habitats?
- a. Their ability to crawl
 - b. Their ability to fly
 - c. Their ability to jump
 - d. Their ability to swim
- ____ 8. In which human life stage are individuals typically most dependent on their parents?
- a. Adolescence
 - b. Adulthood
 - c. Childhood
 - d. Infancy
- ____ 9. In which stage of life are humans most likely to reminisce about the past and share wisdom from their experiences?
- a. Adolescence
 - b. Adulthood
 - c. Infancy
 - d. Elderly Age
- ____ 10. During which stage of life are humans most likely to start attending school and making new friends?
- a. Adulthood
 - b. Childhood
 - c. Elderly Age
 - d. Infancy

LESSON 6

Animals According to the Food They Eat



Target

At the end of this lesson, you will be able to:

- ◇ Classify animals according to the food they eat.



Engage



How do animals differ in the food they eat?



Explore

Access the interactive
to perform the activity.



What Animals Eat

Objective

- Compare animals based on the food they eat.

Instructions from the Interactive

1. Bring food to the mouth of each animal.
2. The food can be either plant or meat.
3. Group those animals that ate only plants.
4. Group those animals that ate only meat.
5. Group those animals that ate both plants and meat.

Guide Questions

1. What were the animals that ate only plants?
2. What were the animals that ate only meat?
3. What were the animals that ate both plants and meat?



Explain

Herbivores: The Plant Eaters

You have probably seen cows grazing in a field or rabbits nibbling on carrots. These animals are called herbivores. Grazing animals such as goats and horses have a set of teeth that are mostly strong, flat molars to help them grind the leaves properly. Their digestive system is designed to digest plants.



Cows eating grass

Carnivores: The Meat Eaters

Imagine a lion chasing its prey in the wild or a cat pouncing on a mouse. These animals are carnivores, meaning they eat meat. Lions, tigers, snakes, sharks, eagles, and falcons are some examples of carnivores. They have sharp teeth and long claws to easily hold and grab their prey.

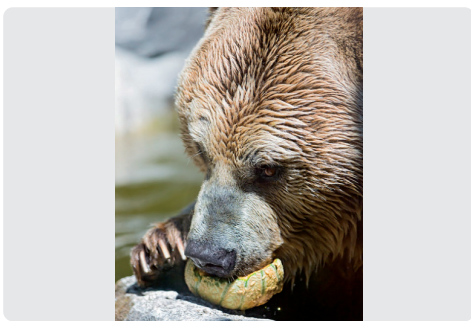


Snake eating frog

Omnivores: A Little Bit of Everything

Imagine having a meal with a bit of everything – veggies, meat, fruits, and more. If you enjoy eating a mix of plants and meat, then you are eating like an omnivore. Omnivores, like bears, monkeys, and rats, have a varied diet. One day they might eat small animals, and the next, they could be munching on fruits. Omnivores have both flat teeth like herbivores and pointy ones like carnivores. This combination lets them enjoy a wide range of foods.

As you have learned about the various eating habits of animals, it becomes clear that nature has a diverse and balanced way of ensuring every creature gets its nourishment. Just as animals have evolved to suit their dietary needs, it is essential for us to appreciate and respect the balance of nature and the roles each animal plays in our planet.



A bear eating a fruit



A bear catching fish



Elaborate

Form a group. List 15 different animals that can be found in the Philippines. Then, classify each animal according to the food they eat. Write the names of the animals in the appropriate column in the table below.

Herbivores	Carnivores	Omnivores



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is the purpose of the flat molars in herbivores?
- a. To grab food quickly
 - b. To grind leaves properly
 - c. To pounce on prey
 - d. To tear meat from bones
- ____ 2. If an animal has both flat and pointy teeth, it most likely belongs to which group?
- a. Carnivore
 - b. Herbivore
 - c. Insectivore
 - d. Omnivore
- ____ 3. What can you infer about an animal with sharp teeth and long claws?
- a. It has a limited diet.
 - b. It hunts for its food.
 - c. It mainly eats plants.
 - d. It prefers fruits.

- ____ 4. Which animals might have similar dental structures to humans based on what they eat?
- a. Cows and goats
 - b. Lions and eagles
 - c. Monkeys and bears
 - d. Sharks and falcons
- ____ 5. If you observed an animal primarily eating grass in an open field, which category would it most likely belong to?
- a. Carnivore
 - b. Herbivore
 - c. Omnivore
 - d. Predator
- ____ 6. A new species of lizard, *Cyrtodactylus santana*, was discovered in East Timor and was found out to eat snails, frogs, and small birds. What kind of animal is this lizard based on the food it eats?
- a. Carnivore
 - b. Herbivore
 - c. Omnivore
 - d. Predator
- ____ 7. In 2022, scientists classified the Southern Mane Sloth as a new species of sloth and is considered an herbivore. Which physical feature helped scientist infer that this species of sloth is an herbivore?
- a. It has sharp, long claws.
 - b. It has several flat teeth.
 - c. It has a long, agile tail.
 - d. It is covered with thick fur.
- ____ 8. Which of the following pairs of animals are NOT correctly grouped based on the food they eat?
- a. Cows and goats
 - b. Pigs and monkeys
 - c. Pythons and cobras
 - d. Sheep and wolves
- ____ 9. If you observed the common sparrow primarily eating seeds and occasionally small insects, to which group can it be classified?
- a. Carnivore
 - b. Herbivore
 - c. Omnivore
 - d. Predator

- ____ 10. What can one infer about its habitat and behavior by understanding an animal's food patterns?
- a.** Its ability to socialize with other animals.
 - b.** Its breeding and migration patterns.
 - c.** The kind of environment it thrives in.
 - d.** The type of shelter it prefers.

LESSON 7

Food Chain



Target

At the end of this lesson, you will be able to:

- ◇ Explain how a food chain shows relationship between living things.
- ◇ Draw a simple food chain using living things from the Philippines.



Engage



How do organisms interact in the environment?



Food Chain

Objectives

1. Determine how living things interact with the environment
2. Identify the different parts of the food chain

Instructions from the Interactive

A. Interaction with the Environment

1. Click the "River" category.
2. Observe the basic need provided by the environment for each animal or plant.
3. Identify the organism and the basic need provided.
4. Write your answers on Table 1.

B. Parts of Food Chain

1. Go back to the categories window.
2. Click the "Lake" category.
3. Click on each organism.
4. Identify its name and its role in the food chain (producer, consumer, or decomposer).
5. Write your answers on Table 2.

Data

Table 1.

Organism	Basic Need Provided by the Environment

Table 2.

Organism	Role in Food Chain

Guide Questions

1. How does the environment help organisms survive?
2. What is the difference among the following: producer, consumer, and decomposer?



Explain

Interactions Between Living Things

Predation

Have you ever seen a cat suddenly jump and catch a tiny mouse? This is an example of predation. Predation occurs when one animal, the predator, hunts and eats another animal, the prey. Through predation, carnivores can get the food they need to survive.



A hawk (predator) catching a fish (prey).

Competition

In the wild, animals and even plants compete for everything they need to live. Nature has a limited supply of resources. Living organisms must often compete to ensure they get what they need to survive. In a forest, a snake and a hawk compete to catch a mouse so they can survive. Plants also compete with one another to get more sunlight.



An egret (left) competing against a cormorant (right) for territory and hunting area.

The Food Chain

Predation and competition between living things in the environment forms a process which we call the food chain. Observe the diagram below.



As you can observe, the very beginning of every food chain is the sun. It provides the energy that plants, or producers, need to make their own food. The **producers**, such as plants, will then use sunlight along with water and carbon dioxide to produce food through a process called photosynthesis.

The producers are then eaten by **consumers**. Plants are eaten by **primary consumers**, which are herbivores such as the grasshopper, goats, and cows. The primary consumers are then eaten by **secondary consumers**, which are carnivores or omnivores that eat other organisms. In our example, the frog eats the grasshopper. The **tertiary consumers** then eat the secondary consumers. They are usually larger carnivores in the environment. The snake, a tertiary consumer eats the frog in our example. The largest, most dominant predator in the environment is called the apex consumer or **apex predator**. The hawk in our example is the apex predator.

When organism dies, they are broken down by decomposers. **Decomposers**, such as fungi and worms, reduce the dead bodies of living things and give the nutrients back to the soil for producers to use thus, completing the food chain.



Elaborate

Form a group. Think of animals that can be found in the Philippines. You may recall the animals you have listed from the activities on the previous lessons. Then, draw a food chain using the animals from the Philippines on a cartolina or manila paper. Present your diagram of a food chain in class and explain the relationship between each organism.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. If a habitat started to have fewer plants, which group of animals would immediately have less food supply?
- | | |
|----------------------|------------------------|
| a. Producers | c. Secondary consumers |
| b. Primary consumers | d. Decomposers |

- ____ 2. In a forest, wolves only hunt deer for food. If the number of deer suddenly decreases, what will most likely happen to the wolf population?
- a.** It will decrease.
 - b.** It will increase.
 - c.** It will stay the same.
 - d.** It will move to a new forest.
- ____ 3. A tomato plant and a squash vine live in the same garden and need sunlight to grow. If the squash vine grows higher and blocks sunlight, what might happen to the tomato plant?
- a.** It might stop growing.
 - b.** It might cover the squash vine.
 - c.** It will grow taller.
 - d.** It will attack the squash vine.

For items 4 to 5, refer to the paragraph below.

In the ancient times, humans took care of cats to control the number of rats that eat grains. This relationship between humans and cats has stood the test of times and can even be seen today.

- ____ 4. In this scenario which is considered as the prey?
- | | |
|-----------------|------------------|
| a. Cat | c. Humans |
| b. Grain | d. Rat |
- ____ 5. Which organism in the scenario is considered a secondary consumer?
- | | |
|-----------------|------------------|
| a. Cat | c. Humans |
| b. Grain | d. Rat |

- _____ 6. If there is a decrease in the number of plants in a region due to less rainfall, what will most likely happen between herbivores in that region?
- a.** They will compete more intensely for the remaining plants.
 - b.** They will leave the region immediately for more plants.
 - c.** They will live in harmony and share the remaining plants.
 - d.** They will start changing the food they eat from plants to meat.
- _____ 7. Which statement BEST describes the role of the sun in a food chain?
- a.** It gives organisms light to hunt easily.
 - b.** It gives animals the warmth they need.
 - c.** It is the primary consumer in the food chain.
 - d.** It provides energy for producers to make food.
- _____ 8. Why are decomposers important in a food chain?
- a.** They eat the apex predator.
 - b.** They eat the primary consumers.
 - c.** They break down dead living things.
 - d.** They produce the food for the food chain.
- _____ 9. Which human activity can harm the balance of the food chain?
- | | |
|---------------------------|-----------------------------|
| a. Planting trees | c. Conserving water |
| b. Illegal logging | d. Recycling garbage |
- _____ 10. Which organisms would most likely trigger the population decrease of the rest of other organisms if they all die?
- | | |
|-----------------------|------------------------------|
| a. Producers | c. Apex consumer |
| b. Decomposers | d. Secondary consumer |



Extend

Living Things and the Environment

Form a group. Create a terrarium, or an aquarium to illustrate how some plants or animals live on land or in water. A terrarium is a sealed or open glass container containing soil and plants, creating a miniature ecosystem. On the other hand, an aquarium is a water-filled tank in which aquatic plants and animals, such as fish, are kept and displayed. Present your output in an exhibit inside the classroom or the school hallway. Invite other students and explain the interactions that the organisms in your terrarium or aquarium depicts.



Rubric For Assessment

Criteria	4 (Excellent)	3 (Proficient)	2 (Approaching Proficiency)	1 (Needs Improvement)
Creativity	Displays exceptional creativity in design and layout. Unique theme with original plant or aquatic life selection.	Shows creativity with thoughtful, somewhat original design and selection.	Limited creativity, basic design, and selection with few original elements.	Little to no creativity, very basic design, and selection without original elements.
Understanding of Interactions in the Ecosystem	Demonstrates thorough understanding of ecosystem needs. All elements suitable for habitat.	Good understanding with most elements suitable for habitat.	Basic understanding with some unsuitable elements.	Limited understanding with many unsuitable elements.
Neatness and Organization	Neatly assembled with attention to detail. No spills or messy areas.	Well-assembled, minor spills or messy areas.	Basic assembly, some noticeable spills, or messy areas.	Poor assembly, many spills, or messy areas.
Presentation	Poor assembly, many spills, or messy areas.	Mostly clear and organized. Minor errors in terminology.	Lacks clarity or organization. Incomplete sentences or incorrect terminology.	Unclear, poorly organized, frequent incomplete sentences and incorrect terminology.

QUARTER 3

We have different activities that keep us entertained. Some of us like playing sports, some like to draw, while others like to sing and dance. In all these activities, we use force and energy. In this quarter, you are going to learn how push and pull make things move. You will discover distance and time and how it is related to motion. You will learn how magnets work in appliances like refrigerators and fans, making our lives easier. Oh, and did you know that sound, heat, and light affect many parts of our lives? They let you hear, stay warm, and see everything around you. So, get ready for an exciting journey of learning about force, motion, and energy.

LESSON 1

Types of Forces



Target

At the end of this lesson, you will be able to:

- ♦ Identify the different types of forces.
- ♦ Determine the effects of force on the movement and shape of an object.



Engage



What activities in school and at home requires a lot of force?



Factors that Make an Object Move

Objectives

1. Identify the different factors that can make an object move
2. Differentiate a push from a pull

Instructions from the Interactive

A. Factors that Make an Object Move

1. Click the "Table" category. Turn off air resistance.
2. Drop the object from the edge of the table. Identify the force acting on it.
3. Turn on smooth surface.
4. Drag the metal ball near the magnet and identify the force acting on it.
5. Write your answers on Table 1.

B. Push vs. Pull

1. Go back to the category selection window.
2. Click the "Playroom" category.
3. Drag the child to each object.
4. Identify if the child is pushing or pulling the object.
5. Write your answers on Table 2.

Data

Table 1.

Location	Why Did the Object Move?
Edge of Table	
Near Magnet	

Table 2.

Object	Push or Pull
Ball	
Fence	
Toy Robot	
Doll	
Toy Car	

Guide Questions

1. What happens to an object when gravity acts upon it?
2. What happens to a metal if it is near a magnet?
3. What is the difference between push and pull?



Explain

Force

Force is a push or a pull that can make things move, change direction, or stop its motion. It can even modify the shape and size of an object.

Types of Force

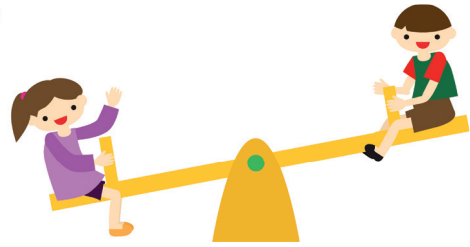
1. **Applied Force** – is a force that pushes or pulls something.
2. **Friction** – is a force that slows down and stops a rolling or sliding object from moving.
3. **Gravity** – is an invisible force that pulls everything with mass, like you and me, towards the center of the Earth.
4. **Magnetic Force** – is another invisible force that attracts or repels (pushes away) certain objects made of metal.



Applied Force Vs Friction

Interaction Among Forces Applied on an Object

1. **Balanced force** – a force that keeps an object at rest or in constant motion when the forces acting on opposite directions are equal in strength.
2. **Unbalanced force** – a force that causes a change in the motion of an object due to the unequal amount of force experienced by an object from several sources.



Unbalance Force on a Swing

The type and amount of force applied determines its effect on objects. These objects can change shape by being pushed, pulled, stretched, bent, twisted, or squeezed. They can also experience a change in their state of motion by moving from a state of rest, speeding up, slowing down, or even stopping from a state of motion.



Elaborate

Form a group. Play a game of charades and act out an activity or scenario that exhibits a type of force to be given by the teacher. Instead of guessing the activity, the group members will guess which type(s) of force is present in the scenario being acted out. The group with the most points wins.



Evaluate

Write the letter of the best answer on the space before the number.

____ 1. When you throw a ball up into the air, what force brings it back down?

a. Gravity

c. Push

b. Pull

d. Wind

- ____ 2. You want to move a heavy bookshelf across the room. How can you lessen the force of friction to make it easier to move?
- a.** Lift the bookshelf off the ground.
 - b.** Wait for someone else to move it.
 - c.** Push harder against the bookshelf.
 - d.** Add wheels to the bookshelf.
- ____ 3. What force helps you stop when you press the brakes on a bike?
- a.** Gravity
 - b.** Friction
 - c.** Magnetism
 - d.** Pull
- ____ 4. When you push a toy car down a hill, what force helps it go faster?
- a.** Friction
 - b.** Gravity
 - c.** Pull
 - d.** Push
- ____ 5. If you slide a book across a table, which force gradually slows it down?
- a.** Wind
 - b.** Gravity
 - c.** Friction
 - d.** Push
- ____ 6. While flying a kite, what type of force keeps the kite in the air against gravity?
- a.** Pull of the string
 - b.** Wind resistance
 - c.** Friction from the air
 - d.** The push of the air
- ____ 7. What force do you overcome when climbing a ladder?
- a.** Wind
 - b.** Gravity
 - c.** Friction
 - d.** Push
- ____ 8. If two forces acting on an object are not equal in strength, we say that the forces are _____.
- a.** Balanced
 - b.** Unbalanced
 - c.** Invisible
 - d.** Equal

- ____ 9. What will happen to an object if the forces acting on it are balanced?
- a.** It will start moving.
 - b.** It will change direction.
 - c.** It will stay still or continue moving.
 - d.** It will slow down and eventually stop.
- ____ 10. Which of the following is a result of unbalanced forces?
- a.** A leaf floating down a river.
 - b.** A soccer ball rolling at the same speed.
 - c.** A book resting on a desk.
 - d.** A skateboard stopping suddenly.

LESSON 2

Distance and Time



Target

At the end of this lesson, you will be able to:

- ◇ Define distance and time.
- ◇ Identify the units of measurement used for distance and time.
- ◇ Describe the tools used for measuring distance and time.



Engage



What are the tools and standard units used to measure distance and time?



Explore

Access the interactive
to perform the activity.



Measuring Distance and Time

Objective

- Determine how to measure the distance and time of a body in motion.

Instructions from the Interactive

1. Shown on the screen is a situation related to motion.
2. Observe the situation carefully and complete the table.

Data

Table 1.

Distance traveled from Max's house to John's school (m)	
Distance traveled from Dan's house to a nearby hospital (m)	
Time it takes to travel from Max's house to John's school	
Time it takes to travel from Dan's house to a nearby hospital	

Guide Questions

1. What instrument did you use to measure distance?
2. What instrument did you use to measure time?



Explain

Distance tells us how far apart things are. It is the amount of space between two points or things.

A **unit** is used to measure various quantities such as distance and time. It provides a consistent way to express measurements, making it easier for people to understand, compare, and communicate about different quantities.

For distance, we can use the following units:

Millimeter (mm): This is used to measure small objects, like the width of a pencil lead.

Centimeter (cm): This can be used to measure things like the length of a book.

Meter (m): This can be used to measure the length of a room or the height of a person.

When measuring long distances, we use kilometer (km). For example, the distance between cities or countries is measured in kilometers.

Distance can be measured using tools like rulers, meter sticks, or measuring tapes.



Students using a measuring tape.

On the other hand, **time** is a quantity that helps us understand when events occur and how long it occurred. Just like distance, time has its own units, and they vary from very short moments to long stretches:

Seconds is used for measuring short activities, like running a race.

Minutes is used to measure everyday activities, such as brushing your teeth or taking a bath.

Hours help us keep track of more extended activities, like how long you sleep or how long it takes to drive to a different town.

Days measure the time it takes for the Earth to complete one full rotation. We use this unit for scheduling events.

A year is the time it takes for the Earth to go around the Sun. We use years to record our age and important dates.

A century is made up of 100 years and is used to talk about significant spans of time, like historical events.

To measure time, we use a clock or stopwatch.



A stopwatch is used to measure how much time has passed.



Elaborate

Form a group. Using a stopwatch and a meterstick, record the distance and time that it takes to walk from a certain place in your school from the classroom. Record your measurements on the table below. Share your measurements and compare the values you recorded with other groups to see if there are differences.

Locations	Distance (in meters)	Travel Time (in seconds)
Canteen		
Clinic		
Library		
Principal's Office		
School Gate		



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is distance?
- a. The amount of space between two things.
 - b. The amount of space occupied by an object.
 - c. The amount of force that acts on an object.
 - d. The pull of gravity on an object.
- ____ 2. What is time?
- a. The length of an object
 - b. A type of force
 - c. A measure of the duration of events
 - d. How heavy something is

- ____ 3. Which unit is commonly used to measure time?
- a.** Kilogram
 - b.** Meter
 - c.** Second
 - d.** Liter
- ____ 4. Which of the following is a unit of distance?
- a.** Hour
 - b.** Celsius
 - c.** Kilometer
 - d.** Gram
- ____ 5. Which tool can you use to measure time?
- a.** Ruler
 - b.** Stopwatch
 - c.** Scale
 - d.** Thermometer
- ____ 6. Which of these is an example of measurement of time?
- a.** Counting how many steps you take
 - b.** Noting how long it takes water to boil
 - c.** Measuring how tall your friend is
 - d.** Weighing a bag of apples
- ____ 7. Which activity involves measuring time?
- a.** Finding out how tall a tree is
 - b.** Recording how long it takes to finish a puzzle
 - c.** Measuring how much water is in a bottle
 - d.** Counting the number of apples in a basket
- ____ 8. Which is a way to measure distance?
- a.** Weighing your backpack
 - b.** Checking the temperature outside
 - c.** Using a ruler to measure the length of a desk
 - d.** Counting how much time it takes to walk somewhere

- ____ 9. What would be the best way to find out how long a day is from sunrise to sunset?
- a.** Measuring the shadow of a tree
 - b.** Weighing something at sunrise and sunset
 - c.** Measuring the height of the sun in the sky
 - d.** Using a clock to note the time of sunrise and sunset
- ____ 10. If you were tracking the growth of a plant, what would you measure over time?
- a.** The sound the plant makes
 - b.** The color of the plant's leaves
 - c.** The height or length of the plant
 - d.** The temperature of the plant

LESSON 3

Speed and Velocity



Target

At the end of this lesson, you will be able to:

- ◇ Define speed and velocity.
- ◇ Calculate the speed of a moving object.



Engage



When can we say that something is moving fast?



Explore

Access the interactive
to perform the activity.



Speed and Velocity

Objective

- Determine how to measure speed and velocity of an object in motion.

Instructions from the Interactive

Shown on the screen is a situation related to motion. Observe carefully the situation and complete Table 1.

Data

Table 1.

	Max	Dan	John
Average Speed			
Average Velocity			

Guide Questions

- What instrument did you use to measure time?
- What can be used to measure speed and velocity?



Explain

Speed and Velocity

Speed tells us how quickly or how fast an object moves from one place to another. We measure it using a system called the metric system, and the units we use are meters per second (m/s) or kilometers per hour (km/h). Velocity, on the other hand, is the speed of an object in a particular direction.

If you want to find it out the speed of a moving object, here is a simple formula:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

In other words, to find out how fast something is going, just divide the distance it travels by the time it takes to cover the said distance.

You may also find out the time that it takes for an object to travel a particular distance given its speed, and get the distance covered by a moving object by knowing its speed and amount of travel time by using the following formulas:

$$\text{Distance} = \text{speed} \times \text{time}$$

$$\text{Time} = \frac{\text{distance}}{\text{speed}}$$

Before we try to solve a sample problem, let us first discuss the six basic steps of solving a word problem.

1. Read the problem carefully.
2. Identify the given.
3. Determine the missing quantity.
4. Write the formula.
5. Substitute the given.
6. Solve the problem and write the answer with its unit.

Let us say that you ran 100 meters in just 20 seconds, what is your speed?

By now you have read the problem, so our next step is to identify the given which are:

distance = 100 meters

time = 20 seconds

After listing the given, identify the missing quantity, which in this case is speed. Then, write the formula in getting the missing quantity and substitute the values:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{Speed} = \frac{100 \text{ meters}}{20 \text{ seconds}}$$

Lastly, solve the problem and write the answer with its correct unit.

$$\text{Speed} = 5 \text{ meters/second}$$



Elaborate

Find a partner. Compare the speed of different animals using the distance they can cover in a given amount of time. Identify which animal is faster. Write your answer in the table below. Show your solution in a separate piece of paper.

Animal A	Animal B	Which is faster?
Lion Distance: 110 km Time: 2 hrs.	Deer Distance: 120 km Time: 3 hrs.	
Tortoise Distance: 1 km Time: 1 hr.	Sloth Distance: 1.35 km Time: 5 hrs.	
Dolphin Distance: 120 km Time: 2 hrs.	Shark Distance: 100 km Time: 2 hrs.	
Dog Distance: 90 km Time: 3 hrs.	Rabbit Distance: 30 km Time: 3 hrs.	
Cat Distance: 100 km Time: 3 hrs.	Cheetah Distance: 90 km Time: 1 hr.	



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What is the main difference between speed and velocity?
- a. Speed is faster than velocity.
 - b. Speed includes direction, but velocity does not.
 - c. Velocity includes direction, but speed does not.
 - d. There is no difference; they are the same.
- ____ 2. If two bicycles are moving at the same speed but in opposite directions, how are their speed and velocity different?
- a. Their speeds are different, but their velocities are the same.
 - b. Their speeds are the same, but their velocities are different.
 - c. Both their speeds and velocities are the same.
 - d. Neither their speeds nor velocities can be compared.
- ____ 3. If a car travels 200 meters in 10 seconds, what is its speed?
- a. 20 meters per second
 - b. 2000 meters per second
 - c. 2 meters per second
 - d. 0.05 meters per second
- ____ 4. A runner completes a 400-meter lap in 50 seconds. What is the runner's speed?
- a. 4 meters per second
 - b. 8 meters per second
 - c. 50 meters per second
 - d. 450 meters per second
- ____ 5. A bird flies 300 meters north in 15 seconds. How fast is the bird flying?
- a. 2 meters per second, north
 - b. 5 meters per second, north
 - c. 15 meters per second, north
 - d. 20 meters per second, north

- ____ 6. If the speed of a bicycle increases, what happens to the time it takes to travel the same distance?
- a.** It increases.
 - b.** It decreases.
 - c.** It stays the same.
 - d.** It becomes unpredictable.
- ____ 7. Which of the following is a possible unit for speed?
- a.** Kilograms per hour
 - b.** Meters per second
 - c.** Liters per minute
 - d.** Degrees Celsius
- ____ 8. A car travels 200 meters in 10 seconds. If it keeps this speed, how far will it travel in 1 minute?
- a.** 600 meters
 - b.** 1200 meters
 - c.** 1800 meters
 - d.** 2000 meters
- ____ 9. If a car travels at a constant speed of 60 km/h for 30 minutes, how far does it travel in that time?
- a.** 15 km
 - b.** 30 km
 - c.** 60 km
 - d.** 120 km
- ____ 10. A train travels at a constant speed of 100 km/h for 4 hours. How much distance does it cover?
- a.** 25 km
 - b.** 100 km
 - c.** 104 km
 - d.** 400 km

LESSON 4

Laws of Motion



Target

At the end of this lesson, you will be able to:

- ◇ Explain the laws of motion.
- ◇ Explain how force affects the motion of an object.
- ◇ Demonstrate push and pull in changing the speed and direction of an object.



Engage



What happens when force is applied to an object?



Laws of Motion

Objective

- Demonstrate the three laws of motion.

Instructions from the Interactive

A. Law of Inertia

1. Place a passenger on the car that is at rest. Push the backside of the car with a quick tap. What happens to the passenger as the car suddenly moves forward?
2. Push the car gently to make it move forward then stop the car with your hand. What happens to the passenger when the car suddenly stops?

B. Law of Acceleration

1. Push a car gently. Observe what happens to the car.
2. Push a car with a stronger force than number 1. What happens to the car?
3. Add two more cars on top of the first car and apply the same gentle force you applied in number 1.

C. Law of Interaction

Push a car towards a wall. Observe and write down what happens to the car.

Guide Questions

A. Law of Inertia

1. What happens to the passenger as the car suddenly moves forward?
2. What happens to the passenger when the car suddenly stops?

B. Law of Acceleration

Compare the motion of the car in number 1 to number 3. Which changed its motion more? Why is this so?

C. Law of Interaction

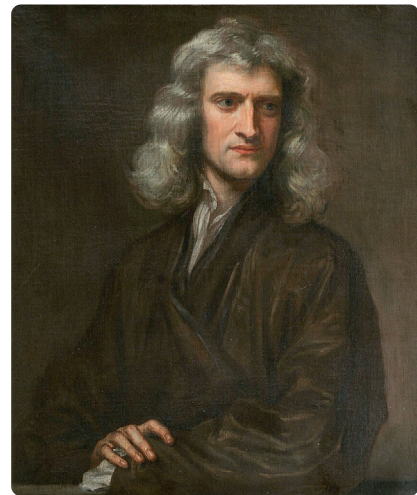
1. Did the car exert a force on the wall when the car hits the wall?
What is the evidence of your answer?
2. Did the wall exert a force on the car when the car hits the wall?
What is the evidence of your answer?



Explain

Newton's Laws of Motion

In 1687, Sir Isaac Newton, an English mathematician and scientist, formulated three physical laws that provide the connections between the forces acting upon an object and its resulting motion. Let us discuss each law one by one.



Sir Isaac Newton

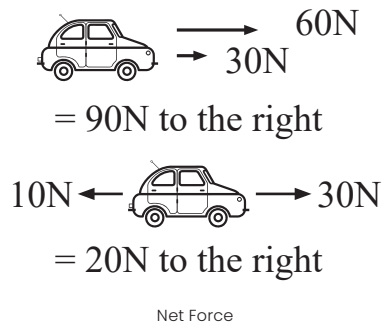
First Law of Motion: Law of Inertia



A jeepney will move once the engine applies sufficient force.

It states that an object at rest remains at rest, and an object in motion remains in motion at constant speed and in a straight line unless acted on by an unbalanced force.

Think about the jeepney we see everywhere in the Philippines. The driver pushes on the gas pedal which applies force to make the jeepney move or go faster, and when they hit the brakes, they are using force to slow it down or stop it altogether.



This is also where the concept of net force will come in. **Net force** is the overall force (push or pull) acting on an object. When multiple forces are acting on an object, they can either add together to make the object move faster or in a different direction, or they can cancel each other out, causing the object to remain at rest, stop moving or continue moving at a constant speed and in a straight line. Take note that in the figure, the unit of force is called Newton (N).

Second Law of Motion: Law of Acceleration

It states that the acceleration of an object depends on the mass of the object and the amount of force applied on it. **Acceleration** refers to how fast something speeds up when you push or pull on it.

Imagine when you are pushing a cart at the grocery store or supermarket, the heavier it gets, the more difficult it gets to move it and more force is needed. When it is still empty, it is lighter and requires less force to move.

On the other hand, **deceleration** happens when something slows down because we push or pull it the other way. Think about a cyclist squeezing the brakes. The bicycle starts to slow down and eventually stops.

Third Law of Motion: Law of Interaction

It states that for every action, there is an equal and opposite reaction. This is called the **action-reaction pair**. For example, when you are swimming in the pool and you paddle your arms in the water, you move forward because your arms push the water backward.



Elaborate

Your teacher will divide the class into groups. The groups will be paired up and compete in a game of tug-of-war. Once, ready wait for the whistle and start pulling the rope. The team that manages to pull the center marker or the other team over a designated line on their side wins. Remember to always keep safe and show sportsmanship. After performing the game, answer the following guide questions:

1. Which laws of motion are represented by the game?
2. Why was there an instance that the rope was not moving even if both opposing teams were applying force?



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Which of the following describes Newton's First Law of Motion?
- a. Energy cannot be created or destroyed.
 - b. For every action, there is an equal and opposite reaction.
 - c. The force of an object is equal to its mass times its acceleration.
 - d. Objects in motion tend to stay in motion unless acted upon force.

- ____ 2. If a soccer ball is sitting still, which of the following is needed to make it move?
- a.** Gravity
 - b.** A push or a pull
 - c.** Friction
 - d.** Magnetism
- ____ 3. What does Newton's Second Law of Motion tell us?
- a.** Objects at rest stay at rest.
 - b.** Motion is the same in all directions.
 - c.** The heavier the object, the easier it is to move.
 - d.** Force is equal to mass times acceleration.
- ____ 4. According to Newton's Third Law of Motion, if you push on a wall, what happens?
- a.** The wall will not push back.
 - b.** The wall pushes back with the same force.
 - c.** The wall gets heavier as you apply force.
 - d.** The wall moves away when you push it.
- ____ 5. If you increase the force on an object, but its mass remains the same, what happens to the acceleration?
- a.** It stops.
 - b.** It decreases.
 - c.** It increases.
 - d.** It stays the same.
- ____ 6. Which of the following is an example of Newton's First Law of Motion?
- a.** Kicking a football.
 - b.** A leaf falling from a tree.
 - c.** A rocket launching into space.
 - d.** A seatbelt holding you during a sudden stop.

- ____ 7. If two objects, one heavy and one light, are pushed with the same force, which one will accelerate more?
- a.** The light object
 - b.** The heavy object
 - c.** Neither would not move
 - d.** Both will accelerate the same
- ____ 8. What would happen to a floating balloon in a moving car if the car suddenly stops?
- a.** The balloon moves forward.
 - b.** The balloon pops.
 - c.** The balloon moves backward.
 - d.** The balloon stays in place.
- ____ 9. What happens when you stop pedaling your bike?
- a.** It turns into a corner.
 - b.** It stops right away.
 - c.** It keeps going forever.
 - d.** It slows down and eventually stops.
- ____ 10. If you push a toy car lightly and then push it hard, what difference will you notice?
- a.** It becomes heavier.
 - b.** It makes a louder noise.
 - c.** The color of the car changes.
 - d.** It moves faster when pushed harder.

LESSON 5

Magnets



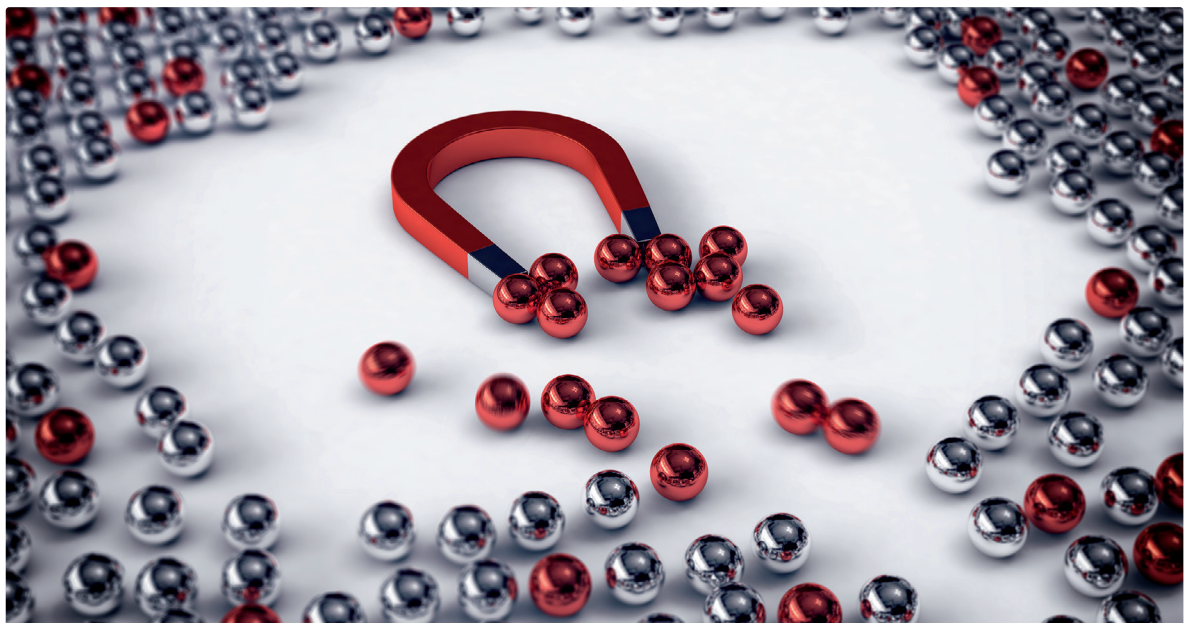
Target

At the end of this lesson, you will be able to:

- ◇ Describe how the poles of magnets interact with each other.
- ◇ Identify materials that magnets can attract.
- ◇ Explain how magnets are useful in everyday life.



Engage



How does a magnet interact with another object?



Magnetic Force

Objective

- Determine what happens to the magnetic force exerted by a magnet to another object as the object is moved closer

Instructions from the Interactive

1. Measure the magnetic force around a bar magnet using the Magnetic Force Sensor.
2. Move the Magnetic Force Sensor from a far distance and closer to the bar magnet. Record your observation on Table 1.

Data

Table 1. Distance and Magnetic Force

Distance of the Magnetometer to the Magnet	Value on the Magnetic Force Sensor

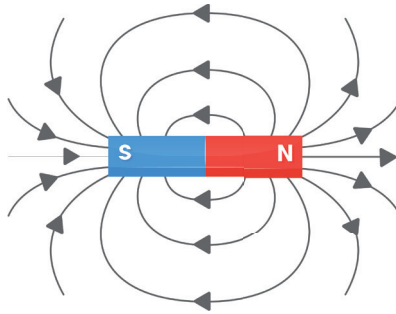
Guide Questions

1. What happens when the distance between the magnet and the magnetic force sensor is decreased?
2. Where is the magnetic force strongest?



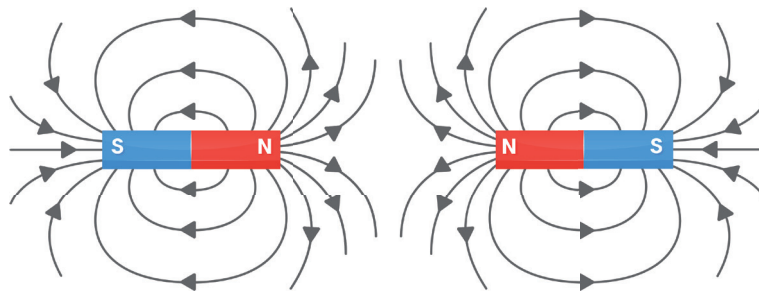
Explain

A magnet is an object or material that exerts a force which pulls certain materials and attracts or repels other magnets. Each magnet has two distinct poles: the **North Pole** and the **South Pole**. This invisible force that magnets create is known as magnetic field, and it is this field that causes materials to be attracted to, or repelled by, the magnet.



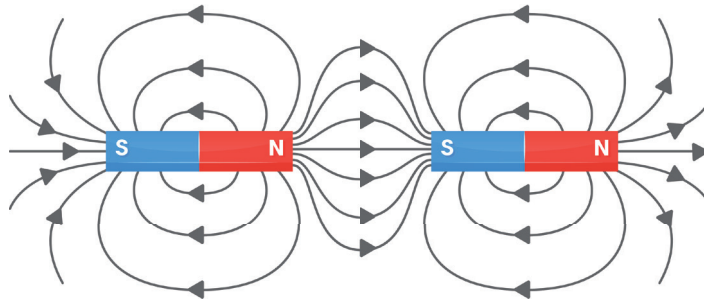
Magnetic field lines of a bar magnet.

When magnets are brought near each other, something interesting happens: like poles will repel each other, meaning a North Pole will push away another North Pole, and a South Pole will push away another South Pole.



Like poles will repel each other.

However, opposite poles attract each other; the North Pole of one magnet will pull the South Pole of another magnet towards it. This is caused by the interaction of the magnetic fields around the poles.



Unlike poles will attract each other.

Magnets do not attract all materials. They attract materials like iron, nickel, and cobalt. These are known as **ferromagnetic materials**. However, materials like plastic, wood, glass, and rubber are not affected by the pull of a magnet, as they are **non-magnetic materials**.

Uses of Magnets

Magnets have many applications in our daily lives and in various industries. For example, in the field of recycling, powerful magnets are used to separate metallic waste from non-metallic waste. Magnets are also the important component in compasses, which have been used for centuries by explorers and travelers to find their way by aligning the compass needle (a small magnet) to the Earth's magnetic field.



MRI uses magnets to create images of the internal body parts.

Additionally, in the medical field, a technology called Magnetic Resonance Imaging (MRI) utilizes magnetic fields to create detailed images of the body's internal structures, aiding doctors in diagnosis and treatment of medical conditions.



Elaborate

Identify an appliance or device that makes use of magnets. Prepare a presentation to explain how magnets are used in the appliance or device and how it is important to humans for everyday life.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. What do like poles of magnets do when we they are brought close to each other?
- a. Attract
 - b. Repel
 - c. Break apart
 - d. Melt together
- ____ 2. Which of the following materials is typically attracted to a magnet?
- a. Plastic
 - b. Wood
 - c. Iron
 - d. Glass
- ____ 3. How do opposite poles of two magnets behave when close to each other?
- a. They repel each other.
 - b. They ignore each other.
 - c. They attract each other.
 - d. They become neutral.
- ____ 4. What kind of materials do magnets attract?
- a. Organic
 - b. Transparent
 - c. Ferromagnetic
 - d. Non-magnetic
- ____ 5. Which of the following is NOT a common use of magnets?
- a. MRI in medicine
 - b. Recycling separation
 - c. Compass navigation
 - d. Enhancing the flavor of food

- ____ 6. What happens to a compass needle due to the Earth's magnetic field?
- a.** It spins continuously.
 - b.** It points towards the North Pole.
 - c.** It lies flat and motionless.
 - d.** It becomes demagnetized.
- ____ 7. Which of the following is not attracted to magnets?
- a.** Iron
 - b.** Nickel
 - c.** Cobalt
 - d.** Rubber
- ____ 8. What is the area around a magnet within which magnetic force is exerted called?
- a.** Magnetic zone
 - b.** Magnetic field
 - c.** Magnetic sphere
 - d.** Magnetic radius
- ____ 9. What happens when you break a magnet into two pieces?
- a.** They become electrically charged.
 - b.** Both pieces lose their magnetic properties.
 - c.** One piece becomes north, and the other becomes south.
 - d.** Each piece becomes a smaller magnet with its own north and south poles.
- ____ 10. In what way are magnets used in recycling centers?
- a.** To reduce waste size
 - b.** To weigh metallic waste
 - c.** To identify organic materials
 - d.** To separate metallic from non-metallic waste

LESSON 6

Sounds



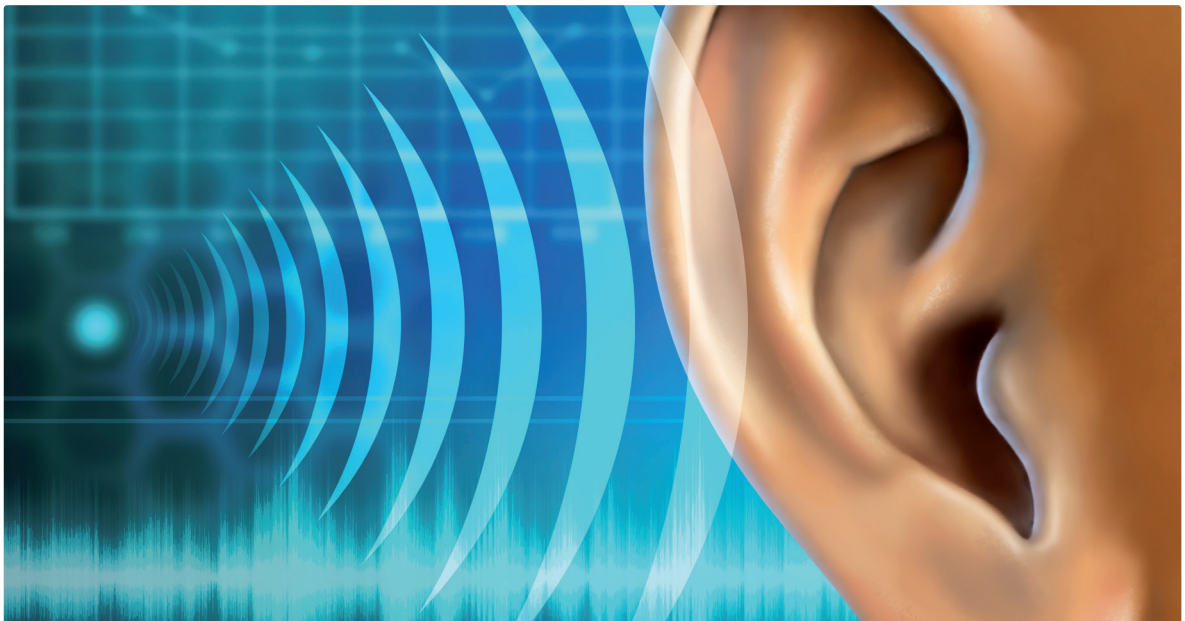
Target

At the end of this lesson, you will be able to:

- ◇ Explain how sounds are produced.
- ◇ Identify sources of sound.
- ◇ Describe the different properties of sound.



Engage



How is sound produced?



Explore

Access the interactive
to perform the activity.



Tuning Fork Experiment

Objective

- Describe how sound waves travel in the air.

Instructions from the Interactive

1. Strike a tuning fork and observe the vibration it produces in the air molecules.
2. Strike the tuning fork again and this time let it stand on the surface of a solid table. Observe the vibration produced in the surrounding air.

Guide Questions

1. Describe the motion of the air molecules when the tuning fork is vibrated.
2. Describe what happens when the vibrating tuning fork stood on the surface of a solid table.



Explain

How is Sound Produced?



Guitar strings vibrate to produce sound

When an object moves back and forth very quickly, it creates vibrations or little waves of energy. For example, when you pluck a guitar string, it vibrates. These vibrations push against the air particles around them. This makes the air particles around the object vibrate too, creating sound waves. These sound waves travel through the air to our ears, allowing us to hear the sound.

Our ears catch these sound waves. Our brain then interprets these vibrations as sound. So, when a dog barks, it is making air vibrate, creating sound waves that travel to our ears and letting us hear the bark.

Properties of Sound

Pitch

The pitch of a sound determines whether it is high or low. The pitch is affected by the speed of vibrations. Fast vibrations create high-pitched sounds like the whistle of a kettle, while slow vibrations create low-pitched sounds like the roar of a lion. Instruments like pianos and violins can produce sounds of different pitches.



A boiling kettle produces a high-pitched sound.

Intensity

The intensity or volume of sound tells us how loud or soft it is. The strength or amplitude of the vibrations determines the volume. Strong vibrations make loud sounds, while weak vibrations make soft sounds. For example, banging a drum hard produces a loud sound, but tapping it gently produces a soft sound.

Tone

The tone of a sound refers to its quality or character. It is what makes a note played on a flute sound different from the same note played on a guitar, even if the pitch and volume are the same. The materials of the objects creating the vibrations, and the way they vibrate, influence the tone.



Different musical instruments each have their unique tone.

Reflection of Sound

An interesting property of sound is reflection which can result to an echo. An **echo** occurs when sound waves bounce back after hitting a hard surface, like mountains or buildings. It is like the sound is saying hello back to you.

Sources of Sound

Sound is everywhere. Animals and humans are significant sources of sound. Nature is also full of sounds. In our modern world, machines, and technology are major sources of sound. Musical instruments are designed to create beautiful sounds. Pianos, flutes, drums, and many other instruments produce sound through the vibrations of strings, skins, or air.



Elaborate

Sing your favorite song or play a musical instrument. Describe the songs or the musical instrument to your classmates in terms of its pitch, intensity, and tone. Then, explain why you like this song or musical instrument.



Evaluate

Write the letter of the best answer on the space before the number.

____ 1. Which process causes sound to be produced by objects?

a. Diffraction

c. Refraction

b. Reflection

d. Vibration

- ____ 2. Which organ of our body can detect sound waves in the environment?
- a. Ears
 - b. Eyes
 - c. Nose
 - d. Skin
- ____ 3. What happens to the air in the surrounding when a loud speaker is playing music?
- a. The air particles are reflected.
 - b. The air particles would vibrate.
 - c. The air particles become hotter.
 - d. The air particles changes phase.
- ____ 4. Which situation shows sound that is high-pitched?
- a. Thunder during a storm
 - b. Rolling boulder downhill
 - c. Sound from a bass guitar
 - d. Whistling of a boiling kettle
- ____ 5. What causes sound to be high-pitched?
- a. Low energy
 - b. Fast vibrations
 - c. Strong intensity
 - d. Slow vibrations
- ____ 6. Which scenario has a higher intensity sound?
- a. A rock concert
 - b. Bicycle strolling
 - c. People laughing
 - d. Two friends whispering
- ____ 7. What makes a note played on a flute sound different from the same note played on a guitar?
- a. Intensity
 - b. Strength
 - c. Tone
 - d. Volume

____ 8. Which property of sound is involved in echo?

- a.** Intensity
- b.** Pitch
- c.** Reflection
- d.** Vibration

____ 9. What does the intensity of a sound refer to?

- a.** The speed of the sound
- b.** The pitch of the sound
- c.** How melodic the sound is
- d.** How loud or soft the sound is

____ 10. Which of the following sounds are found in nature?

- a.** Rustling of leaves
- b.** Engine running
- c.** Car honking
- d.** Radio playing music

LESSON 7

Light and Heat



Target

At the end of this lesson, you will be able to:

- ◇ Describe different properties of light.
- ◇ Explain the different ways that heat can be transferred.
- ◇ Describe the different source of light and heat.



Engage



Why is heat and light important to us?



Transmission of Light

Objective

- Determine what happens to light when it is transmitted.

Instructions from the Interactive

- Point a white beam on differently-colored objects. What color do you see? Try other colors of the beam. Observe and record the color of the objects under the beam. Complete Table 1.
- Point a white beam to differently-colored transparent materials. Complete Table 2.

Data

Table 1. Reflected Color

Actual Color of Object	Color of Light	Reflected Color
Red apple	White	
Green leaf	White	
Blue teddy bear	White	
Red suitcase	Blue	
Yellow raincoat	Red	

Table 2. Transmitted Color

Light Source	Transparent Material	Light Observed
White	Yellow	
White	Red	
White	Green	
White	Blue	

Guide Questions

- What color will you see when an object is under a white light?
- How will you determine the color of an object under a colored light?
- What determines the color of the light that you see?

Heat Transfer

Objective

- Describe the three mechanisms of heat transfer.

Instructions from the Interactive

A. Conduction

1. Let the end of a spoon touch the flame of a Bunsen burner.
2. Observe how atoms in the length of a metal spoon move when a source of heat is made to touch its end.

B. Convection

1. Pour water on a glass bowl.
2. Put the bowl with water on the heat plate.
3. Observe how water molecules behave when subjected to a source of heat.

C. Radiation

1. Set the Sun at a distance from the Earth.
2. Turn on "Particles". The space around the Sun and Earth will be filled with particles.
3. Turn on "Sunshine". Once this is done, the Sun will start shining.
4. Observe the change in temperature of the Earth.
5. Turn off "Particles". The space around the Sun and Earth will be a vacuum.
6. Turn on "Sunshine". Once this is done, the Sun will start shining.
7. Observe the change in temperature of the Earth.

Guide Questions

1. How does heat travel via conduction?
2. What is the difference between conduction and convection? What are the similarities between the two?
3. Can heat travel in a vacuum? Why or why not?



Light

Light is a form of energy that allows us to see the world around us. It has several fascinating properties that we encounter in our everyday lives. Let us explore some of the key properties of light.

Light Travels in a Straight Line

Light always travels in straight lines. If you shine a flashlight, the light goes straight forward, not to the sides or backward. When an object blocks the light, it creates a shadow behind it where the light cannot reach.

Reflection

Light can bounce off surfaces; this is called reflection. When light hits a shiny or reflective surface, like a mirror or water, it bounces back. This is how we see ourselves in a mirror; the light bounces off us, hits the mirror, and then reflects to our eyes.



We can see ourselves in the mirror because of the reflection of light.



We can see ourselves in the mirror because of the reflection of light.

Refraction

Light can also bend; this is called refraction. When light passes through different materials, like from air into water or glass, it changes speed and direction. This is why a pencil in a glass of water looks bent or broken.

Colors of Light

White light, like sunlight, is made up of different colors of light combined. When light passes through a prism, it splits into different colors, creating a rainbow. Objects have color because they absorb some colors of light and reflect others. A red apple looks red because it absorbs all colors except red, which it reflects.

Speed of Light

Light travels with the fastest possible speed in the universe. It can zip around the Earth more than seven times in just one second. When we switch on a light, it seems to light up instantly because light moves so quickly.

Heat

Heat is a form of energy that can be transferred from one object to another, making things warm or hot. Let us explore the three main methods by which heat is transferred.

Conduction

Conduction is the way heat moves through solids. When you touch a metal spoon that is in a hot cup of coffee, the heat travels from the coffee to the spoon and then to your hand. This is because the particles in the metal spoon are close together, and they quickly pass the heat along.



The heat of the coffee transfers to the spoon due to conduction.

Convection

Convection is the way heat circulates through liquids and gases. When you heat soup on a stove, the soup at the bottom gets hot first. As it heats up, it rises to the top, and the cooler soup goes to the bottom to get heated. This movement creates a convection current, helping the heat to spread through the whole pot of soup.

Radiation

Radiation is the transfer of heat through vacuum. Vacuum means an empty space. The Sun warms the Earth by sending heat across the empty space between them. You can feel heat radiation when you sit near a campfire; the heat travels through the air and warms your skin, even if you are not touching the fire.



We can feel heat from a campfire even if we are at a distance due to radiation.

Sources of Heat and Light

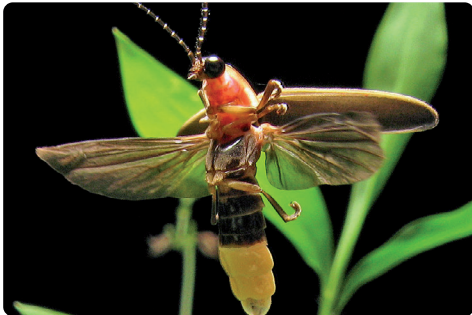


The Sun is the main source of heat and light on our planet.

Heat and light are forms of energy essential in our lives, providing us with warmth and visibility.

The **Sun** is a massive, natural source of light and heat, essential for life on Earth. It sends light and heat to our planet, making it possible for us to see during the day and helping plants to grow. In fact, all energy present on Earth comes from the Sun.

Fire has been a crucial source of heat and light since the prehistoric times. People use fire for cooking food, staying warm, and lighting dark places. Campfires, candles, and lanterns are common examples of fire used as a source of heat and light.



Fireflies can produce their own light.

In the modern world, electricity is a vital source of heat and light. Light bulbs, heaters, and electrical appliances provide illumination and warmth in our homes, schools, and workplaces, allowing us to continue our activities when it is dark and cold.

Some living organisms, like fireflies and glow-worms, can produce their own light through a process called **bioluminescence**. Additionally, all living organisms, including humans, produce some amount of heat.



Elaborate

Form a pair. With your classmate, think about your home and look around the school and list the objects which produces heat and light. List the objects you can find in the table below. Present the list and explain the importance of these light and heat sources in the school.

Sources of Light and Heat at Home and in School

Sources of Light	Sources of Heat



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. A mirror shows which property of light in action?
- a. Absorption
 - b. Dispersion
 - c. Refraction
 - d. Reflection
- ____ 2. Which statement best describes the direction that light travels?
- a. It travels in a straight line.
 - b. It bends as it moves in space.
 - c. It always passes through object.
 - d. It cannot be reflected by a surface.

- 154

____ 10. Which of the following is the primary source of heat and light of our planet?

a. Fossil fuels

c. Sun

b. Moon

d. Volcanoes



Extend

Digital Wellness Pamphlet: Safety from Hazards of Screen Time

Many people spend a lot of time on their mobile phones, tablets, laptops, and desktop computers. As a student, you are also likely to spend time on these gadgets for studying and entertainment. Because of this, you need to be aware of the possible dangers that the light and sound coming from these devices can bring.

Prepare a pamphlet explaining the possible harmful effects of too much exposure to light and loud sound from gadgets as well as tips on how to responsibly use gadgets. You may create your pamphlet by hand using coloring materials or you may use photo editing software and print your output. Share your pamphlets to other students in the school and explain the message you want others to learn.



Rubric For Assessment

Criteria	3 (Proficient)	2 (Approaching Proficiency)	1 (Needs Improvement)
Content Accuracy	All information is accurate, clear, and concise, providing detailed explanations of harmful effects and responsible use of gadgets.	Most information is accurate, but there are minor inaccuracies or vague areas, with some lack of detail on harmful effects or responsible use of gadgets.	Significant inaccuracies and vagueness are present, with substantial lack of detail on harmful effects and responsible use of gadgets.
Design and Organization	Exceptionally well-organized with clear and logical layout. Graphics, fonts, and colors significantly enhance readability and understanding.	Organized with a clear layout but with minor flaws. The use of graphics, fonts, and colors generally enhance readability.	Poorly organized with a confusing layout. Inappropriate use of graphics, fonts, and colors detract from readability.
Promotion of Awareness and Persuasiveness	Effectively raises awareness and persuasively promotes responsible gadget use, providing compelling reasons and relatable examples.	Adequately raises awareness but is less persuasive in promoting responsible gadget use, providing satisfactory reasons and examples.	Fails to adequately raise awareness and is not persuasive, providing insufficient or no reasons or examples.
Creativity and Originality	Demonstrates outstanding creativity and originality, captivating the audience with novel presentation of information and ideas.	Demonstrates good creativity and originality, engaging the audience with interesting presentation of information and ideas.	Demonstrates little to no creativity and originality, presenting information and ideas in a dull or copied manner.

QUARTER 4

We are blessed with soil, water, and weather that helps us produce food. In this quarter, you will learn about the different types of soil and sources of water. You will also apply your knowledge of weather and the Sun to keep yourselves safe from different weather disturbances and from the extreme heat of the Sun. Are you ready? Let us now start our journey to the different concepts about Earth and space.

LESSON 1

Soil



Target

At the end of this lesson, you will be able to:

- ◇ Compare different types of soil.
- ◇ Explain which type of soil is best for growing plants.
- ◇ Describe the different layers of soil.



Engage



Which type of soil is best for growing plants?



Types of Soil

Objective

- Compare and contrast different types of soil.

Instructions from the Interactive

1. Observe the texture of the four soil samples. Click each sample to spread the soil particles.
2. Observe the composition of the four soil samples. Click each sample to spread the soil particles.
3. Put each type of soil in different beakers.
4. Pour the same amount of water to each beaker. Observe the absorption capacity of the different types of soil.
5. Record your observation on Table 1.

Data

Table 1. Different Types of Soil

Type of Soil	Texture	Composition	Absorption Capacity
Sand			
Clay			
Silt			
Loam			

Guide Questions

1. Can all plants thrive in all four types of soil? Why or why not?
2. What is the importance of knowing the texture, composition, and absorption capacity of soil?

Soil

Soil is made up of minerals, rocks, sediments, moisture, and organic matter from decaying plants and animals. Soil is found on the outermost layer of earth which is the crust. It is where we live and grow the plants we eat.

Types of Soil

Sand – It is composed of small particles of rocks and minerals which is why its texture appears to be coarse. It cannot hold water very well and it can warm faster compared to other soil types.



Sand is commonly found in beaches.



Natural clay can be molded and turned into pots.

Clay – It is made of very fine particles. It is also hard to grow plants on clay soil because it is too compact and can hold too much moisture which affects the roots' ability to effectively absorb water and nutrients.

Silt – It has finer particles and, compared to sand, it is smoother and darker in color. It contains more nutrients and can hold a good amount of water.



Silt has very fine particles.



Loam soil is good for plants.

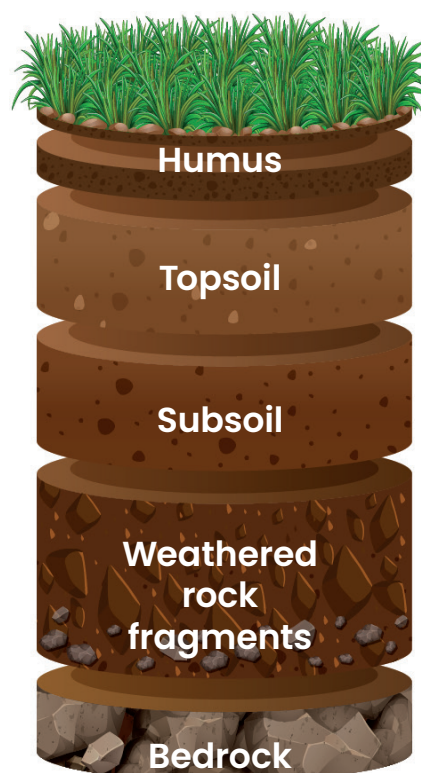
Loam – It is a mixture of equally good amount of sand, clay, and silt. It is good in retaining water but also has a good draining ability. It is the darkest in color due to the presence of organic matter. Loam is the most fertile type of soil.

Layers of Soil

Soil of different types is found in different layers. As you go deeper into the ground, you will encounter different layers with their own properties.

Layers of the Soil

1. **Topsoil** – It is the uppermost layer of soil that is exposed to the air. It is dark in color due to the presence of humus and nutrients. **Humus** is formed from decomposed plants and animals. It provides nutrients for plants to grow and increases the soil's ability to retain water. It is the most fertile layer of the soil.
2. **Subsoil** – It has a lighter in color. This layer has a high level of clay content which makes it difficult for plants to grow.
3. **Weathered rock fragments** – This layer is composed of rocks that have been broken down into smaller size through a process called **weathering**. Eventually these rock fragments will be turn into soil.



Layers of the Soil

4. **Bedrock** – It is grayish in color and mostly composed of rocks. This is found buried under all other layers of the soil.

Importance of Soil

Soil is important for our planet. It is where plants get their nutrients and water they need to grow. When plants grow in soil, they produce oxygen and food that humans and animals need. Without soil, many living things would not be able to survive and thrive.

Soil Erosion



Soil erosion can cause problems in a community.

The topsoil is prone to being washed away by water, wind, movement of animals, and actions by humans. This process is called erosion. It is a major problem in many communities. This can lead to landslides and difficulty in growing plants. Always remember to not throw harmful chemicals to our soil and take care of more plants and trees to save soil from erosion.



Elaborate

Form a group. Go to different spots inside the school. Using a garden shovel, you will collect soil from the spot your group has chosen. Observe the color, texture, and ability to hold water of the soil sample you collected. Record your observations in the table below. Then, using your observations, evaluate which type of soil is the sample you collected. Share your observations and findings in class.

Where is the soil sample taken?	Color	Texture	Ability to Hold Water



- ____ 1. Which type of soil is best for retaining water and often feels sticky when wet?
 - a. Clay
 - b. Loam
 - c. Sand
 - d. Silt
- ____ 2. If you need soil that drains water quickly and feels gritty, what type of soil would you choose?
 - a. Clay
 - b. Loam
 - c. Sand
 - d. Silt
- ____ 3. Why is loam beneficial for growing plants?
 - a. It is only made of fine clay particles.
 - b. It offers good drainage and nutrients.
 - c. It is mostly made of large sand particles.
 - d. It only contains silt which makes plants grow taller.
- ____ 4. Which material is present in loam soil that provides nutrients for plants?
 - a. Ash
 - b. Gravel
 - c. Humus
 - d. Pebbles
- ____ 5. Which layer of soil is rich in organic matter and nutrients?
 - a. Bedrock
 - b. Subsoil
 - c. Topsoil
 - d. Weathered rock
- ____ 6. Which layer is composed of solid rocks, usually found deep in the ground?
 - a. Bedrock
 - b. Subsoil
 - c. Topsoil
 - d. Weathered rock

- ____ 7. Why is the subsoil lighter in color compared to topsoil?
- a.** Because it contains more sand.
 - b.** Because of its high clay content.
 - c.** Because it has more humus.
 - d.** Because it is closer to the surface.
- ____ 8. When you plant a tree, which layer of soil will its roots first spread into?
- a.** Bedrock
 - b.** Subsoil
 - c.** Topsoil
 - d.** Weathered rock fragments
- ____ 9. How can soil erosion affect a community?
- a.** It can lead to landslides.
 - b.** It increases the growth of plants.
 - c.** It makes the soil more fertile.
 - d.** It changes the composition of soil.
- ____ 10. Which action can best protect soil from erosion?
- a.** Building less houses
 - b.** Cutting down grass
 - c.** Placing walls in slopes
 - d.** Planting more trees

LESSON 2

Water



Target

At the end of this lesson, you will be able to:

- ◇ Explain that water is one of the basic needs of plants and animals.
- ◇ Identify the different sources of water.
- ◇ Perform actions that would help conserve water.



Engage



Where do we get the water that we need?



Explore

Access the interactive
to perform the activity.



Clean-Up Our Water Sources

Objective

- Determine the ways to take care of sources of water.

Instructions from the Interactive

1. Shown on the screen is a body of water that has been polluted.
2. Perform the actions that will turn the water back to its normal condition.
3. Drag materials from the materials' task pane to perform these actions.
4. A prompt will tell you if you have successfully saved the body of water.

Guide Questions

1. What are the ways to clean up bodies of water?
2. Why is it important to take care of bodies of water?



Explain

Humans use water in many ways. Our bodies are made up of a lot of water—about two-thirds of our body weight. We use this water to help digest food, keep our temperature just right, and remove wastes. Animals use water in similar ways that we do as humans.

Plants need water just like we do. Plants use water to make their food through a process called photosynthesis.



Animals drink water to survive.

Water also plays a big role in the world around us. Rivers, lakes, and oceans are homes to many animals and plants. These habitats provide everything that animals and plants need, including food, shelter, and, of course, water to drink.

Sources of Water

1. **Groundwater** is found underneath the Earth's surface. Groundwater is usually clean because the layers of soil and rocks below the ground help filter it.
2. **Surface water** is water found above the ground.
 - a. **Saltwater** – The oceans and seas hold the most abundant amount of water on Earth. It also serves as a habitat for thousands of marine and freshwater species.
 - b. **Freshwater** – Freshwater can be found on waterfalls, lakes, or rivers. A river is a body of water which has flowing freshwater. Dams are constructed to serve as reservoirs or storage of water. These are barriers built to hold back water from a river.



Dams are built to collect water from rivers.

Water Conservation

We must conserve water as not all the water found on Earth are accessible and can be used for every day needs. To help conserve and use water responsibly, you may follow these steps:

1. Turn off the faucet while brushing your teeth.
2. Inform adults in your family to fix leaky faucets.
3. Collect rainwater for watering plants and other use.
4. Wash fruits and vegetables in a basin and reuse the water.
5. Water your plants at home with the amount they just need.



Elaborate

Find a partner. Identify a major source of water in the Philippines, preferably near your community. This may include the dam where the water is kept and the body of water where the dam is built. Read up about the challenges that this source of water experiences in terms of water supply. Share what you have read about in class. Do not forget to state the sources of your information.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. How much of our body weight is made up of water?
- a. One-fourth
 - b. One-third
 - c. One-half
 - d. Two-thirds
- ____ 2. Which type of water would NOT be suitable for drinking?
- a. Freshwater from a river
 - b. Groundwater from a well
 - c. Water from an ocean
 - d. Water from a spring
- ____ 3. Which of these sources is not considered surface water?
- a. Deep well
 - b. River
 - c. Ocean
 - d. Waterfall
- ____ 4. Why are dams primarily built?
- a. To collect freshwater
 - b. To create a fishing spot
 - c. To cool down water
 - d. To gather minerals from rivers
- ____ 5. Which action will help conserve water?
- a. Collecting rainwater in containers
 - b. Use hoses when watering plants

- c. Letting the faucet running when brushing teeth
- d. Use water from washing vegetables for drinking

____ 6. Which type of water source is most abundant on Earth?

- a. Freshwater
- b. Groundwater
- c. Rainwater
- d. Saltwater

____ 7. Why are dams built along rivers?

- a. They increase the salt content in rivers.
- b. They store freshwater from rivers.
- c. They help transport river water to the oceans.
- d. They heat the river water for humans.

____ 8. Why is it important to save water despite the abundance of water in the world?

- a. Because some water sources are too expensive to get water from.
- b. Because it is difficult to go to the oceans and gather water for everyday use.
- c. Because water from rivers and lakes are protected against water consumption.
- d. Because only a small percentage of the world's water is freshwater and accessible.

____ 9. What is a good way to use rainwater?

- a. Use it for cooking.
- b. Use it to water plants.
- c. Use it as drinking water.
- d. Use it to wash dishes.

____ 10. Which action will NOT help conserve water?

- a. Fixing leaky faucets.
- b. Collecting rainwater for use.
- c. Turning off the faucet while brushing.
- d. Watering plants more than they need.

LESSON 3

Elements of Weather



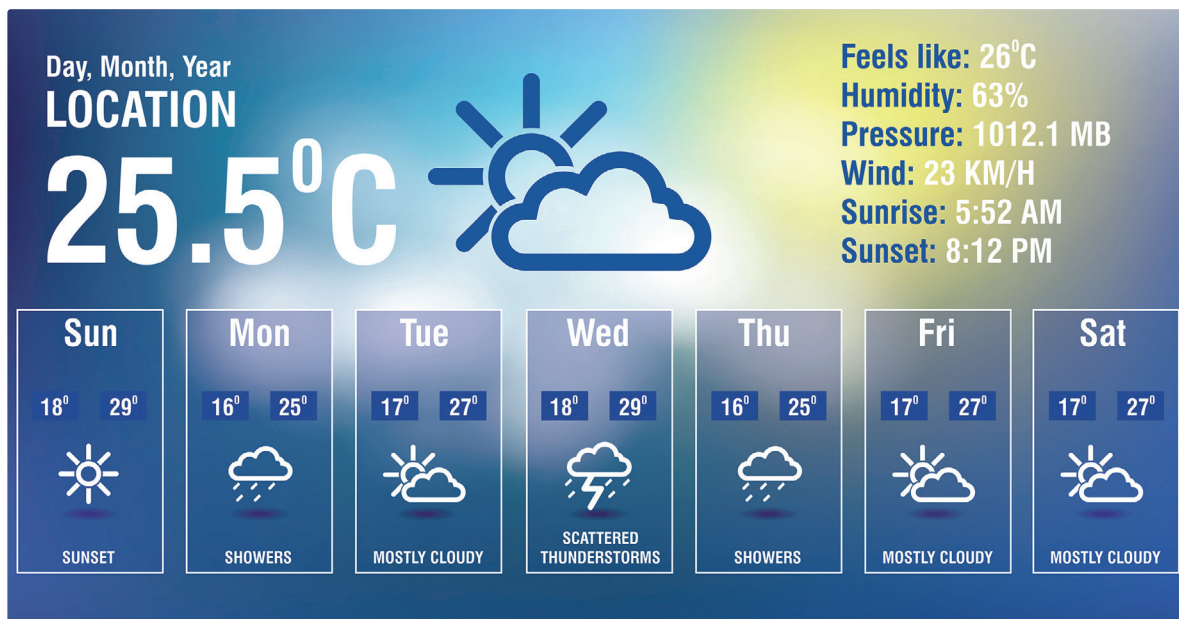
Target

At the end of this lesson, you will be able to:

- ◇ Identify elements used to describe weather.
- ◇ Describe how different elements of weather are felt or observed by people.



Engage



What do the symbols and numbers found in a weather report mean?



Weather Chart

Objective

- Plot the data on the weather chart obtained from weather stations.

Instructions from the Interactive

- Collect weather-related data from COMS (Communication, Ocean, and Meteorological Satellite) Data Analysis system for a given date.
- Plot this data on the weather chart.

Data

Table 1. Weather Chart

	Date	
	Sunday, January 20	Monday, January 21
Wind speed		
Cloud cover		
Rainfall		
Temperature		

Guide Questions

- What is the importance of collecting the data found in the weather chart?
- How will the forecast be affected if one element of the weather was not reported for a given day?



Explain

When you step outside, you will feel the weather around you. Is it hot or cold? Is it windy or calm? The weather can change from day to day, and it is made up of several different elements.

Elements of Weather

1. **Air Temperature** – This tells us how hot or cold the air is outside.
2. **Air Pressure** – Air pressure is the weight of the air above us. Days with higher air pressure often feels clear and sunny, while low-pressure days can bring clouds and rain.
3. **Wind Speed** – Winds can move slowly or quickly, depending on the weather conditions.
4. **Wind Direction** – Just like we have directions on a map – north, south, east, and west – the wind also comes from specific directions. The direction the wind comes from can affect our weather.
5. **Humidity** – It describes the amount of water vapor in the air. On some days, the air might feel “sticky” or “damp” – that means there is a lot of humidity.



Cirrus clouds indicate fair weather



Nimbus clouds indicates that rain may soon fall

6. **Rainfall** – Rain is nature’s way of watering the Earth. There are certain times of the year when it is rainier and we should always be prepared with protective clothing such as umbrellas and raincoats.

7. **Cloud Cover** – Cloud cover talks about the clouds present in the sky. By observing the types and patterns of clouds, we can sometimes guess the weather. Some clouds, like cumulus clouds, which are fluffy and white, and cirrus clouds, which are thin and feather-like, means fair weather. While darker, thicker clouds like nimbus clouds might bring rain.



Elaborate

Everyone has a different kind of weather that they prefer. Describe the weather that you prefer if you are to spend a day in your favorite place. Use the elements of weather in describing the weather conditions you like. Share this in class and explain why you prefer this kind of weather. You may follow the example below.



I like to spend a day taking a swim in a river. I like a cool air temperature of around 21 degrees Celsius and just low humidity. I like the wind to blow a gentle breeze and the cloud cover to be a lot. I also wish there is no rainfall so I can enjoy the calming river.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Which element of weather gives us information about how hot or cold the surroundings are?
- | | |
|--------------------|---------------|
| a. Air pressure | c. Humidity |
| b. Air temperature | d. Wind speed |

- ____ 2. Which weather condition is most likely to bring rain?
- a. Fluffy and white clouds
 - b. Gentle wind breeze
 - c. High pressure area
 - d. Low pressure area
- ____ 3. When you feel the day is "sticky", it is most likely due to which element?
- a. Air pressure
 - b. Humidity
 - c. Rainfall
 - d. Wind direction
- ____ 4. What can cirrus clouds indicate about the weather?
- a. Strong winds
 - b. Immediate rainfall
 - c. Typhoon is soon coming
 - d. Fair weather and clear skies
- ____ 5. Which cloud type is associated with rainy weather?
- a. Cirrus
 - b. Cumulus
 - c. Nimbus
 - d. Stratus
- ____ 6. Why is rain essential for the environment?
- a. It increases humidity.
 - b. It increased air temperature.
 - c. It cools down the surroundings.
 - d. It provides water for living things.
- ____ 7. If you felt a gentle breeze while in the park, which statement about wind speed is likely true?
- a. The wind speed is high.
 - b. The wind speed is low.
 - c. There is a storm coming soon.
 - d. The wind is not moving at all.

- ____ 8. If you are planning to go the park and notice cumulus clouds in the sky, how might you prepare?
- a.** Pack heavy rain gear and umbrellas.
 - b.** Cancel the picnic due to expected rain.
 - c.** Wear a jacket because it will be very cold.
 - d.** Wear loose clothing because it will be warm.
- ____ 9. On which type of day would you most likely feel the need to drink more water to stay hydrated?
- a.** When humidity is low
 - b.** When wind speed is low
 - c.** When cloud cover is high
 - d.** When air temperature is high
- ____ 10. If the wind is coming from the ocean and the day feels cooler than usual, what does this tell us about wind direction's effect on weather?
- a.** Ocean winds only affect coastal areas.
 - b.** Ocean winds always make the day hotter.
 - c.** Wind direction does not influence temperature.
 - d.** Winds from the ocean can bring cooler, moist air.

LESSON 4

Weather Instruments



Target

At the end of this lesson, you will be able to:

- ◇ Describe the different instruments used to measure weather elements.
- ◇ Use weather instruments to observe and record weather elements.



Engage



What helps weather forecasters determine the weather?



Weather Report

Objective

- Measure air temperature, air pressure, wind speed and direction, humidity, and precipitation.

Instructions from the Interactive

1. For every page, you will be asked to measure the air temperature, air pressure, wind speed and direction, humidity, and precipitation of a certain area.
2. Drag the instruments you will need for this observation from the materials' task pane.
3. Install the instruments to the proper place to perform the measurement activity.
4. Record your observation on Table 1.

Data

Table 1. Weather Report

	Situation		
	Sunny	Windy	Rainy
Air Temperature			
Air Pressure			
Wind Speed			
Wind Direction			
Humidity			
Precipitation			

Guide Question

Choose one situation from Table 1 and write a weather report incorporating the elements of the weather.



Explain

Different instruments are used to measure weather elements. These help **meteorologist**, scientists who study weather, to predict what kind of weather we will experience.

Thermometer

A thermometer measures temperature or how hot or cold something is. Temperature is measured using degrees Celsius or degrees Fahrenheit.



Thermometer



Barometer

Barometer

A barometer measures air pressure, or the weight of the air above us. Air has weight, and as the weight changes, the air pressure changes too.

Hygrometer

A hygrometer tells us about humidity, or the amount of water vapor in the air. A hygrometer displays humidity as a percentage which tells us how many parts of air is composed of water vapor.



Hygrometer



Anemometer

Anemometer

The anemometer measures wind speed, or how fast the wind is blowing. Most anemometers have cups that catch the wind. As the wind blows, it turns the cups in a circle. The faster the wind, the faster the cups turn, and this speed is shown on a scale.

Wind Vane

A wind vane or weather vane tells us the wind's direction. The wind vane has an arrow that can spin freely.



Wind vane



Rain Gauge

Rain Gauge

A rain gauge measures how much rain has fallen over a specific period. It is a container with a funnel at the top leading to a measuring tube. The funnel directs rain into the tube. By reading the marks on the side of the tube, we can tell how much rain has fallen.



Elaborate

Form a group. Read up on how to make an improvised weather instrument. Create the improvised weather instrument and use it to record data for a period of 5 days. Then, explain to the class how you built the improvised weather instrument and present the weather data that you have collected.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Which weather instrument would you use to find out how hot or cold the day is?
- a. Hygrometer
 - b. Rain gauge
 - c. Thermometer
 - d. Wind vane
- ____ 2. Jenny observed that the barometer's needle is dropping. What can she most likely conclude about the upcoming weather?
- a. It will be sunny and clear.
 - b. The day will be very windy.
 - c. Rainy weather will come soon.
 - d. The wind direction has changed.
- ____ 3. What does a fast spinning anemometer indicate?
- a. A lot of rain has fallen.
 - b. It is very humid outside.
 - c. The wind speed is high.
 - d. The wind is blowing from the north.
- ____ 4. If the hygrometer shows a high percentage, how would the air likely feel outside?
- a. Cold and windy
 - b. Dry and dusty
 - c. Sticky and damp
 - d. Cool with a breeze
- ____ 5. Which instrument would be most helpful for a farmer to know if he should water his crops more?
- a. Barometer
 - b. Hygrometer
 - c. Rain gauge
 - d. Wind vane

- _____ 6. Mr. Roberto wants to fly a kite with his children and needs to know the direction of the wind. Which instrument should he use?
- a. Hygrometer
 - b. Thermometer
 - c. Rain gauge
 - d. Wind vane
- _____ 7. A scientist observes that the liquid in a weather instrument is rising as the sun rises in the morning. Which instrument is she most likely observing?
- a. Anemometer
 - b. Rain gauge
 - c. Thermometer
 - d. Wind vane
- _____ 8. Which weather instrument would you use to determine if the air outside feels dry or moist?
- a. Anemometer
 - b. Hygrometer
 - c. Rain gauge
 - d. Wind vane
- _____ 9. Why would an anemometer be placed high above the ground?
- a. To make it easier to see from the ground
 - b. To avoid things that will block the flow of wind
 - c. To keep it safe from people who might move it
 - d. To reduce the noise that you can hear as it spins
- _____ 10. How might the readings from a barometer and an anemometer work together to help forecast a storm?
- a. Low pressure and low humidity could indicate a storm.
 - b. Low pressure and high wind speeds could indicate a storm.
 - c. High pressure and low wind speeds could indicate a storm.
 - d. High temperature and high wind speeds could indicate a storm.

LESSON 5

Safety Precautions for Different Weather



Target

At the end of this lesson, you will be able to:

- ◇ Describe different extreme weather conditions.
- ◇ List safety precautions for extreme weather.



Engage



What should you do during extreme weather conditions?



Explore

Access the interactive to perform the activity.



Preparing for a Typhoon

Objective

- Determine the ways to prepare for a typhoon.

Instructions from the Interactive

1. Shown on the screen is a community that will be experiencing a typhoon in a day or two.
2. Help the community prepare for the incoming typhoon.
3. Drag the materials you need from the materials' task pane to make the preparations.
4. A prompt will appear if you have completed all the preparations.

Guide Questions

1. What are the preparations you need before a typhoon hits your community?
2. Why is it important to prepare for a typhoon?



Explain

Safety Precautions for Different Weather Conditions

Weather is ever changing, so we need to be ready and prepare ourselves for whatever conditions we might experience every day. Here are some of the ways we can prepare for different weather conditions.

Heavy Rainfall and Flooding

During the wet season, which typically occurs from May to October, the Philippines experiences heavy rainfall, leading to flooding and landslides, especially in low-lying and mountainous areas.

1. Be familiar if your neighborhood can get flooded when it rains.
2. Keep your important documents safe from water by putting it in a sealed container.

3. Plan with your family about where to go if your area starts to flood.
4. Listen to news and weather reports if classes will be suspended due to heavy rains.



Flooding usually happens after heavy rains.

Extremely Hot and Dry Weather

The dry season occurs from November to April. During this time, the weather is hot and dry, with little to no rainfall. It can be quite hot, especially in April and May.

1. When it is hot, drink lots of water to stay cool and hydrated.
2. Use sunscreen, wear a hat, bring an umbrella, and cover up to avoid overexposure to sunlight.
3. Do not play with flammable materials or throw away lit things like matchsticks. Dry weather increases risk of fires.



Bring an umbrella during hot and sunny weather.

4. Use water responsibly because water shortage is common during this kind of weather.

Typhoons

The Philippines is often affected by typhoons. These weather disturbances can bring intense rainfall, strong winds, and storm surges, leading to flooding, and landslides.

What to Do Before a Typhoon

1. If local authorities say it is time to evacuate, go to the designated evacuation area.



Always have an emergency kit ready before a typhoon hits.

2. Fix broken parts of your home so it does not lead to even bigger damage during a typhoon.
3. Prepare an emergency kit with things like food, water, and medicine.

What to Do During a Typhoon

1. Stay at home if possible and do not go out.
2. If you are not at home during the onslaught of a typhoon, stay in a strong building until it is safe to go out.
3. Ensure your phone has power. If possible, prepare extra batteries such as power banks in case of power outage.
4. Stay in touch with your family and friends to ensure they are okay and to update them of your situation.

What to Do After a Typhoon

1. Watch out for things like electrical wires on the ground and floodwater in the streets.
2. Listen to news reports and announcements from local authorities.



Elaborate

Choose a specific weather condition commonly occurring in the Philippines and create a weather preparedness poster about it. In your poster, you may include the following details:

- A visual representation of the weather condition (e.g., drawings, symbols).
- Safety tips and measures specific to that weather condition.
- Illustrations or images related to preparedness (e.g., emergency kit, family plan).
- After creating your poster, share it with the class. You will briefly explain the chosen weather conditions and the preparedness tips you included.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. Why is it important to keep important documents inside sealed plastic containers during typhoons?
- a.** To keep them dry.
 - b.** To keep it warm.
 - c.** To make it last longer.
 - d.** To make them easy to find.
- ____ 2. What is the most important reason for drinking lots of water during extremely hot and dry weather?
- a.** To stay full
 - b.** To stay active
 - c.** To stay awake
 - d.** To stay hydrated
- ____ 3. Why should you save water during the dry season?
- a.** Water is more available
 - b.** Water looks and taste different
 - c.** Water shortages are common
 - d.** Water is more expensive
- ____ 4. Why is it important to use sunscreen during extremely hot and dry weather?
- a.** To look good
 - b.** To stay cool
 - c.** To stay hydrated
 - d.** To avoid sunburn
- ____ 5. Why is it important to keep food, water, and medicine ready before a typhoon comes?
- a.** To have supplies if you get stuck indoors
 - b.** To have something to sell after the typhoon hits
 - c.** To have a heavy meal to eat before the typhoon hits
 - d.** To save money because prices will increase after the typhoon

- ____ 6. Why is it important to know where elevated places in your community are found?
- a.** To know where to evacuate in case of flooding
 - b.** To learn the ins and outs of your community
 - c.** To find place where you can store food and water
 - d.** To have a place where you can hide before a typhoon
- ____ 7. Why would you avoid throwing away lit things like matchsticks during extremely hot and dry weather?
- a.** To avoid starting fires
 - b.** To lessen the heat
 - c.** To save matchsticks
 - d.** To prevent littering
- ____ 8. Why should you listen to local authorities and leave when they say it is time during floods?
- a.** To evacuate while it is still safe to do so
 - b.** To show that you are an obedient citizen
 - c.** To prepare a plan in case you need rescuing
 - d.** To received food and water from local authorities
- ____ 9. Why is it crucial to have a plan with your family about where to go if your area starts to flood?
- a.** To avoid getting stuck in traffic on the way
 - b.** To make sure everyone knows where to go
 - c.** To have a place where the family can hide
 - d.** To prevent other people from knowing your evacuation spot
- ____ 10. Which food product should NOT be in an emergency kit?
- a.** Raisins
 - b.** Biscuits
 - c.** Pancake mix
 - d.** Canned sardines

LESSON 6

Characteristics of the Sun



Target

At the end of this lesson, you will be able to:

- ◇ Describe the characteristics of the sun.
- ◇ Explain that the sun is the source of all energy on Earth.



Engage



Why is the Sun important to life forms on Earth?



Explore

Access the interactive
to perform the activity.



The Sun

Objective

- Determine how the Sun affect human activities.

Instructions from the Interactive

A. Effects of Sun on Weather Condition

Investigate the effect of the Sun in changing the weather condition.

B. Effects of Sun on Living Things

Investigate how living things are influenced by the Sun.

C. Activities During Day Time

Discover the activities that are done on a sunny day.

Guide Questions

1. What are the effects of the Sun on weather conditions?
2. How are living things influenced by the Sun?

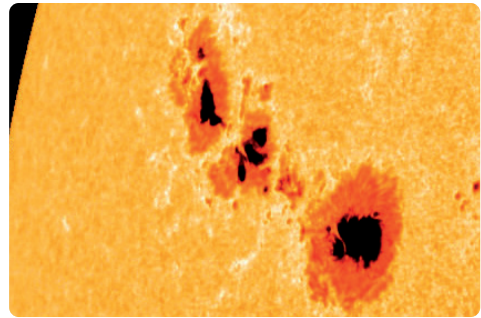


Explain

Characteristics of the Sun

The **Sun** is a massive ball of hot, glowing gases, primarily the gases known as hydrogen and helium. It is so big that it could fit about 1.3 million Earths inside it. But, despite its massive size, the Sun is just an average-sized star compared to others in our Milky Way galaxy. The Sun sits at the center of our solar system, and its powerful gravity holds all the planets, including Earth, in orbit around it.

The surface of the Sun is a busy place, with lots of activity such as sunspots, solar flares, and prominences. **Sunspots** are cool, dark areas on the Sun's surface caused by its magnetic field. **Solar flares** are sudden, intense explosions on the Sun's surface that release a large amount of energy, and **prominences** are large loops of hot, glowing gas that extend outward from the Sun's surface.



The surface of the sun with sunspots visible.

Importance of the Sun to Life on Earth



The Sun provides heat and light to Earth. This is important for plants to produce food.

The Sun is the primary source of energy for Earth. It emits light and heat, or solar energy, which is crucial for sustaining life on our planet. This solar energy is the driving force behind photosynthesis, a process carried out by plants, allowing them to convert sunlight into food. This not only helps the plants grow but also provides food and energy sources for animals and humans. The Sun is also responsible for creating the weather and climatic patterns we experience on Earth. Moreover, the Sun influences the Earth's water cycle. The Sun's heat causes water from oceans, lakes, and rivers to evaporate, forming water vapor. This vapor rises and condenses into clouds, and eventually, it returns to Earth as precipitation, such as rain or snow, completing the cycle.



Elaborate

Find a partner. Discuss what would happen to our society and our surroundings if the Philippines would experience several months without sunlight. Share what you have discussed with your partner to the class.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. How does the Sun compare in size to other stars in the Milky Way galaxy?
- a.** It is the largest star.
 - b.** It is smaller than average.
 - c.** It is an average-sized star.
 - d.** It is the smallest star.
- ____ 2. Approximately how many Earths can fit inside the Sun?
- a.** 130,000
 - b.** 1.3 million
 - c.** 13 million
 - d.** 130 million
- ____ 3. What would happen to Earth if there was no Sun?
- a.** It would flourish even more.
 - b.** It would be too hot for life.
 - c.** It would be a lifeless, frigid place.
 - d.** It would rely on the Moon for energy.
- ____ 4. What do sunspots signify on the Sun's surface?
- a.** Areas of intense heat
 - b.** Regions of increased solar wind
 - c.** Locations of differently colored flames
 - d.** Cool, dark areas due to the magnetic field
- ____ 5. What does the Sun's gravity do to the planets in the solar system?
- a.** Pushes them away.
 - b.** Causes them to rotate.
 - c.** Holds them in orbit around it.
 - d.** Influences their magnetic fields.

- ____ 6. Why is the uneven heating of the Sun on Earth vital in maintaining life in this planet?
- a.** It causes the changing weather patterns.
 - b.** It causes the gravity to pull us down.
 - c.** It moves the Earth to complete its rotation.
 - d.** It provides the Earth with oxygen that humans need.
- ____ 7. Which phenomenon on the Sun's surface releases a large amount of electromagnetic energy which can affect the Earth?
- a.** Sunspots
 - b.** Solar Flares
 - c.** Prominences
 - d.** Solar Wind
- ____ 8. Which process in plants that produces food is made possible by the Sun?
- a.** Digestion
 - b.** Photosynthesis
 - c.** Respiration
 - d.** Transpiration
- ____ 9. How does the Sun primarily impact the Earth's water cycle?
- a.** By cooling the oceans
 - b.** By causing evaporation of water
 - c.** By creating more water sources
 - d.** By causing precipitation directly
- ____ 10. Which gases are present in the Sun in large quantities?
- a.** Hydrogen and Helium
 - b.** Oxygen and Carbon dioxide
 - c.** Neon and Xenon
 - d.** Methane and Water Vapor

LESSON 7

The Sun and Our Surroundings



Target

At the end of this lesson, you will be able to:

- ◇ Explain how the Sun causes day and night.
- ◇ Describe changes in the direction and length of shadow by the Sun.
- ◇ Explain how the Sun affects the seasons.



Engage



How can the Sun affect living things?



Explore

Access the interactive
to perform the activity.



Sun and Shadow

Objective

- Determine the positions of shadow at different times.

Instructions from the Interactive

1. Move the sun in different locations in the sky (indicated by target icons).
2. Observe the shadow cast by the sundial at these times.
3. Illustrate the shadows formed at three different times.

Data



Figure 1. Sun and Shadow

Guide Questions

1. How are shadows formed?
2. When is no shadow cast by the sundial?
3. When is the longest shadow formed?

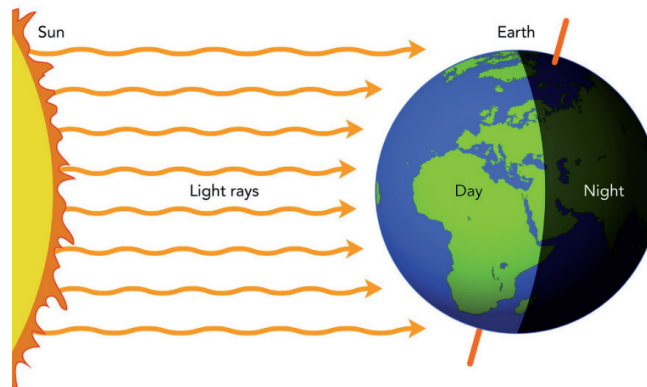


Explain

The Sun affects many of the phenomena that we observe every day such as daytime and nighttime.

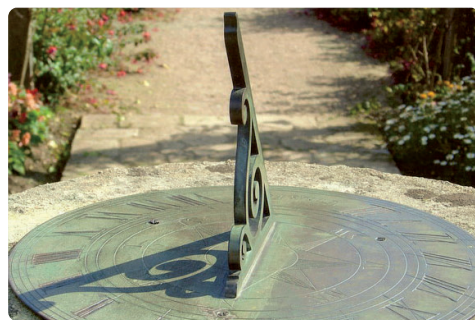
Day and Night

The Earth is continuously rotating or spinning on an imaginary line called its axis. It completes one full rotation approximately every 24 hours. When a part of the Earth is facing the Sun, experiencing the Sun's rays, it is daytime in that region. This is the time when we see the bright Sun in the sky and everything around us is illuminated. When a part of the Earth is facing away from the Sun, the Sun's rays are blocked, and it is nighttime in that area.



Sun and Shadows

The strength of the sun's rays varies each day. They are the strongest during the middle of the day when the sun is found directly overhead. Sunlight travels in a straight line and when it hits an object, it may not be able to pass through forming a **shadow**.



The Sun provides heat and light to Earth. This is important for plants to produce food.

The length of a shadow depends on how low or high the Sun is in the sky. During noontime, the Sun is positioned high. This results to shorter shadows. When the Sun is low, this is when the shadows are the longest. The Sun is low very early in the morning or very late in the afternoon.

Sun and the Seasons

The Sun is not only responsible for day and night but also for the changing seasons we experience on Earth. As you have learned earlier, the Earth spins around an imaginary line called its axis. However, this axis is not straight up and down; it is tilted at an angle of approximately 23.5 degrees. As the Earth travels or orbits around the Sun, different parts of the Earth receive varying amounts of sunlight at different times of the year.

The Philippines is a country near the middle line of the Earth called the equator. It experiences only two seasons – dry and wet, but these seasons are also affected by the heat received by Earth during different times of the year.



Elaborate

Interview people, such as family members or friends, who have lived in countries which have four seasons. You may also look for personal accounts of foreign people using online sources. Ask your interviewee how the Sun's position differs from one season to another and how it affects the length of day and night. Ask how the changing of the season affects the activities that people do. Summarize the information you have gathered and share it in class.



Evaluate

Write the letter of the best answer on the space before the number.

- ____ 1. As Earth moves around its axis, which part experiences night?
- a. The part facing the Sun
 - b. The part facing the Moon
 - c. The part facing the stars
 - d. The part facing away from the Sun

- ____ 2. If the Earth did not rotate, what would happen to day and night?
- a.** Days and nights would be shorter.
 - b.** Days and nights would be longer.
 - c.** There would still be day and night but with no changes.
 - d.** One side of Earth would always be day and the other, night.
- ____ 3. How does the Earth's rotation affect the appearance of the Sun in the sky?
- a.** It makes the Sun appear to stay in one place.
 - b.** It makes the Sun appear as if it is hotter than usual.
 - c.** It makes the Sun appear to move across the sky from east to west.
 - d.** It makes the Sun appear to move across the sky from west to east.
- ____ 4. What causes shadows to form?
- a.** Reflection of light
 - b.** Light bending around objects
 - c.** Opaque objects blocking light
 - d.** Transparent objects blocking light
- ____ 5. When are shadows the longest?
- a.** During noon
 - b.** During midday
 - c.** During summer
 - d.** Early in the morning
- ____ 6. How do the length and direction of shadows change from morning to noontime?
- a.** They get shorter and shift to the left.
 - b.** They get longer and shift to the right.
 - c.** They get shorter and shift to the right.
 - d.** They remain the same length but shift direction.

- ____ 7. What determines the length of an object's shadow?
- a.** The object's height
 - b.** The brightness of the Sun
 - c.** The angle of the Sun in the sky
 - d.** The transparency of the object
- ____ 8. How would the seasons be affected if the Earth's axis were not tilted?
- a.** There would be more seasons.
 - b.** The seasons would not change.
 - c.** The seasons would be more extreme.
 - d.** The length of the seasons would be shorter.
- ____ 9. How does the tilt of the Earth's axis affect the sunlight received by different regions?
- a.** It does not affect the sunlight received.
 - b.** It causes the Sun to appear at different points in the sky.
 - c.** It causes regions to receive different intensities of sunlight.
 - d.** It changes the color of the sunlight received by different regions.
- ____ 10. When are the Sun's rays the strongest?
- a.** During the night
 - b.** Early in the morning
 - c.** Late in the afternoon
 - d.** During the middle of the day



Extend

As a country which experiences severe weather conditions such as typhoons, we should always be ready whenever natural disaster strikes. The class will be divided into three groups and the class will conduct a seminar that would teach other students in the school what to do before, during, and after a typhoon. One group will be assigned for what to do before, another group for what to do during, and the final group will be assigned for what to do after.

A seminar is a meeting where people gather to learn about a topic. Imagine you and your friends gather in a room, and there is a person, usually an expert, who talks about a topic. This person shares knowledge, interesting facts, and may show pictures or videos to help you understand better.

Similarly, the groups will prepare learning materials such as slide presentations, printed pictures, actual objects, or handwritten visual aids. They will invite other students to attend the seminar to be held in the classroom or in a conference room in the school. Each group will be given 15 minutes to deliver their topic. Be prepared for a 5-minute question-and-answer portion from the audience.



Rubric For Assessment

Criteria	3 (Excellent)	2 (Satisfactory)	1 (Needs Improvement)
Knowledge and Understanding of Typhoon Preparedness	Demonstrates comprehensive understanding of typhoon preparedness; answers audience questions accurately and confidently.	Demonstrates adequate understanding of typhoon preparedness; answers most audience questions correctly.	Demonstrates limited understanding of typhoon preparedness; struggles to answer audience questions.
Presentation Skills	Speaks clearly and confidently; maintains good eye contact with the audience; uses visual aids effectively.	Speaks clearly but lacks confidence or eye contact; uses visual aids with minimal impact.	Speaks unclearly; lacks confidence, eye contact, and effective use of visual aids.
Presentation Skills	Actively engages the audience with thoughtful questions and interactive activities; responds effectively to audience input.	Somewhat engages the audience with basic questions or activities; has some response to audience input.	Struggles to engage the audience and has limited or no interaction; does not respond effectively to audience input.