AKSORN

Work-Textbook

KEY

Revised Curriculum '60

Targeting SCIENCE

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- Mintra Singhanak
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Primary 5

Work-Textbook

Active Learning

Targeting Science P.5

Primary 5

Based on Thailand's
newly revised curriculum of B.E. **2560** (A.D. **2017**)

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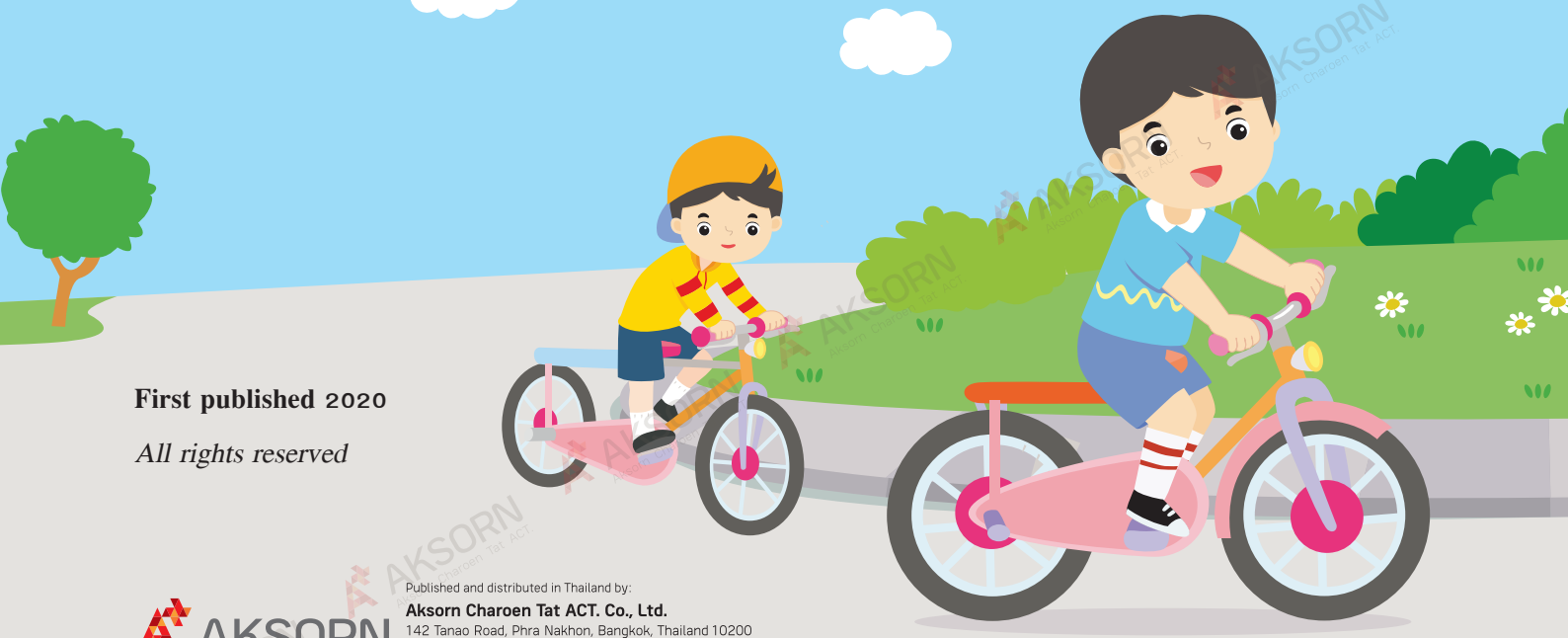

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Name: ..... Class: ..... No.: .....

Preface

Targeting Science Work-textbook Primary 5 is written based on the B.E. 2560 (A.D. 2017) revised version of Thailand's Basic Education Core Curriculum B.E. 2551 (A.D. 2008) for the purpose of facilitating the learning of students in Science subject.

With the scientific process and 21st century skills enhancing activities, students will discover the world of Science and learn to solve various problems in effective ways. In addition, they will have opportunities to learn and engage with every step of scientific experiments and activities so that they can apply the knowledge and skills to solve problems in real world context and create innovative ideas and works.

Illustrations, graphs, tables, and other infographics contained in each unit help students to understand the content better and encourage them to read and engage with the activities. The following are the features of this book.

KEY

Indicators

Stating indicators applied in each unit

Engaging Question

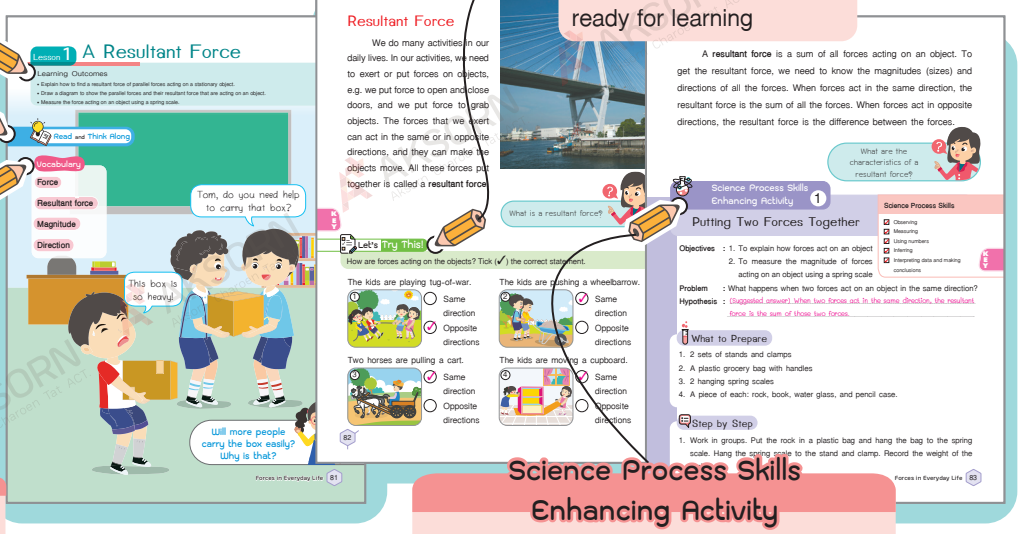
Engaging students with the lessons through interesting questions

Learning Outcomes

Stating skills or knowledge that students are expected to achieve from each unit

Let's Try This!

An activity to get students ready for learning



Read and Think Along

Encouraging students to learn through stories and questions

Vocabulary

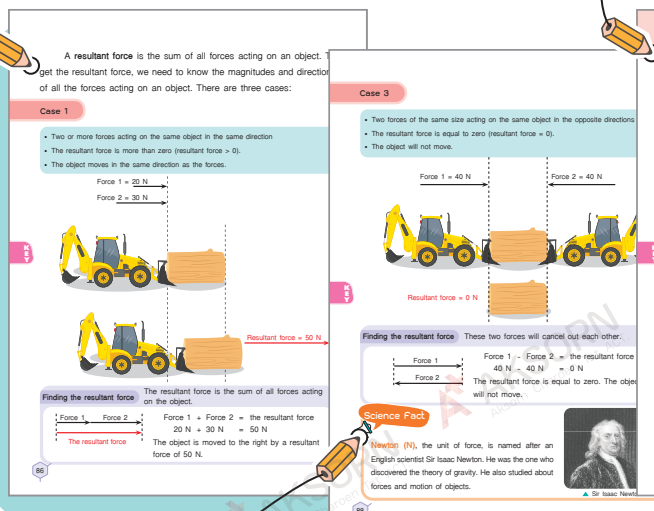
Listing scientific vocabulary used in each unit

Science Process Skills Enhancing Activity

Providing opportunities for students to conduct experiments with the scientific inquiry process

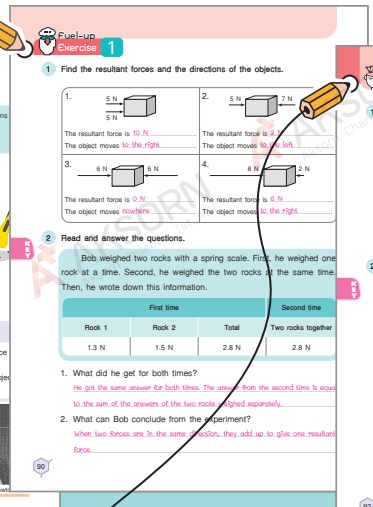
Content

Developed based on the B.E. 2560 (A.D. 2017) revised version of Thailand's Basic Education Core Curriculum B.E.2551 (A.D. 2008) with creative and helpful illustrations and infographics



Fuel-up Exercise

Exercise to check if students understand what they have learned after doing the activity

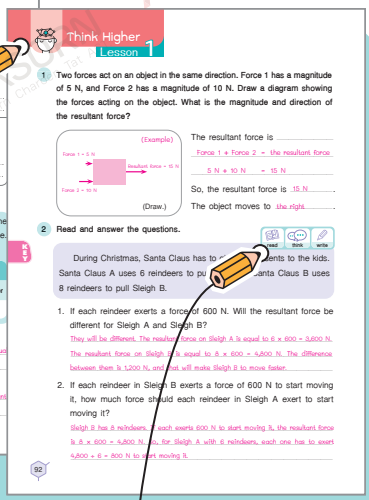


Science Fact

Providing additional knowledge of science relevant to each unit

Think Higher

Exercise at the end of each lesson to enhance thinking skills and to review what have been learned



Read Think Write

Activity for evaluating students' competencies in reading, thinking, and reasoning through writing

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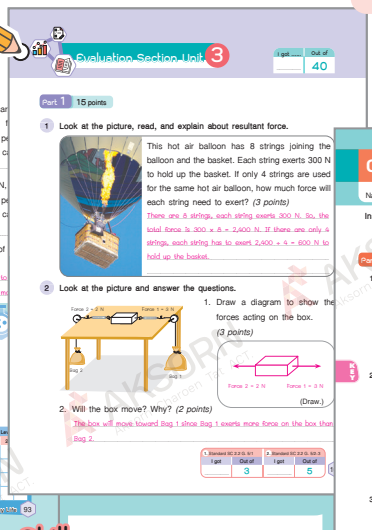
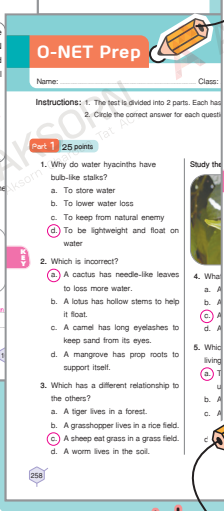
Evaluation Section

Tool for evaluating learning achievement of students according to the indicators



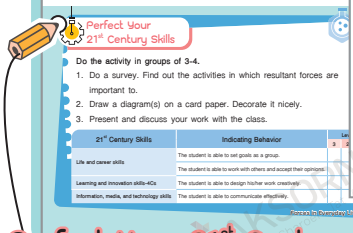
O-NET Prep

Test for checking each student's understanding, evaluating his/her performance, and getting the student ready for the O-NET test



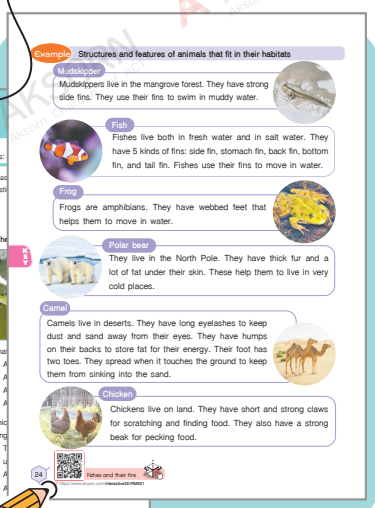
Perfect Your 21st Century Skills

Activity focusing on implementing knowledge and enhancing the 21st century skills to create works



Interactive 3D

Making learning experiences more fun and realistic



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Unit

1 Learn Like a Scientist

Science is the study of all the things around us. We study the things around us by using a step-by-step action to find answers to what we want to know. These actions and steps are called the **scientific process**.

The scientific process is grouped into 3 types: the scientific method, the science process skills, and the scientific mind.

KEY

Lesson 1 The Scientific Process

Learning outcomes

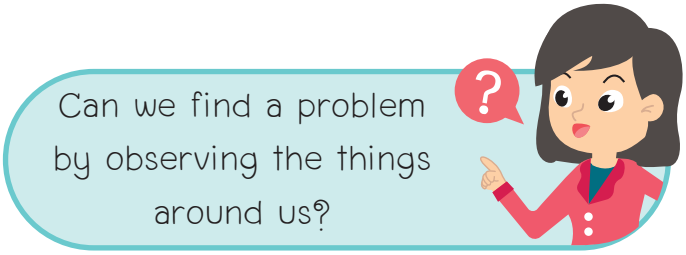
- Describe and apply the scientific method in searching for knowledge.
- Describe and apply the various science process skills in searching for knowledge.

Read and Think Along

Did the kids in this picture use the scientific process? How?

1 The Scientific Method

To learn like scientists, we observe the things around us to help find answers to what we want to know. This is called the **scientific method.** There are 5 steps to it: ask a question, make a hypothesis, gather information, study the information, and draw a conclusion.



KEY

Let's Try This!

Fill in the blanks using steps of the scientific method.

1. To grow morning glory, Jake has to know the right soil to use. So, Jake has to ask a question .

2. Mary gathers information about types of butterflies by reading books, searching the Internet and observing butterflies with a magnifying glass.

The **scientific method** is a way to learn science using steps-by-step actions. It is important for scientists to learn how to observe and find answers to the things they want to know. There are 5 steps in this method:

1 Ask a question

In this step, we ask questions or identify problems from observing things around us. We should observe carefully, using all five senses.

2 Make a hypothesis

In this step, we guess answers to our questions. We guess from what we know.

3 Gather information

In this step, we find answers to our questions. We observe more, explore, do experiments, create models, and then write down the data we get.

4 Study the information we gathered

In this step, we describe the information we got or try to explain the meaning of the results we got.

5 Draw a conclusion

In this step, we make a summary of all the information and results. We check if they match the hypothesis we made. This knowledge is used in our everyday life or used as guide for other studies in the future.

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Example The use of the scientific method

Keng and his friends want to know the best type of soil to grow Chinese kale. Together, they used the scientific method to find the answer as shown:

Step 1 **They identified the problem.**

Step 2 **They made a hypothesis.**

KEY

Step 3 They gathered information.

Keng and his friends did an experiment to gather information. They planted Chinese kale seeds in 3 plant pots; each pot had a different soil: clay in Pot 1, loam in Pot 2 and sandy soil in Pot 3. They watered each pot equally and wrote down how they grow for 25 days.

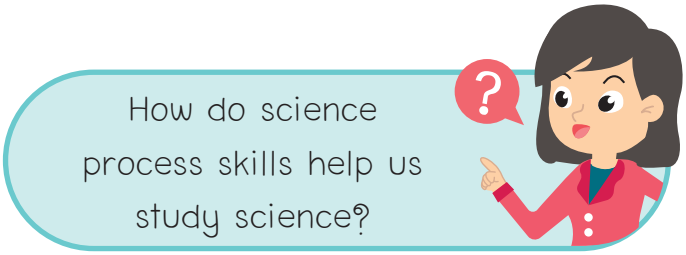
KEY

Step 5 They made a conclusion.

Step 4 They studied the information.

2 The Science Process Skills

The science process skills are important when we study science. When we study things step-by-step, we can correctly find out the answers to our questions. These skills show the steps in our thinking which makes us understand science better and help us learn well.



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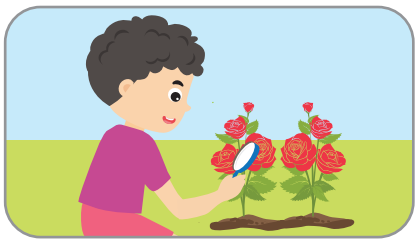
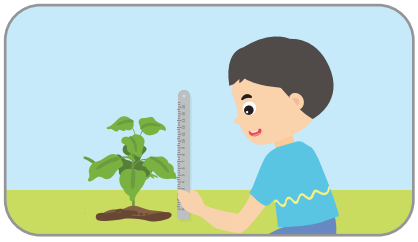
Let's Try This!

Look at the pictures and fill in the blanks using a science process skill.



- Nont uses a magnifying glass to study the petals of a rose.
- Nont is observing the rose.



- Keng uses a ruler to find the height of an eggplant in his backyard.
- Keng is measuring the eggplant.

- The sky turned dark, so Kaewsai thought that it could rain.
- Kaewsai was predicting that it could rain.

The science process skills are tools that scientists use to search for knowledge, answer questions, and solve problems. There are 14 skills that are sorted into 2 groups:

The 8 basic science process skills

- Observing
- Classifying
- Measuring
- Organizing data and Communicating
- Using space/time relationships
- Predicting
- Inferring
- Using numbers

The 6 integrated science process skills

- Identifying and controlling variables
- Interpreting data and making conclusions
- Experimenting
- Defining operationally
- Formulating hypotheses
- Modeling

(Reference: The Manual for The Basic Science Education: Primary Level, The Institute for the Promotion of Teaching Science and Technology, Ministry of Education, 2018)

1. Organizing data and communicating

When we gather data from experiment, we need to put it into simple ways for other people to understand it better. This means that we can share the data using diagrams, charts, tables, graphs, equations, or essays.

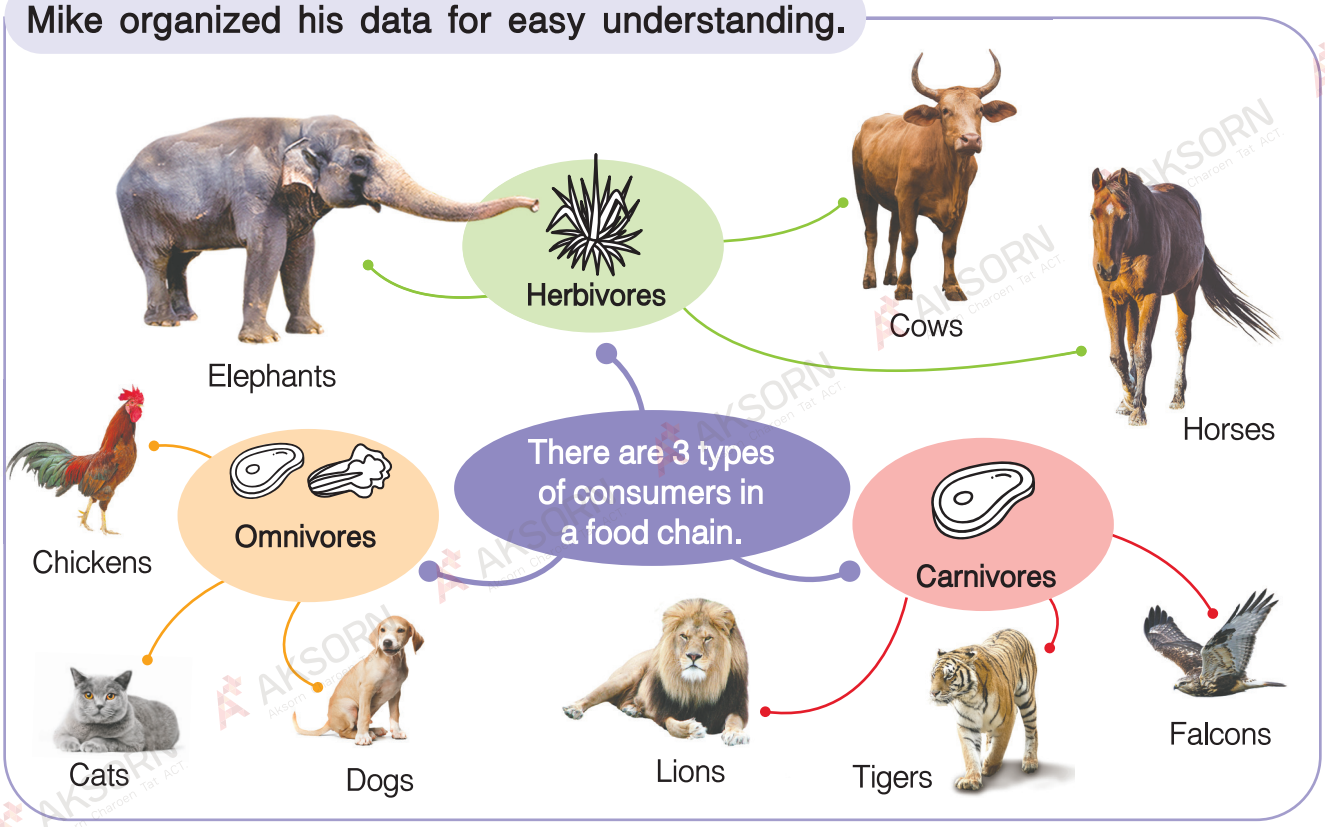
Example Organizing data and communicating

Mike searched for information about consumers in a food chain from different sources. He made a record as follows:

Mike's record

There are three types of consumers in a food chain. They are herbivores (e.g. cows, elephants, horses); carnivores (e.g. tigers, lions, falcons); and omnivores (e.g. dogs, cats, chickens).

Mike organized his data for easy understanding.



2. Modeling

This is to create models as a way to explain the things that we study. We show and describe our results in different ways, e.g. pictures, graphs, messages, motion pictures, for others to understand it easily.

We also use models to describe or explain how ideas, objects, or things are linked.

Example **Different types of modeling**

A model of an aquatic ecosystem

A model of a frog's skeleton

A model of a volcanic eruption

A model of a butterfly's life cycle

A model of the traveling of sound through a medium

A model of a plant's growth

3. Using space/time relationships

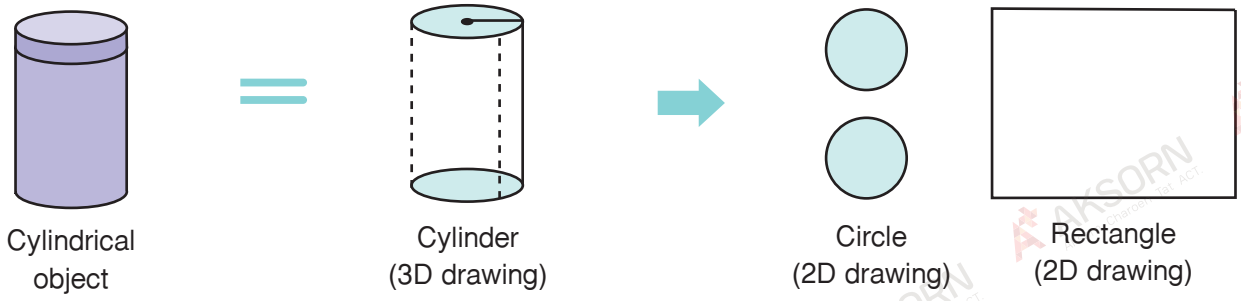
This is to find the relationships between one-dimensional (1D), two-dimensional (2D), and three-dimensional (3D) objects. It is to find shapes, sizes, positions, and directions of moving objects at different times.

The **space** of an object is the space that the object fills up and has the same shape as the object. The space of an object is given in 3 ways: width, length, and height. There are 2 types of space relationship:

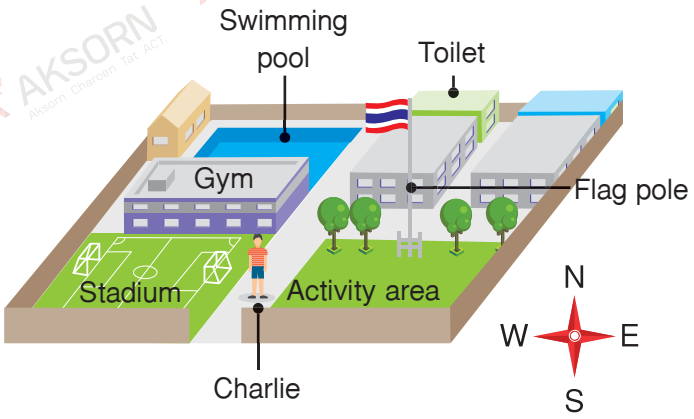
1. Space-space relationship

This is the relationship between the spaces filled by objects.

- **A relationship between 2D object and 3D object.** This is to find or draw a 2D and 3D objects, e.g.



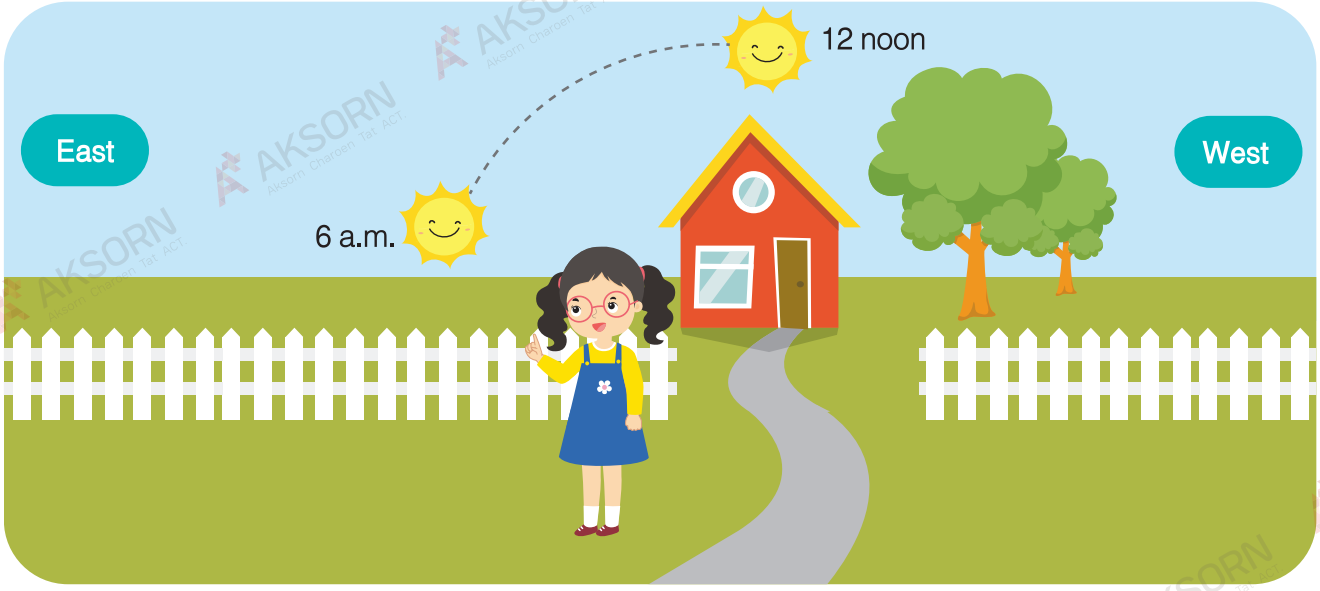
- **A relationship between the positions of two objects.** This is to find the position and direction of an object when compared to other objects. For example, Charlie can say that the gym is to the west of the flag pole.



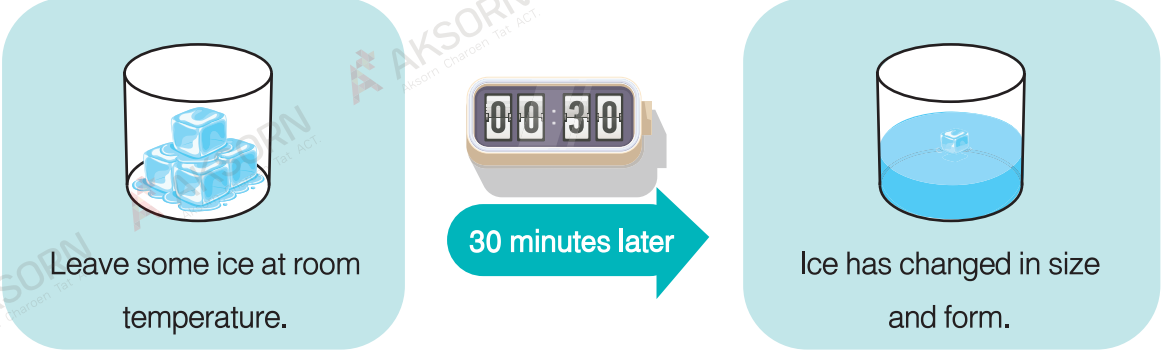
2. Space-time relationship

This is the relationship between the spaces filled by objects at a given time.

• **A relationship between an object's position and time.** This is to find the position of a moving object as time goes by. For example, at 6 a.m., the Sun rises in the East. After 6 hours, the Sun changes its position. It is now right above Jane's house at 12 noon.



• **A relationship between an object's shape and time.** This is to find the changes in the shape or amount of an object as time passes. For example, when we leave ice cubes at a room temperature for 30 minutes, the ice will melt and change in size or form.



3 The Scientific Mind

When we learn science using the scientific process, we will think like scientists. So, we should use the scientific method to learn and answer questions. Also, we have to use the science process skills all the time, as this will help us to know more and think like scientists.

KEY

Let's Try This!

Look at the picture an fill in the blanks using the science process skills.

1. Who has a scientific mind?

   Ploy, Keng, May, and Kaewsai

   Reason: They pay attention and work as a team.

2. Who does not have a scientific mind?

   Tom and Nont

   Reason: They do not pay attention.

3. What are the traits of a person with a scientific mind?

   They are disciplined and eager to learn.

A scientific mind is the traits of a person who studies science through the scientific process. A person with a **scientific mind** is careful, eager to learn, honest, patient, responsible, reasonable, curious, work with others, kind, and open-minded.

Example Characteristics of a person with a scientific mind

Being eager to learn

Being curious

KEY

Being open-minded

Being able to work with others

Being willing to share knowledge with others

Being responsible

Knowledge Summary

Lesson 1

Draw a mind map, a diagram, or summarize what you have learned about the scientific process.

(Example)

Ask a question | Make a hypothesis | Gather information | Study the information | Draw a conclusion

The Scientific Method

The Scientific Process

The Scientific Mind

A scientific mind is the traits of a person that is gained by studying science through the scientific process. A person with a scientific mind is careful, eager to learn, honest, patient, responsible, curious, works well with others, kind, and open-minded.

The science process skills learned at this level

- Organizing data and communicating
- Finding the space/time relationship
- Modeling

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KEY

Active Learning

Targeting Science Primary 1-6
Content, Activities, Exercises and Evaluation Section

Covering all the content based on the B.E. 2560 (A.D. 2017) revised version of Thailand's Basic Education Core Curriculum B.E. 2551 (A.D. 2008)

Packed with active learning activities to engage the students in the learning process which helps enhance their thinking skills

Including different exercises to practice the science process skills and problem solving skill of students

Providing evaluation section to reflect students' competence on what they have learned, both knowledge and skills

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