

SCIENCE PROCESS SKILL APPROACH

*Students should be learning about
the scientific process, and gaining
scientific habits of mind*

3 DIMENSIONS of SCIENCE

1. Product: the content of science, the basic concepts, and our scientific knowledge
Sains sebagai Proses
2. processes of doing science
3. scientific attitudes.

Science as a product

- the content of science, the basic concepts, and our scientific knowledge
Sains sebagai Proses
- This is the dimension of science that most people first think about, and it is certainly very important.

Science as a process

- Scientists use special skills in the process of doing science
- When we teach students to use these skills in science, we are also teaching them skills that they will use in the future in every area of their lives

Science as an Attitude

Scientific attitude is a respect for the methods and values of science. These scientific methods and values include seeking to answer questions using some kind of evidence, recognizing the importance of rechecking data, and understanding that scientific knowledge and theories change over time as more information is gathered.

six basic science process skills:

1. Observation
2. Communication
3. Classification
4. Measurement
5. Inference
6. Prediction

OBSERVATION

- Observing is the fundamental science process skill.
- We observe objects and events using all our five senses, and this is how we learn about the world around us.
- The ability to make good observations is also essential to the development of the other science process skills: communicating, classifying, measuring, inferring, and predicting.

OBSERVATION

- **The simplest observations**, made using only the senses, are qualitative observations. For example, the leaf is light green in color or the leaf is waxy and smooth. Observations that involve a number or quantity are quantitative observations



COMMUNICATION

- Students have to communicate in order to share their observations with someone else, and the communication must be clear and effective if the other person is to understand the information
- Students can communicate their observations verbally, in writing, or by drawing pictures. Other methods of communication that are often used in science include graphs, charts, maps, diagrams, and visual demonstrations.

Classification

- Grouping objects or events is a way of imposing order based on similarities, differences, and interrelationships.
- This is an important step towards a better understanding of the different objects and events in the world.

Measurement

Measuring is really just a special case of observing and communicating.

When we measure some property, we compare the property to a defined referent called a unit.

A measurement statement contains two parts, a number to tell us *how much* or *how many*, and a name for the unit to tell us how much *of what*.

The use of the number makes a measurement a quantitative observation.

Inference

- inferences are explanations or interpretations that follow from the observations.
- For example, it is an observation to say *an insect released a dark, sticky liquid from its mouth*, and it is an inference to state, *the insect released a dark, sticky liquid from its mouth because it is upset and trying to defend itself*

Prediction

- Making predictions is making educated guesses about the outcomes of future events.
- Prediction is based on both good observation and inferences made about observed event

Reflection Questions can encourage students to make predictions.

REFLECTION QUESTION

Do you think that in the future, more or less rural forests will be replaced by buildings, roads, parking lots, and urban forests? Why?