Chapter 1 The Science of Biology

1.1 What is Science

Inquiry Activity

Page 2
Follow directions

Once your groups are finished. Answer questions in the "Think About It" and be prepared to have a discussion about the activity

What you should have learned???

1. **Be more precise, exact, or specific.**
2. **Writing procedures that can be replicated allows other scientists to repeat the experiment to see if the same results occur every time.**

Objectives

Explain what is the goal of science?
Explain what is a hypothesis?

Look at these pictures below, write 5 questions a biologist might ask about these picture.

Science

According to your book it is an organized way of using evidence to learn about the natural world.

What else is science?

Observing the natural world
Collecting data
???

Goal of Science?

The goal of science is to investigate and understand the natural world, to explain events in the natural world and to use those explanations to make useful predictions.

Science Skills

Small groups

Without using any scientific thinking, be creative and explain why it rains.

clouds are crying
river in the sky

Now, suppose someone does not believe your explanation. Could you supply evidence to support your explanation?

probably not, Why not???

There is no way to gather evidence, there is no way to observe a cloud that is "crying"

Remember that scientists propose explanations that can be tested by examining evidence.

Scientists use a method to get a problem solved.

Scientific Method

1. Problem/Question
- **written in question form**
- **what are you trying to solve**

2. Research/Observations
- **Quantitative - uses numbers or measurements to collect data**
- **Qualitative - does NOT use numbers or measurements in data**
- **Data - information collected from the observations**
  - **used to make inferences - logical interpretations based on knowledge or experiences, an explanation to your data**

3. Hypothesis
- **proposed answer to our question**
- **must be testable**
- **scientists develop hypotheses from prior knowledge, inferences, and even imaginations**

4. Procedures
- **Step by step directions**

5. Experiment
- **Carry out your procedures**

6. Observations/Record
- **What did you see?**
- **What happened?**
- **Record data - make data table, graphs, charts**

7. Analyze/Interpret
- **What is your data telling you?**

8. Conclusion

Accept or reject your hypothesis

How do they decide? Scientists accept or reject a hypothesis by evaluating the outcome of a controlled experiment or by gathering more data

Include data and research in conclusion

Look at Figure 1-5 on page 6

What are some other questions that might be asked about this discovery?

Male or Female?

How did the person die?

How old was the person?

Where might the person have been going at the time that he or she died?

How could we find the answers to these questions?

X-ray, dissecting the body

Scientists

skeptics - question ideas and hypotheses

1-2 How Scientists Work

They follow the Scientific Method

Biologists questioned "life".

About 400 years ago, it was believed that dead things could produce living things.

What does generate mean?

to bring into existence

What does spontaneous mean?

without preparation, just happens

Spontaneous Generation

non-living produced living things

for example:

maggots from meat

mice from grain

beetles from dung

Scientists tested these beliefs by using the Scientific Method

Refer to Figure 1-8 page 9 and Figure 1-10 page 11.

What do these experiments suggest?

Their Hypotheses

Redi - tested maggots on meat, flies produce maggots

Spallanzani - boiling would kill all living things

Results????

the jar with flies produced maggots, the other did not

the opened jar had microorganisms in gravy

Each experiment contained variables:

Controlled Variable/Variables

all components of experiments are kept the same

Manipulated Variable

component being tested, variable changed in experiment

Responding Variable

results, what happened in response to the changed variable

Controlled Experiment

all variables remain the same in the experiment except for one

Theory

developed after evidence has been collected from numerous experiments

allows scientists to make proper hypotheses when conducting experiments

no theory is considered the only truth

Assignment

Complete 1-1 and 1-2 worksheet