Name _____ Date _____

Analysis Skill

Using a Scientific Method

Scientists are interested in the world around them. This curiosity leads them to investigate things and events. Scientists use their senses to observe as they investigate. They use many methods of scientific problem solving. One scientific problem-solving technique has six steps:

1. State the problem.
2. Gather information about the problem.
3. Form a hypothesis.
4. Test the hypothesis.
5. Accept or reject the hypothesis.
6. Do something with the results.

Read the information in the paragraph and answer the following questions, applying the scientific method outlined in the box.

Scientists observed that white mice that were fed seeds appeared to grow more than mice given leafy green and yellow vegetables. The scientists hypothesized that the protein in the seeds was responsible for the growth. They designed an experiment to test this hypothesis. They divided 200 mice of the same age, size, health, and sex into two groups of 100 mice each. The mice were kept under identical conditions for 14 days. One group was given a diet low in protein. The other group was given a normal protein diet. The mass of each mouse was recorded daily for 14 days.

1. Which group of mice served as a control?

_____

2. What was the variable?

_____

3. What effect of the protein diet was tested?

_____

_____

4. What other effects of a protein diet could have been tested?

_____

_____

5. Why were larger numbers of mice used in this experiment?

_____

_____

6. If the results of the experiment did not show a marked change between the two groups, what should the scientists do next?

_____

7. What are the parts of an experiment?

_____

_____

Name _____ Date _____ Class _____

CHAPTER 1 SCIENCE PUZZLERS, TWISTERS & TEASERS

The World of Life Science

Listening In

1. Figure out what step in the scientific method the scientists are practicing. Write the name of the step in the blank.

   a. "Wow! I can't believe how green the grass is over there. Why isn't it brown like on our side of the mountain?"

   _____

   _____

   b. "All right, Nan, flip that switch and cross your fingers."

   _____

   _____

   c. This Internet site says mollusk shells gradually get longer and wider because calcium carbonate is added to the edges.

   _____

   _____

   d. "Hmmmm . . . If television viewing is important to weasel growth, then weasels who watch less television will not grow as much."

   _____

   _____

   e. "Interesting. My graph of weasel weights shows that weasels that watch sitcoms weigh about 2 kg more!"

   _____

   _____

   f. "The soil is richer where the grass is green. Shall we conclude that the soil is always richer on the other side?"

   _____

   _____

The Case of the Sleeping Frog

The following paragraphs tell about an investigation carried out by a life science student named Kara. See if you can put the paragraphs in the correct order. Place the number 1 next to the paragraph that describes what you think happened first. Put the number 2 beside what you think happened next and so on. Then answer the questions.

_____ Kara obtained two liter jars and placed a live frog in each. She inserted a thermometer through a hole in the screened lid of each jar. She then placed each jar inside a larger jar. Kara filled one of the larger jars with ice cubes. The ice cubes surrounded the smaller jar that held the frog. Kara did not put any ice cubes in the other set of jars.

_____ Kara went to the library to find out about hibernation. She read several articles on the topic.

_____ Kara noted that in the jar with the ice cubes, the frog began to move more slowly and finally seemed to go to sleep. The frog's rate of breathing became slower too. These changes did not occur in the other jar. When the ice was removed from the first jar, the frog gradually became more active.

_____ Every 30 minutes Kara recorded the temperature inside each of the two smaller jars. She also recorded the breathing rate of the frog and other observations about the frog's appearance and behavior.

_____ After reading about the topic, Kara made an educated guess. She guessed that she could make a frog hibernate by making it cold.

Questions

1. What was the problem that Kara wanted to investigate?

2. What conclusions do you think Kara drew from her experiment?

Name _____ Class _____ Date _____

Identifying Errors

Read the following paragraph and then answer the questions.

Lisa arrived at school and went directly to her life science class. Her teacher gave Lisa three small corn plants of equal size and asked Lisa how water might affect their growth. Lisa measured the plants and found them each to be 8 milliliters tall. She marked the pots for the plants 1, 2, and 3. Each morning for 10 days she sprayed plant 1 with a little bit of water, plant 2 with more water, and plant 3 with the most water. She exposed plant 1 to 2 hours of sunlight, plant 2 to 3 hours of sunlight, and plant 3 to 4 hours of sunlight. She memorized all of these facts. At the end of the 10 days, Lisa again measured the plants and found that plant 1 was 5 inches tall, plant 2 was 6 inches tall, and plant 3 was 2 inches tall. Lisa concluded that corn plants grew best when given a moderate amount of water.

Questions

1. What was wrong with Lisa's first measurement of the corn plants? _____

2. What was wrong with Lisa's water-spraying procedure? _____

3. What should Lisa have done with her data rather than committing it to memory? _____

4. What was wrong with Lisa's measurements at the end of 10 days? _____

5. What was wrong with Lisa's conclusion? _____