Name: _____

OBSERVATIONS & CONCLUSIONS

In "Going Ape Over Apps" (p. 8), you read that scientists are using touch-screen devices to learn more about how captive animals think. The scientists observe the animals using the touch screens. Then they draw conclusions based on how the animals behave. Read through the statements below related to the scientists' research. Next to each observation, write the letter of the conclusion that can be drawn from it.

OBSERVATION	CONCLUSION
• Description of what has occurred • Information gathered by the senses or through measurements from scientific equipment	• Based on observations • An explanation for why or how something occurred • Includes statements that one thing caused another

OBSERVATIONS

_____ **1.** Jingga the orangutan chose to look at pictures of baby animals more often than other images.

_____ **2.** When given a choice between listening to different types of music or silence, orangutans most often choose silence.

_____ **3.** A young male orangutan leapt back when he saw a picture of an older male orangutan on an iPad.

_____ **4.** Chimpanzees were shown a series of number sequences for 0.6 seconds each. They successfully recalled the number sequences 80 percent of the time. The humans tested required several seconds to learn a number sequence.

_____ **5.** Even when motivated by a treat, orangutans can't distinguish between a song and a clip of scrambled music.

CONCLUSIONS

A. Orangutans don't like to listen to music.

B. Young orangutans are intimidated by pictures of older and bigger orangutans.

C. Orangutans love pictures of big-eyed baby animals.

D. Orangutans can't tell the difference between music and noise.

E. Chimpanzees may have a photographic memory.

Name: _____

STRESS IN CAPTIVITY

In "Going Ape Over Apps" (p. 8), you learned how scientists are using touch screens to provide enrichment to some zoo animals. Read the following passage to learn how biochemistry can help scientists determine whether enrichment programs are successful. Then answer the questions that follow.

ENRICHING ZOO LIFE

On your last zoo visit, you may have spotted a polar bear playing with a meat popsicle or a lion pouncing on a zebra-shape piñata. These objects are often part of zoo enrichment programs. Scientists and caretakers modify captive animals' environments to stimulate natural behaviors and improve well-being.

How do scientists know whether the animals enjoy enrichment? A new toy might provoke hours of play, or it might just be scary. One important clue is the animal's behavior. Certain actions, such as excessive pacing or pulling out fur, are signs that an animal is stressed.

Chemicals in the animals' bodies provide more evidence. When any animal is stressed, its body produces hormones, or chemical messengers, called *glucocorticoids*. Short-term exposure to these chemicals helps prepare the animal to take action against threats. But chronic exposure to stress hormones can have damaging effects on the body and the brain.

Stress hormones are released into the animal's blood, urine, and feces. After introducing a new enrichment, some zoo scientists analyze the chemistry of the animal's waste. It is thought that successful enrichment can decrease the average level of stress chemicals over time.

QUESTIONS

1. According to the passage, what is the goal of zoo enrichment?

Ⓐ to stress zoo animals
Ⓑ to stimulate an animal to make glucocorticoids
Ⓒ to increase the well-being of zoo animals
Ⓓ to increase the amount of time zoo animals spend on display

2. Which of the following BEST represents the main idea of this passage?

Ⓐ An animal's behavior and the presence of certain stress-related chemicals can help scientists determine whether enrichment programs work.
Ⓑ Scientists have already discovered the best enrichment program for animals in zoos.
Ⓒ Enrichment programs improve the well-being of zoo animals.
Ⓓ Long-term exposure to stress hormones is harmful.

3. Which of the following is an opinion?

Ⓐ Stressed animals produce glucocorticoids.
Ⓑ Stress hormones are released into an animal's feces.
Ⓒ Zoo enrichment is important.
Ⓓ Stress can change an animal's behavior.

4. Use context clues to choose the BEST definition for the word *chronic*.

Ⓐ negative
Ⓑ long-lasting
Ⓒ temporary
Ⓓ short-term

5. In the article "Going Ape Over Apps," you read that scientists believe orangutans can't tell the difference between music and noise. How might an orangutan be affected if music were played continuously in its enclosure? Use facts from the passage to support your answer.

Name: _____

SHRINKING FOREST

In "Going Ape Over Apps" (p. 8), you learned that scientists are using touch screens to learn more about captive primates. One reason zoos keep populations of captive apes is to educate the public about threats to the animals' relatives that live in the wild. Many apes, like orangutans, are endangered, or at risk of dying out. People have been clearing the forests where orangutans live. The chart below shows the estimated size of the forests in Borneo—home to most of the world's orangutans—over time. Study the chart and then answer the questions that follow.

Size of Borneo's Forests

Year	Forested Land (hectares)	Percentage of Land Area Covered by Forest
1985	53,594,800	73.7
2000	41,821,573	57.5
2005	36,636,513	50.4
2010	32,316,618	44.4
2020 (projected)	23,676,828	32.6

SOURCE: WORLD WILDLIFE FUND

GRAPH IT

Use a separate sheet of paper to draw a bar graph showing the estimated percentage of Borneo's land area covered by forest in the years given. Don't forget to label the *x*- and *y*- axes and give your graph a title.

ANALYZE IT

1. What percentage of land area was cleared of forests between 1985 and 2010?

2. By how many hectares did the total forest size decrease between 1985 and 2005?

3. What percentage of Borneo's land area is predicted to be non-forested by 2020?

4. What is the greatest time gap between two consecutive measurements listed in the chart?

5. What do you think are some of the factors causing the forests to disappear?

Name: _____

DESIGN A ZOO TOY

In "Going Ape Over Apps" (p. 8), you learned how scientists are using touch screens and iPads as enrichment tools for captive animals. Scientists often have to think outside the box to find or design toys that will stimulate and entertain a zoo animal. Use this work sheet to create your own enrichment toy for an animal in captivity.

DEFINE THE PROBLEM: Animals in captivity need ways to keep their bodies and minds busy. Choose a zoo animal for which you would like to design a toy.

_____

RESEARCH YOUR PROBLEM: Different animals have different needs. An enrichment toy should engage the animal in the types of activities it might do in the wild. Use the library or Internet to learn more about your animal. For instance, in what type of environment does it live? What does it eat? How does it find its food? How does your animal normally spend time in the wild (for instance, climbing trees or swimming)? Create a list of your animal's characteristics that will help you create the toy.

_____

_____

_____

_____

_____

DESIGN A SOLUTION: Sketch your toy. Decide what everyday objects and materials you could use to make the toy. Label the different parts of the toy and list ways your animal could play with it.

EVALUATE YOUR SOLUTION: Consider your toy carefully to determine if you can improve it in any way. Does it meet the needs of your animal based on the animal's natural characteristics? Is the toy safe (could your animal choke on it, for example)? Is the toy strong enough to not break if the animal throws, drops, or chews on it?

IMPROVE IT: How can your design be improved? Make a new, labeled drawing of your toy with any changes you would make after evaluating it.