

Scientific Inquiry Open Ended Questions Homework

Name: _____

Date: _____

1. A student conducting an experiment placed five geranium plants of equal size in environmental chambers. Growing conditions were the same for each plant except that each chamber was illuminated by a different color of light of the same intensity. At the end of 20 days, plant growth was measured.

Using one or more complete sentences, state a possible hypothesis for this experiment.
2. Using one or more complete sentences, state the control that should be used in this experiment.
3. In a laboratory investigation, a student weighed each of several genetically similar mice and then placed them in separate cages, where they received identical diets. Half of the mice were given additional amounts of selected amino acids. After 4 weeks, the mice were all weighed and compared. Using one or more complete sentences, state a hypothesis being tested in this investigation.
4. A laboratory investigation was set up to determine if the hormone thyroxin increases metabolic activity in rats. Twenty rats of the same species, age, and weight were selected and divided into two equal groups. All the factors in the investigation were kept the same, except one group was given distilled water, and the other group was given distilled water containing thyroxin.

State the variable being studied in this investigation.
5. Using one or more complete sentences, describe a laboratory activity during which a person should wear safety goggles.

6. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

A student performed a laboratory investigation to determine the effect of temperature on the heart rate of *Daphnia* (water flea). The following temperatures and heart rates were recorded:

20°C—270 beats/min;
10°C—150 beats/min;
15°C—180 beats/min;
25°C—300 beats/min;
5°C—108 beats/min

Organize the data by filling in the data table below. Complete both columns in the data table so that the temperature either increases or decreases from the top to the bottom of the table.

Data Table

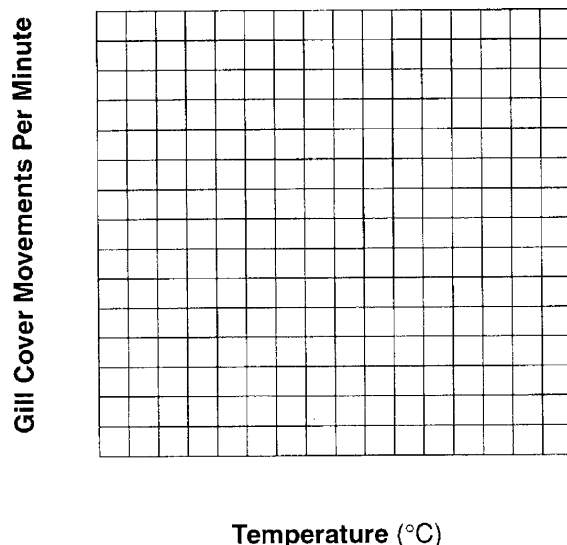
Temperature (°C)	Heart Rate (beats/min)

7. Base your answer(s) to the following question(s) on the information provided and on your knowledge of biology.

An investigation was performed to determine the effect of temperature of the respiratory rate of a goldfish. The respiratory rate was measured by the number of gill cover movements per minute. The following data were collected.

Data	
60 gill cover movements at 23°C	57 gill cover movements at 25°C
15 gill cover movements at 10°C	25 gill cover movements at 15°C
30 gill cover movements at 18°C	25 gill cover movements at 27°C

Mark an appropriate scale on each labeled axis.



8. Base your answer(s) to the following question(s) on the passage below and on your knowledge of biology.

Blown Away Head Lice Meet Hair Dryer of Death

Head lice are becoming indestructible. A study found that as many as 80 percent of the bugs are [resistant] to insecticides in over-the-counter shampoos, and resistance will only increase. Evolutionary biologist Dale Clayton may have a new line of attack.

Clayton, who usually studies lice on bird feathers, stumbled onto his solution after a major research setback. When he moved his laboratory from England to the University of Utah a decade ago, his entire louse collection perished in the dry desert air. Soon after, his 8-year-old came home from school with head lice. He wondered if human head lice could also be killed by drying them out. "It was sort of a forehead slapper," Clayton says. After conventional hair dryers failed, Clayton came up with the LouseBuster, a 10-pound device resembling a vacuum cleaner that desiccates [dries out] the bugs with a jet of 140-degree air [140°F]. "It's a pretty brutal assault," he says. Tests show the invention is both safe and effective, eradicating 80 percent of live lice and 98 percent of eggs, leaving survivors unable to breed. And, Clayton says, "it will be awfully hard for lice to develop resistance."

Source: Emily Saarman, "Blown Away—Head Lice Meet Hair Dryer of Death," *Discover Magazine*, February 2007

Design a controlled experiment to determine the effect of hot, dry air on head lice. In your experimental design, be sure to:

- state the hypothesis to be tested in the experiment
- state *one* way the control group will be treated differently from the experimental group
- state *one* result of the experiment that would support the hypothesis