

CRICKET CHIRPS GRAPHING ACTIVITY

ADVANCED BIOLOGY

Up to this point, you have been given data in either a data table or a graph. Now, you will be asked to:

- Pull data out of text
- Organize the data into a data table
- Create a graph of the data
- Analyze the data

THE SCENARIO...

Several boys who live in Saint Charles, IL are enthusiastic insect collectors. One summer they collected many live crickets. They became interested in the chirping sounds of these insects and discovered that the sounds were made by rubbing the wings together. The boys decided to try to keep some crickets as pets from one summer to the next.

One August night, having nothing better to do, they timed the chirps of their pets for five minutes. The average rate was 100 chirps per minute. Then they decided that watching television would be more interesting, so they stopped timing and went in to watch reruns. After a few nights of reruns they were back outside. One of the boys, John, said, "Hey, I think our crickets are chirping faster tonight. I think I'll time them again." He found the chirping rate to be 88 chirps per minute. This discovery intrigued the boys. They wondered why crickets chirp at a different rate on different nights.

For the last two weeks in August the boys found that the chirping rate each night was slightly different. Although the rate varied, it decreased to 76 chirps per minute by the end of those two weeks. Fred thought that the chirping rate increased from a new moon phase to a full moon, then decreased from a full moon to another new moon. Jeff, however, said that the decrease was due to the drop in temperature that had occurred over the two week period.

Both boys timed the cricket chirps each night in the first two weeks of September. During this time the moon passed from a new moon phase to the full moon phase. Fred expected the chirping rate to increase as the moon changed. Jeff expected the rate to continue decreasing because the night temperature had decreased even more since the last day of August. Again the rate fluctuated, but by the middle of September the rate was 64 chirps per minute. Jeff was satisfied that he had found the cause of the decreasing rate. Fred was not so convinced. He said, "If it's the temperature, then the rate of chirping should vary as the temperature changes." So, Jeff rigged up a cardboard box with a covered light bulb as a source of heat. He found that by moving it closer to and farther away from a cricket, he could increase and decrease the number of chirps.

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During the next five nights the boys recorded the following data:

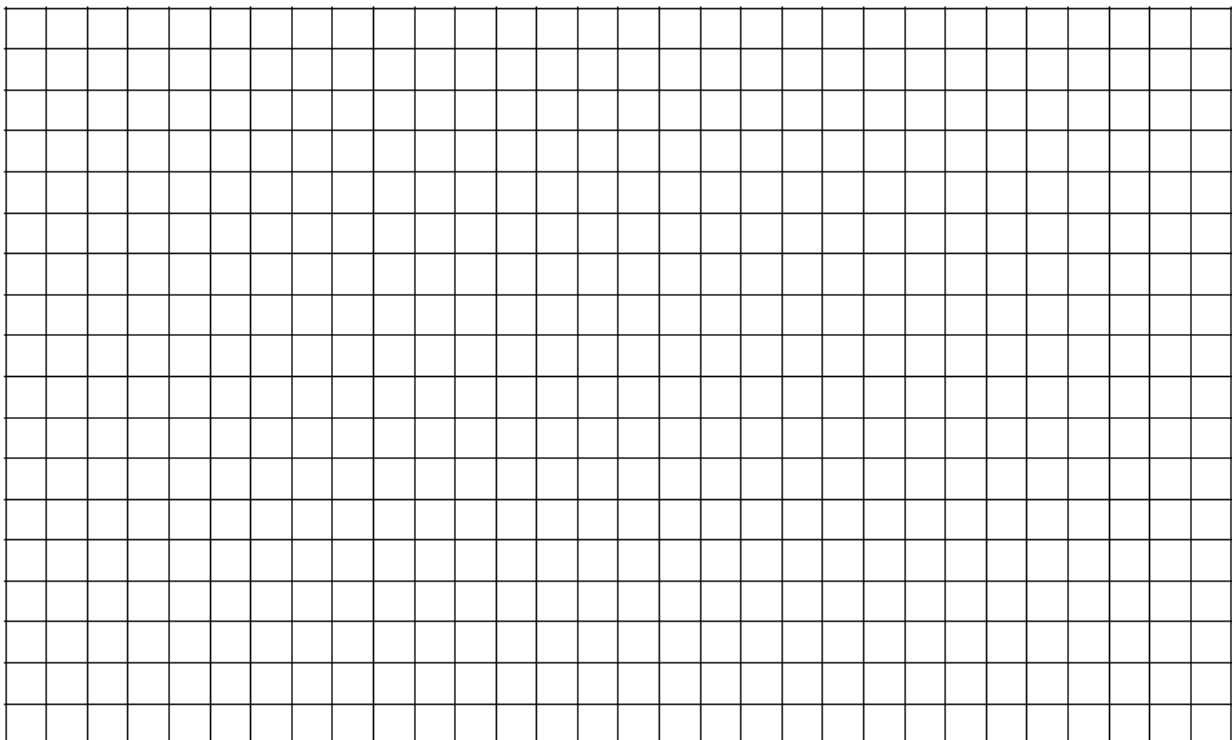
Night 1: temperature 23°C, number of chirps 34; Night 2: temperature 27°C, number of chirps 42; Night 3: temperature 20°C, number of chirps 29; Night 4: temperature 29°C, number of chirps 45; Night 5: temperature 18°C, number of chirps 26.

1. The data is listed by the order of nights. But, this is of no real use to the investigation. Temperature and chirps/minute are the important data. Create a **PROPER** data table with the temperatures arranged in order from **SMALLEST** to **LARGEST** in the first column. Then place the corresponding chirps/minute in the second column. (Keep the ordered pairs together).

Title: _____

2. Create a **PROPER** graph using the data in your data table. Use graph paper and make it an extrapolated **BEST FIT LINE**. Extend the chirps/minute axis to 60 and the temperature axis to 35°C. Remember: Extrapolate using a dashed line beyond your data.

Title: _____



REFLECTION AND REVIEW QUESTIONS—COMPLETE SENTENCES

1. Describe how the change in temperature affects the number of chirps/minute.
2. Looking at your data table and graph, do you think that “temperature and “chirps/minute” are related? Please explain your answer.

A variable that depends on another variable is called a **dependent variable**. A variable that causes another variable to change is called an **independent variable**.

3. Which of the following statements seems to be the most true? (*circle one*)
 - a. Temperature **DEPENDS** on the number of chirps/minute.
 - b. The number of chirps/minute **DEPENDS** on the temperature.
4. Which variable is the **INDEPENDENT** variable? (*circle one*)
 - a. Temperature
 - b. Number of chirps/minute
5. Which variable is the **DEPENDENT** variable? (*circle one*)
 - a. Temperature
 - b. Number of chirps/minute
6. Use your graph to predict how many chirps/minute you would expect if the temperature was:
10°C _____ chirps/minute
25°C _____ chirps/minute
35°C _____ chirps/minute
7. Describe what the following components of experimental design were for this investigation (not definitions):

Independent Variable:

Repeated Trials:

Dependent Variable:

Constants: