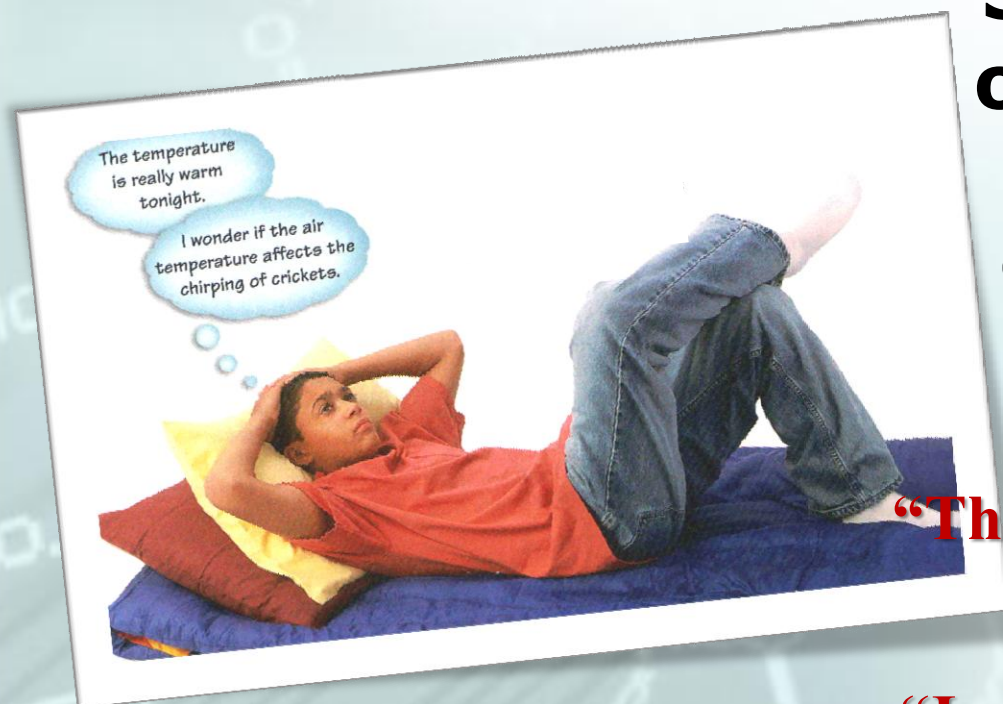




Scientific Inquiry

Problem Solving in the Real World

Posing Questions

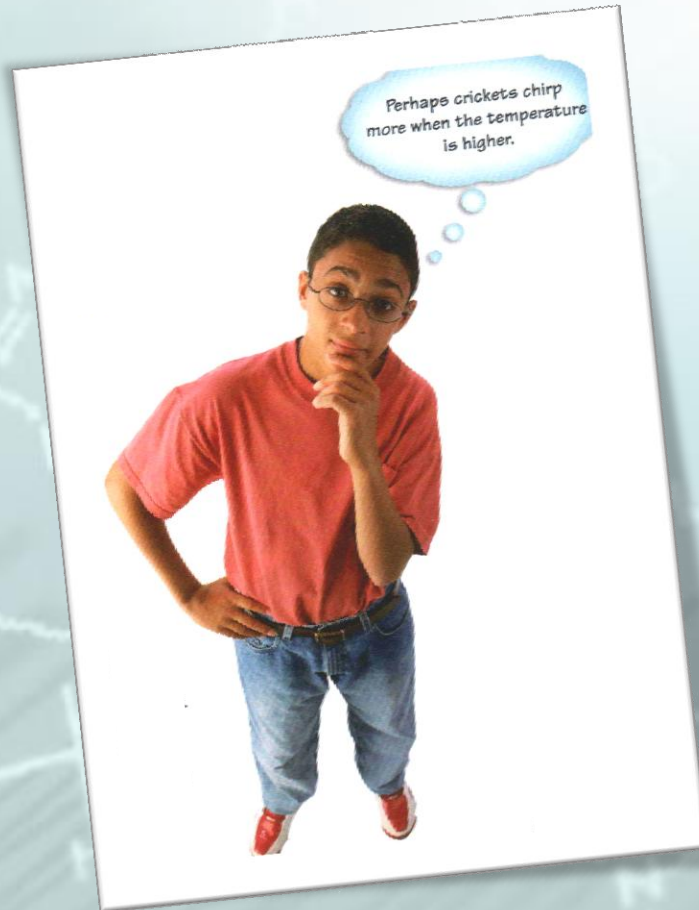


**Scientific Inquiry
often begins with a
problem or
question about an
observation**

**“The temperature is really warm
tonight.”**

**“I wonder if the air temperature
affects the chirping of
crickets?”**

Developing a Hypothesis



A **hypothesis** is a possible explanation for a set of observations or an answer to a scientific question.

A hypothesis must be testable

“Perhaps crickets chirp more when the temperature is higher.”

Designing an Experiment



After you state your hypothesis, you are ready to design an experiment to test it.

Designing an Experiment

Controlling Variables

To test your hypothesis you will need to observe crickets at different temperatures. All other variables need to remain exactly the same. Remember, a **variable** is any factor that can change in an experiment

What are some of the variables in this experiment?



Designing an Experiment

Controlling Variables

To test your hypothesis you will need to observe crickets at different temperatures. All other variables need to remain exactly the same. Remember, a **variable** is any factor that can change in an experiment

What are some of the variables in this experiment?



Designing an Experiment

Controlling Variables

What is the independent variable in this experiment?

The **manipulated** (or independent) **variable** is the one variable that you will change on purpose to test your hypothesis



Designing an Experiment

Controlling Variables

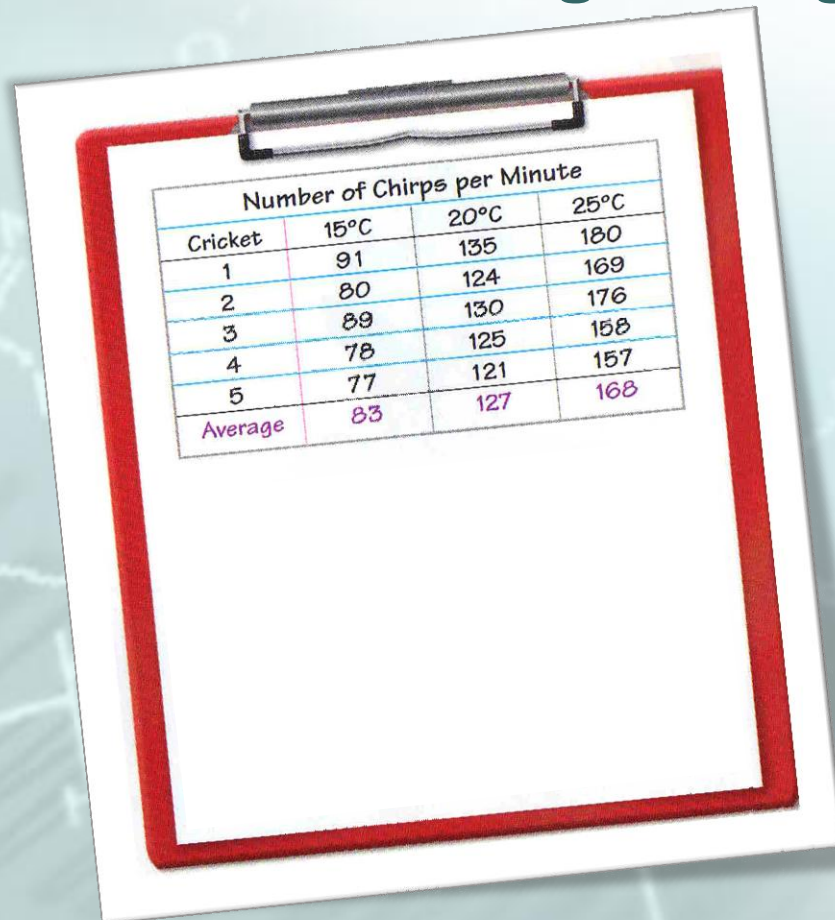
The **responding** (or dependent) **variable** is the one variable that changes because you changed the independent variable

What is the dependent variable in this experiment?



Collecting & Interpreting Data

Organizing your Data



Number of Chirps per Minute			
Cricket	15°C	20°C	25°C
1	91	135	180
2	80	124	169
3	89	130	176
4	78	125	158
5	77	121	157
Average	83	127	168

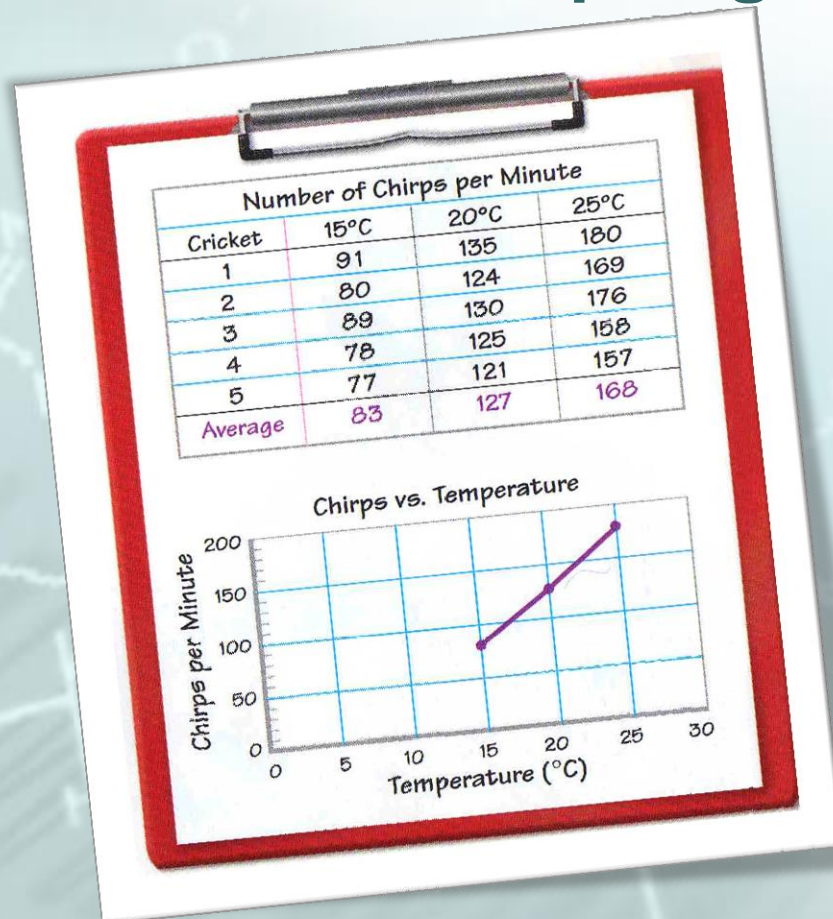
Before you begin your experiment you should create a table to record your data. Remember that **data** are the facts, figures and other evidence gathered through observation

Number of Chirps per Minute

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Collecting & Interpreting Data

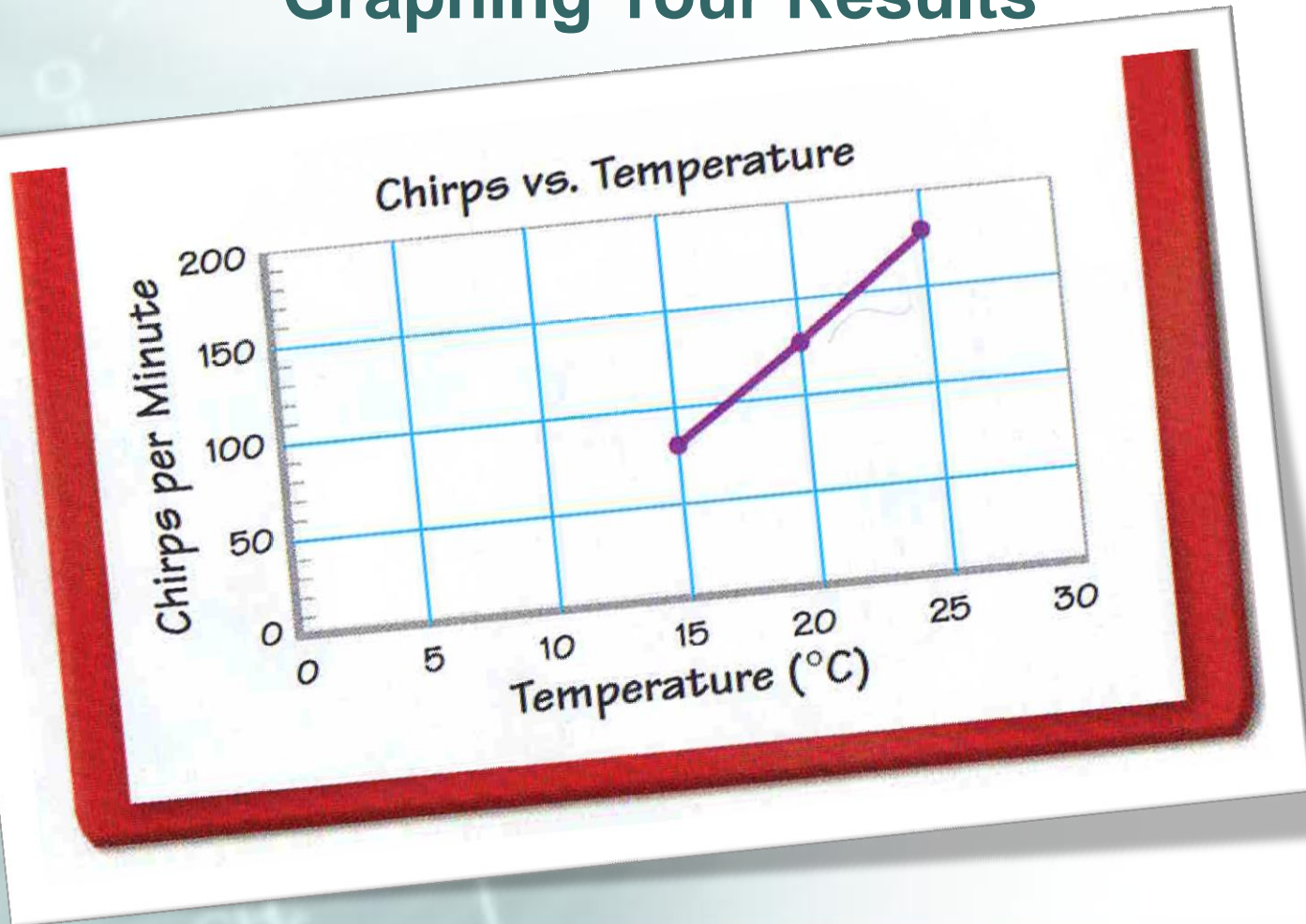
Graphing Your Results



After all the data have been collected, they need to be interpreted. A graph is a useful tool for interpreting data.

Collecting & Interpreting Data

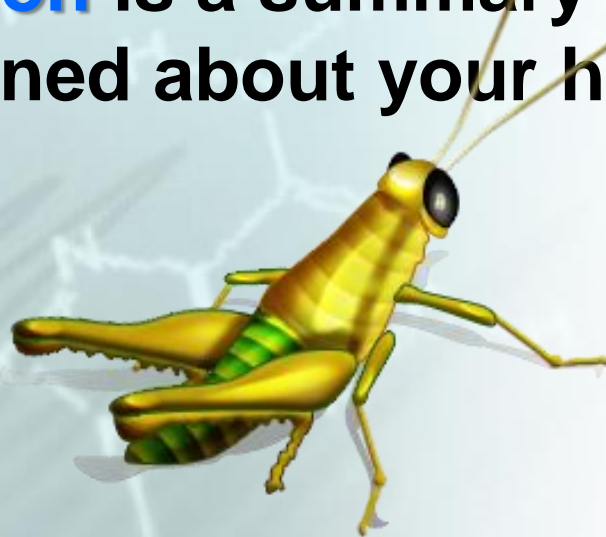
Graphing Your Results



Drawing Conclusions

Now that that you have gathered and interpreted your data, you can draw conclusions about your hypothesis.

A **conclusion** is a summary of what you have learned about your hypothesis.



Drawing Conclusions

Inquiry Leads to Inquiry



Scientific inquiry usually doesn't end once a set of experiments is done. Often, one scientific inquiry leads to another one.

“Cricket chirping does increase with temperature!”

“I wonder if temperature affects the rate of bird chirps too?”

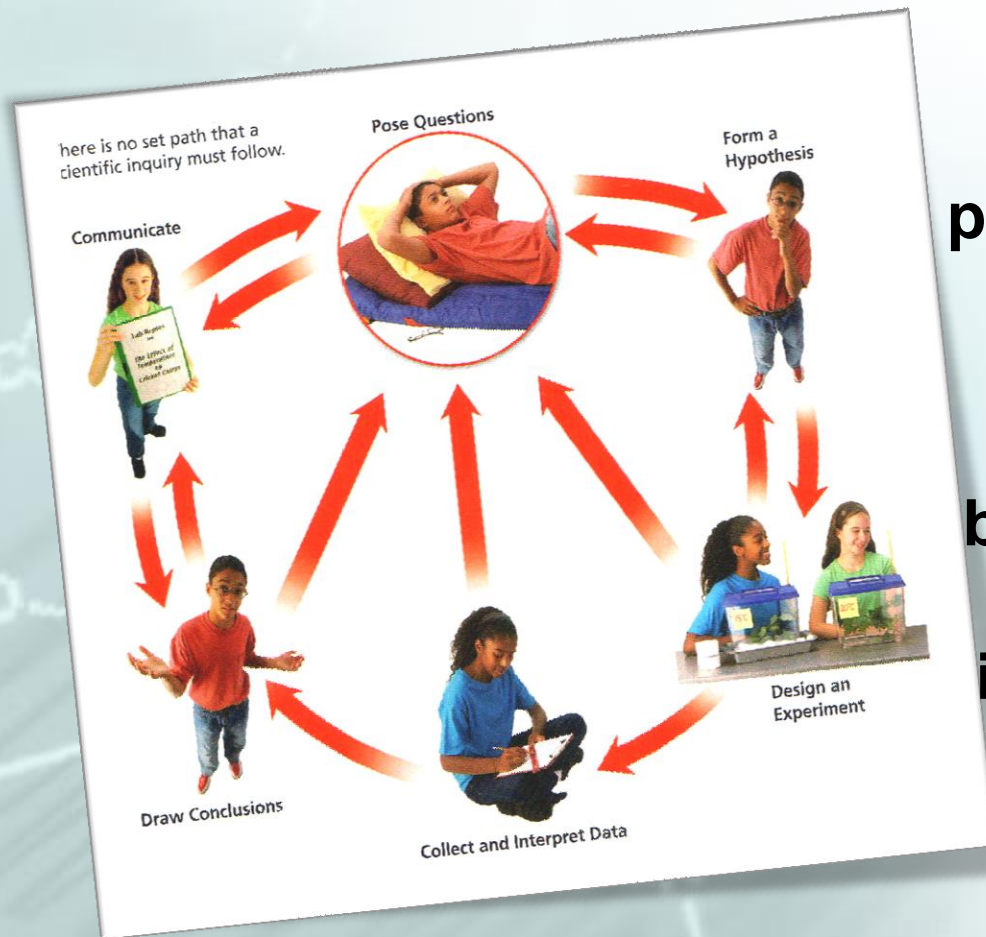
The Nature of Inquiry

In this cricket experiment, you decided to test your hypothesis in one particular way. Your friend may do it another way.

Different questions may require different approaches to finding answers



The Nature of Inquiry



Scientific inquiry is a process with many paths, not a rigid sequence of steps. Work may go forward—or even backward—when testing a hunch or fitting new ideas into existing ones