

## INTERPRETING RESULTS

## Drawing Conclusions

After collecting, organizing, and presenting the data from a scientific investigation, it is necessary to determine what the results mean. The goal of any experiment is to generate data that either support or fail to support your hypothesis. Nothing is proved by an experiment, but you can interpret the data and draw some conclusions from them. Any conclusions that you make must be supported by your results.

Use the tips below to develop your conclusions.

- First, write your results, and then compare your results to your hypothesis.
- Be careful not to make inferences about factors that you did not test.
- Make sure you have enough data before attempting to draw conclusions about your experiment. If your data sample is too small, your conclusions may be faulty.
- Be careful not to conclude a cause-and-effect relationship exists just because one event happened after another, especially if there are alternate ways to explain the second event.

Students investigated how the size of an object affects the depth of the crater it makes when dropped into a pan of flour. Their hypothesis was: “If the object is bigger, then the crater it makes will be deeper, because it will displace more flour.” The students used a small steel ball, a golf ball, a baseball, and a softball in the experiment, and measured the circumference of each. They dropped each ball into the pan from a height of 50 centimeters. The procedure worked well for the golf ball and the softball, but the steel ball and the baseball reached the bottom of the pan, so they dropped those into a garbage can filled with flour. The students collected the following data.

**Table 1. Craters Produced by Different Objects**

Object	Circumference (cm)	Crater Depth (cm)
Steel ball	8.5	10.5
Golf ball	13.5	11.0
Baseball	16.5	16.5
Softball	30.5	17.0

1. The students concluded that their data supported their hypothesis, and that objects of larger circumference make deeper craters. Is this a valid conclusion? Explain.

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Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

2. How could this experiment be improved?

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Another group of students placed varying numbers of steel balls inside similar-sized balls of modeling clay and tested crater depth. Their hypothesis was: “If more steel balls are inside the clay, then the craters will be deeper, because the clay with more steel balls will have more momentum.” The students collected the data shown in the table below.

**Table 1. Craters Produced by Different Objects**

Number of Steel Balls	Crater Depth (cm)		
	Trial 1	Trial 2	Trial 3
1	3.1	4.0	3.8
2	3.6	3.9	3.8
3	4.1	4.0	3.8

3. What factor was this group of students actually testing as their independent variable?

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4. What did the students do correctly in this experiment?

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5. The students had some trouble interpreting the results and were unable to agree on their conclusion. How could they have gained a clearer picture of their results?

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**Challenge** Suppose you had conducted the experiment above. What would you have concluded from the data presented?

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