

## Activity 3: Good and Poor Experiment Designs

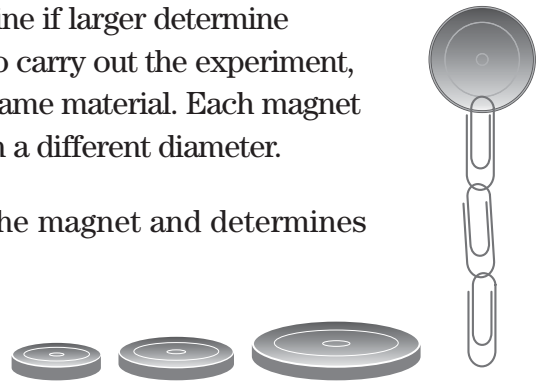
Name \_\_\_\_\_

Date \_\_\_\_\_

Class \_\_\_\_\_

A student wants to perform an experiment to determine if larger magnets are stronger than smaller magnets. To carry out the experiment, he gets three different-sized magnets, all made of the same material. Each magnet is shaped like a disk, with the same thickness, but with a different diameter.

To measure the strength of each magnet, he holds the magnet and determines how many small paper clips he can hang from it before the last one falls off. He repeats his measurement four times for each magnet and records his data in a table.



1. Calculate the best values for the four trials for each magnet and record your answer in the table at right.

Table: Number of Paper Clips Magnet Could Hold			
Trials	Size of Magnets		
	Small Magnet	Medium Magnet	Large Magnet
Trial 1	2	5	10
Trial 2	1	5	8
Trial 3	2	6	9
Trial 4	2	6	9
Best Value			
Uncertainty			

2. Calculate the uncertainty associated with each of the best values and record your answer in the table above.

**PRACTICE** Activity 3: **Good and Poor Experiment Designs**

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To answer Questions 3 – 5, choose from the following responses:

- size of the paper clips
- size of the magnets
- number of paper clips
- material from which magnets are made

3. What is the *manipulated variable* in this experiment? \_\_\_\_\_

4. What is the *responding variable* in this experiment? \_\_\_\_\_

5. Which variables are *controlled* (held constant) in this experiment?

\_\_\_\_\_

6. Which of the following would be a reasonable conclusion for this experiment? Record your answer in the lines below.

- The smaller the magnet, the stronger it is.
- The larger the magnet, the stronger it is.
- There is no relationship between the size of the magnet and its strength.

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\_\_\_\_\_

7. Explain your reasoning for your answer to Question 6.

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