

# DR. HERD, I PRESUME?



## --- AN EXPEDITION IN EXPERIMENTATION

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DR. HERD is an acronym for the six basic steps in the scientific method of experimentation:

*D --- Define the problem*

To what question do you seek an answer? For example: "I wonder if different types of string would affect how far a balloon rocket travels."

*R --- Research background information*

Check the library and other resources for information related to your experiment. For the rocket balloon experiment, you may want to learn about gravity, friction, or Newton's laws of motion.

*H --- Hypothesize*

Make an educated guess about the outcome of the experiment. Some options might be: "The smoother string will cause the balloon to travel farther", or "The type of string used will not affect the distance the balloon travels."

*E --- Experiment*

Conduct an experiment to test the hypothesis.

\*List materials needed and use metric measures.

\*Identify constants and variables. Remember, in an experiment, there should only be one variable. In the case of the rocket balloon experiment, the type of string used is the variable.

\*List each step of the experiment in an orderly and detailed fashion.

\*Be sure to do several trials.

*R --- Record Data*

Keep a record of results by using a chart or log book. Then transfer that information onto a graph.

*D --- Draw Conclusion*

State whether or not the data supports your hypothesis.

Science process skills are fundamental elements to master in order to conduct experiments properly. The following outline covers these essential skills.

## SCIENCE PROCESS SKILLS

### I. Observe

#### A. Use all 5 senses

- 1.
- 2.
- 3.
- 4.
- 5.

#### B. Use quantitative skills

- 1.
- 2.

#### C. Note changes in properties

- 1.
- 2.

#### D. Negative rule -

### II. Classify

- A.
- B.
- C.
- D.
- E.

### III. Use metric measures

- A.
- B.
- C.
- D.
- E.

IV. Communicate

A.

B.

1.

2.

3.

C.

1.

2.

3.

4.

V. Experiment

***Workshop examples:***

1. Five senses - (pebbles) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Quantitative skills - (peppermints) \_\_\_\_\_

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3. Changes in property - (paper, candle, cracker) \_\_\_\_\_

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4. Classification - (buttons, bag of 10 items) \_\_\_\_\_

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5. Communication - (Fruit loops) \_\_\_\_\_

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## ANSWER KEY TO OUTLINE NOTES:

### SCIENCE PROCESS SKILLS

#### I. Observe

##### A. Use all 5 senses

1. see
2. hear
3. smell
4. taste
5. touch

##### B. Use quantitative skills

1. count
2. measure

##### C. Note changes in properties

1. physical
2. chemical

##### D. Negative rule - no inferences

#### II. Classify

##### A. color

##### B. size

##### C. texture

##### D. flexibility

##### E. other attributes

#### III. Use metric measures

##### A. mass in grams

##### B. length in meters

##### C. volume in liters

##### D. force in Newtons

##### E. temperature in degrees Celsius

#### IV. Communicate

##### A. Oral

##### B. Written

1. notes, log book
2. charts
3. reports

##### C. Graphs

1. line
2. bar
3. circle
4. picture

#### V. Experiment

