**The Scientific Method**

How do scientists solve problems?  They do EXPERIMENTS!!!!  The set of steps they follow is called the scientific method.  Use the words in the word bank below to fill in the blanks.

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| **Word Bank** |  |  |  |
| analyze | procedure | conclusion | hypothesis |
| materials | problem | observations | variables |

1. Identify a PROBLEM to solve.
2. Research topics related to your problem, and use your information to form a HYPOTHESIS, or a good guess, about what you think will happen.
3. Determine the  VARIABLES in your experiment.
4. Design a plan or PROCEDURE to test your hypothesis to see if it is correct.  Decide what supplies or MATERIALS you will use in your plan.
5. Use your five senses to notice what happens and make OBSERVATIONS.  Record what happens!
6. ANALYZE your results.  You may need to make calculations, or graph your data.
7. Discuss your results.  What do they mean?
8. Form a summary statement or CONCLUSION.  Summarize the results of your experiment and say whether or not your hypothesis was correct.

When writing up a lab report, you will generally use the following headings:

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| --- | --- |
| **Heading** | **Explanation** |
| PURPOSE | What you are trying to find out.  “To determine…” |
| HYPOTHESIS | What you think will happen. “If...then…” |
| MATERIALS | What you will use in your experiment.  → written in a list |
| PROCEDURE | The steps that you will carry out  → numbered 1. 2. 3. 4... |
| OBSERVATIONS | In a table.  Quantitative → using numbers  Qualitative → descriptive (using your senses) |
| RESULTS | Make calculations or graph. |
| DISCUSSION | What do your results mean?  Explain your observations. |
| CONCLUSION | Summary → answer the problem and state if your hypothesis was correct. |

**Variables in an Investigation**

**Variable:**  something that can change during an investigation.  There are three types of variables:

* INDEPENDENT VARIABLE
* DEPENDENT VARIABLE
* CONTROL VARIABLE

**Consider an experiment**:  a student wants to know whether increasing the number of times a balloon is rubbed on a person’s head will affect the length of time that the balloon stays stuck to a wall.

**Independent variable**:  THE ONE VARIABLE THAT YOU CHOOSE TO **CHANGE**

Example:  THE NUMBER OF TIMES A BALLOON IS RUBBED ON A PERSON’S HEAD

**Dependent variable**:  THE ONE VARIABLE THAT YOU **MEASURE**. IT DEPENDS ON THE VARIABLE THAT YOU CHOOSE TO CHANGE (INDEPENDENT VARIABLE)

Example: THE LENGTH OF TIME THE BALLOON STAYS STUCK TO THE WALL

**Control variables:** FACTORS THAT WE KEEP EXACTLY THE SAME DURING AN EXPERIMENT. THERE ARE MANY CONTROL VARIABLES IN EVERY EXPERIMENT.

Example:  THE PERSON’S HEAD, SAME BALLOON, SAME BODY PART, SAME SPOT ON THE WALL