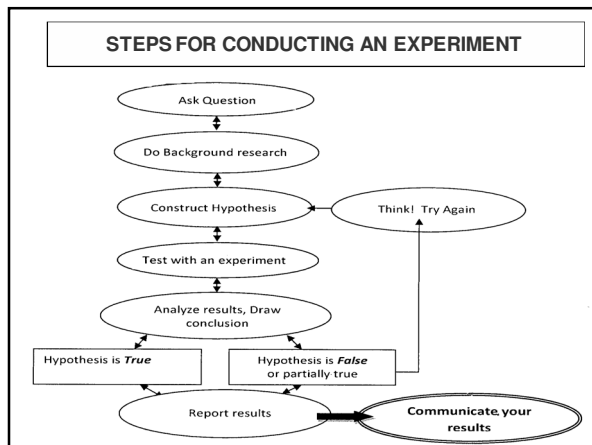
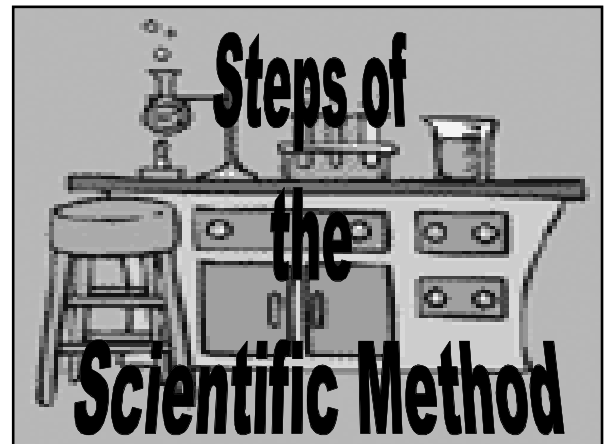


Theme

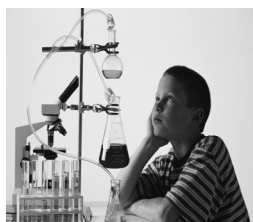
Steps For Conducting An Experiment & Handling Apparatus



The Scientific Method involves a series of steps that are used to investigate a natural occurrence.



We shall take a closer look at these steps and the terminology you will need to understand before you start a science project.



Scientific Method

- Problem/Question
- Observation/Research
- Formulate a Hypothesis
- Experiment
- Collect and Analyze Results
- Conclusion
- Communicate the Results

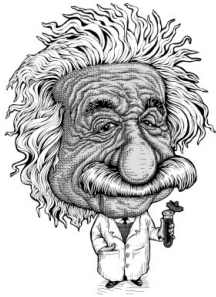
Steps of the Scientific Method

1. Problem/Question: Develop a question or problem that can be solved through experimentation.

Steps of the Scientific Method

2. Observation/Research: Make observations and research your topic of interest.

Do you remember the next step?



Steps of the Scientific Method

3. Formulate a Hypothesis: Predict a possible answer to the problem or question.
Example: If soil temperatures rise, then plant growth will increase.

Steps of the Scientific Method

4. Experiment: Develop and follow a procedure.
Include a detailed materials list.
The outcome must be measurable (quantifiable).

Steps of the Scientific Method

5. Collect and Analyze Results:
Modify the procedure if needed.
Confirm the results by retesting.
Include tables, graphs, and photographs.

Steps of the Scientific Method

6. Conclusion: Include a statement that accepts or rejects the hypothesis.

Make recommendations for further study and possible improvements to the procedure.

Steps of the Scientific Method

7. Communicate the Results: Be prepared to present the project to an audience.

Expect questions from the audience.

Let's put our knowledge of the Scientific Method to a realistic example that includes some of the terms you'll be needing to use and understand.



Problem/Question

John watches his grandmother bake bread. He asks his grandmother what makes the bread rise. She explains that yeast releases a gas as it feeds on sugar.



Problem/Question

John wonders if the amount of sugar used in the recipe will affect the size of the bread loaf?



Observation/Research

John researches the areas of baking and fermentation and tries to come up with a way to test his question.

He keeps all of his information on this topic in a journal.



John talks with his teacher and she gives him a Experimental Design Diagram to help him set up his investigation.



Formulate a Hypothesis

After talking with his teacher and conducting further research, he comes up with a hypothesis.
“If more sugar is added, then the bread will rise higher.”



Hypothesis

The hypothesis is an educated guess about the relationship between the independent and dependent variables.

Note: These variables will be defined in the next few slides.

Experiment

His teacher helps him come up with a procedure and list of needed materials. She discusses with John how to determine the control group.



Experiment

John writes out his procedure for his experiment along with a materials list in his journal. He has both of these checked by his teacher where she checks for any safety concerns.



Collect and Analyze Results

John comes up with a table he can use to record his data. John gets all his materials together and carries out his experiment.



Collect and Analyze Results

John examines his data and notices that his control worked the best in this experiment, but not significantly better than 100g. of sugar.



Conclusion

John rejects his hypothesis, but decides to re-test using sugar amounts between 50g. and 100g.



Experiment

Once again, John gathers his materials and carries out his experiment. Here are the results.



Conclusion

John finds that 70g. of sugar produces the largest loaf. His hypothesis is accepted.



Communicate the Results

John tells his grandmother about his findings and prepares to present his project in Science class.



**Observe your
world and come
up with a question
to answer using the
Scientific Method!**