

Science Experiments: *10 Steps to an Investigation Project*

1. Choose a testable question: Think about a topic that interests you and turn it into a question for further study. Testable questions are answered by hands on investigation and are always about the effects of changing something.

2. Research it: Find out what others know. Use primary sources such as your own experiences or local experts. Use secondary sources, such as books, articles from the web or magazines.

3. Formulate a Hypothesis: Develop a testable statement based on your background knowledge, research, or scientific reason. The statement should compare the relationship between what you will change in the investigation (the independent variable) and how this will impact the end results (the dependent variable).

4. Design the procedure & list materials: After clarifying the variables involved, make a list of the steps you will take to carry out the investigation. Make sure the investigation is a fair test in which only one variable is changed at one time.

5. Validate the design: Before presenting your project idea for approval, ask yourself these questions:

- Is it safe to do?
- Do I have permission to do it?
- What materials do I need and can I get them?
- Do I have enough time to test my idea and to write it up?
- If it involves living things, will they be safe?

6. Get the project approved: An adult needs to approve the project before you start. Your parents and me, your science teacher (Mrs. Wachtler)

7. Carry out the investigation: Be sure to allow enough time to carry out the investigation. Make a rough sketch or make notes of the design set up so the experiment can be repeated in the future. Follow the steps outlined in your procedure.

8. Collect data: Investigators and scientists collect data to help them know if the factors they have changed (independent variables) have an impact on the end results (dependent variable). Without the data there is no way to demonstrate that the changed factors worked. Organize data using lists and tables.

9. Make sense of the data: How do you know it worked, or didn't work? Look for patterns and trends in the data. Use charts and graphs to help organize the data so it can be reviewed. Often a graph of the data will help you see relationships among the variables.

10. Develop a report and share it with your fellow scientists: Look at sample display boards and the project checklist to be sure you include everything you should. Create your display board and prepare for your oral presentation.