

# Investigatory Experiments and Project Reports

## Dear students,

Please remember always, "Science operates on the edge of what is known,, to discover more about what is not... we have to be a person of what we can do to explore being young scientists.....

You can increase your knowledge of the world around you by listening to others, reading books, watching scientific television channels and surfing the Internet... However, one of the most exciting ways of increasing your knowledge is to put on the shoes of the scientist and conduct your own experimental investigations....

Since u all decided to be biologist to work out your projects, you can be a great person of biologist in your field of topic, so you do your research and discuss with your subject teacher for further advice...

## So, now let me tell you the meaning of research projects,

Investigatory projects are meant to be a pleasure-cum-work-cum-knowledge gathering exercise of senior students of you all. It is a type of experimental exercise performed with a scientific attitude by the students of senior level....

1. Selection of topic: For selection of the topic for the project, you work and read different chapters of your syllabus and also consults scientific literature, magazines, newspapers, go and use search engines of internet, etc. Then select the topic of your interest.

2. Planning of the project:

Collect all possibly available information about the topic of the project. Prepare a rough outline of the experimental work of the project.

3. Experimentation for the project:

Plan and conduct the experimental work with precision so that you are sure to get correct results. Following points should be kept in mind while performing the experiments for the project work.

1. Collect data with honesty and utmost care. Record only your observations and data.
2. Repeat the experiment several times and take average of the results of all the experiments.
3. Compare your results with those available in the reference books.
4. Discuss your results in the light of available information about the project and draw out meaningful conclusion.
5. Make use of histograms, graphs, photographs, diagrams or models to support your observations and conclusions.
6. Give a list of books, magazines/journals and internet sites you have consulted during the course of your project.
7. Acknowledge the guidance, help and assistance rendered by your teachers, parents, neighbours and friends by expressing sincere gratitude and thanks to them in the beginning.

How to write: Students are required to get their project report typed on bond paper sheets and to represent in the best possible manner. The project report should be written in the following sequence:

1. **Title / Aim** – Name of the project.
2. **Introduction** – Information collected from various sources related to the topic.

3. **Requirements** – Materials required for experimental work.
4. **Procedure** – Write details of the experimental work you have performed.
5. **Observations** – Record your observations / data in the form of tables, histograms, graphs, photographs, etc.
6. **Results / Conclusion** – Give analysis of the data and compare your results with those available in the literature and draw conclusions.
7. **References** – Give the list of books, internet websites, magazines or journals you have consulted, for the project work.

**List of few project topics:**

**M.R.** means – materials required for your experiment.

1. Any human disease can be taken as a topic and collect the complete information with statistical data and a support of statistical analysis about the same questioners.
2. Study of coaguable and non-coaguable milk proteins. (M.R.- milk, test tubes, rennin tablet, millon's reagent, beaker, burner, etc).
3. To study the adaptability of cockroaches to drastic environmental changes such as (a) complete darkness (b) continuous light (c) refrigerator. (d) high conc. of CO<sub>2</sub>. (M.R.- live cockroaches, refrigerator, four small tin boxes, bread, water, dil.Hcl and CaCO<sub>3</sub>.)
4. Study of drug resistance in bacteria using antibiotics. (M.R.- agar, starch, dis.water, petridishes and any 2/3 antibiotic powders.)
5. Study of locomotion in fishes, importance of different fins in balancing and steering the body. (M.R.- a fish tank, live fishes, scissors, petridishes, cotton).
6. Effects on plant movement (effects of light and effects of gravity). (M.R.- a potted plant, maize grains / bean / green gram seeds, petridishes, cotton).
7. To study the effects of light on sporulation in fungi. (M.R.- bread slices, cotton, petridishes).
8. To investigate the frequency of genes for testing PTC (with Phenyl Thio Carbomide strips).
9. Effect of temperatures and detergents on breathing rate in fish. (M.R.- a fish tank, live fishes, detergents, thermometer)
10. To study the variation in the rate of mitotic cell division in the root tips of onion.
11. Effect of pH on the germination of seeds.(different types of seeds, cotton, Petri dishes). 13. Effect of salinity of water on the growth of one type of plant. 14. Conduct a survey of pesticides at your local nursery, garden supplies shop or supermarket. Construct a table in which to record: a. the names of commercial brands of insecticides b. the target organisms c. the active chemical ingredients d. information given about safety precautions. Find out how the main ingredients act in each of the pesticides and include them in a report in your survey. 15. Find out how ants follow a trail, and how and why birds migrate. 16. Find out some of the innate behaviours of babies. Why might they be useful to a baby? 17. Investigate the statement "Too much adrenaline can cause stress-related diseases". 18. Looking at decomposers. 19. Design and carry out an experiment to investigate the effect of the salinity of water on the growth of one type of plant. 20. The taste test. 21. Making and testing toothpaste. 22. Design an experiment to compare the pH of various brands of toothpaste. What does the pH of toothpaste suggest about tooth decay? 23. What causes pimples? Why are they so difficult to prevent or cure? 24. Imagine you have been asked to find out why so many of the passengers from the Titanic died after 30 minutes in the water, even though they were wearing life jackets. (Hypothesis is heat loss and body cooling is faster in water than in air). 25. To test the effect of varying salt concentrations on the process of osmosis using an egg as a model.