Design Your Own Experiment – Scientific Method

Sections

Joey Scouts | Cub Scouts | Scouts | Venturer Scouts | Rover Scouts

Scouts VICTORIA

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Challenge Areas

COMMUNITY | CREATIVE | OUTDOOR | PERSONAL GROWTH

Scout Method Elements

COMMUNITY INVOLVEMENT | LEARNING BY DOING | NATURE AND THE OUTDOORS | PROMISE AND LAW | PERSONAL PROGRESSION | PATROL SYSTEM

SYMBOLIC FRAMEWORK | YOUTH LEADING, ADULTS SUPPORTING

SPICES Growth Areas

CHARACTER | EMOTIONAL | INTELLECTUAL | PHYSICAL | SOCIAL | SPIRITUAL

The Adventure

Use the scientific method to design and run your own experiment.

Plan

There are quite a few steps that go into planning and conducting a scientific experiment. You might find this scientific investigation template helpful as you work your way through this challenge card.

Aim

What question do you want to investigate? A good investigation question tests the relationship between two variables:

- Independent variable (IV) – the thing you (the scientist) are deliberately going to change
- Dependent variable (DV) – a measured response to the change that you made

For example, you might choose to change the amount of sunlight a seedling is exposed to each day (IV) and then measure how much it grows each day (DV). You can come up with a scientific investigation question for any topic you are interested in but if you're stuck for ideas this list might help you get started.
https://sciencefaircentral.com/students/scientific-projects

Hypothesis

Your hypothesis is an informed prediction about what you think the outcome of the experiment will be. Your hypothesis should say what you expect to happen and give a reason why you are predicting that outcome.

Materials and Method

Your materials is a list of what equipment you will need to complete the experiment and your method is the detailed plan of how to conduct the experiment. Things to consider when writing your method:

- How will you measure the independent and dependent variables?
- What are the controlled variables? These are all the things you need to try and keep the same between each trial so that only the independent * variable is being changed and nothing else.
- How many trials are you going to do?
- What are the risks (things that could go wrong) and safety precautions (things you will do to reduce the risks)?

Do

Results

While you do your experiment make sure you record everything that happens. Even if a result is unexpected still keep a record of it. Did you know some of the best scientific discoveries in history have come from mistakes! (read about the discovery of penicillin.)

Some ideas for recording your results are:

- Table
- Graph
- Photos
- Videos

If you need some help with writing down all aspects of your experiment, you may like to use the Scientific Investigation Sheet.

Review

Discussion

Your discussion is where you analyse your results and write down what you have found out. You might want to consider:

- How precise were your results? Did all your trials give similar results or was there a lot of variation?
- Were there any obvious sources of error in your experiment? If so, what could you do to improve the experimental design?
- How do the results compare to your hypothesis? Explain why you think this is?
- What could you do next to take this experiment further?

Conclusion

Finally, the conclusion gives a brief summary of the main findings of the experiment.

Variations

Here are a few simple experiment ideas to get you started with designing your own experiment but remember you can be as creative as you want when it comes to choosing a topic to investigate.

- Mixtures activity - https://www.science-sparks.com/making-mixtures/
- Sugar cube absorption - https://www.science-sparks.com/fun-with-sugar-cubes/
- What reacts with baking soda - https://www.science-sparks.com/what-reacts-with-baking-soda/