


Design Your Own Experiment



Many scientists use experiments to test ideas and discover new things about the world. This booklet will help you to think about how scientists test theories and design experiments. Then you will get the chance to make your very own experiment. You can print out and use the worksheet at the end of this booklet to help guide you through this, but if you don't have a printer, don't worry, you can use a pen and paper instead.


Step 1: Choose a topic and do your research

The first step for any scientist wanting to investigate something is to learn what everyone else has already discovered, and try their experiments. To keep things simple, choose from one of the experiments already on Dynamic Earth Online. We recommend one of these:




Chromatography
Find out what it is, and do your own ink experiment!

[Chromatography](#)



Ice and Salt
Find out why we put salt on the roads to stop them from getting icy.

[Ice and Salt](#)



Water Surface Tension
How many coins can you add before the surface tension breaks?

[Water Surface Tension](#)



Static Butterfly
Use static electricity to move the butterfly wings!

[Static Butterfly](#)

Then you need to research the science behind the experiment. To do the research on your chosen topic read the 'background information' section in the booklet. The background science behind an experiment is called the theory. The theory is what the experiment is testing.

Step 2: Evaluate the experiment

Now you understand the science behind it, it is time to do the experiment. After you complete the experiment, answer these questions to help you decide what worked and what didn't. If the experiment didn't work that's ok! Having experiments not work is a very important part of science.

- Did the experiment work?
- Did you have all the equipment you needed to do the experiment?
- What made the experiment difficult or easy to do?



Step 3: Design your own experiment

You can use the structure of your chosen experiment to test new questions. You can do this by changing the variables. Variables are all the different parts of your experiment which you can change. For example in the chromatography experiment the variables are:

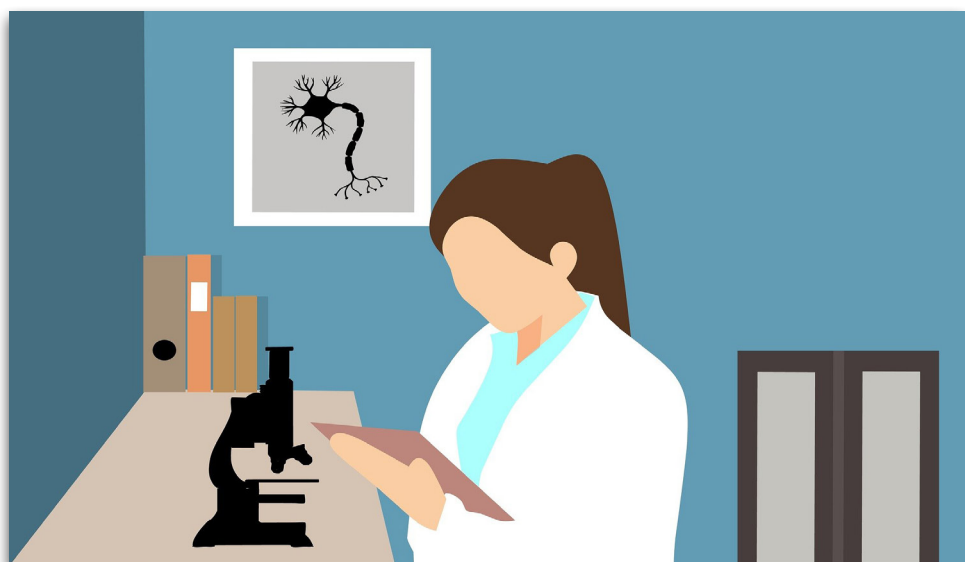
1. The pen used to make the ink dot
2. The paper used
3. The liquid used to separate the ink



By changing one of these things you can ask new questions. For example you could put ink on three different kinds of paper and ask the question “does the kind of paper affect how well the ink separates?”

It is very important to only change one variable at a time, otherwise you don’t know why you are getting a result. For example, in the chromatography experiment, if we changed the paper and the ink and found that the experiment didn’t work then we wouldn’t know if the ink or the paper, or both, had caused this!

Remember there is the potential that changing a variable might mean that your experiment doesn’t work. That’s ok, in science getting no result is just as important as getting a result.



Step 4: Results and conclusions

Write up your new experiments results. Did the experiment work? If it did work, what did you find out? If it didn’t work, what does this tell you? Is there anything else you would like to test?

Now you can write a conclusion. Conclusions are a statement you can make

which sum up the results of an experiment, and often relate back to the theory. These can be very simple, for exaple, felt tip pens separate with chromatography but highlighter pens don’t.



Scientific Evaluation

Step 1: Choose a topic and do your research:

Name of experiment:

What is the experiment testing?

Step 2: Evaluate the experiment

Did you get the results you expected? Yes No

What made the experiment difficult or easy to do?

Step 3: Expand the experiment

What are the variables in your experiment?

Which variable are you going to change?

What new question are you answering?

Step 4: Results and conclusions

Did the new experiment work? Yes No

If yes, what happened?

If no, why do you think it didn't work?

What conclusions can you make?