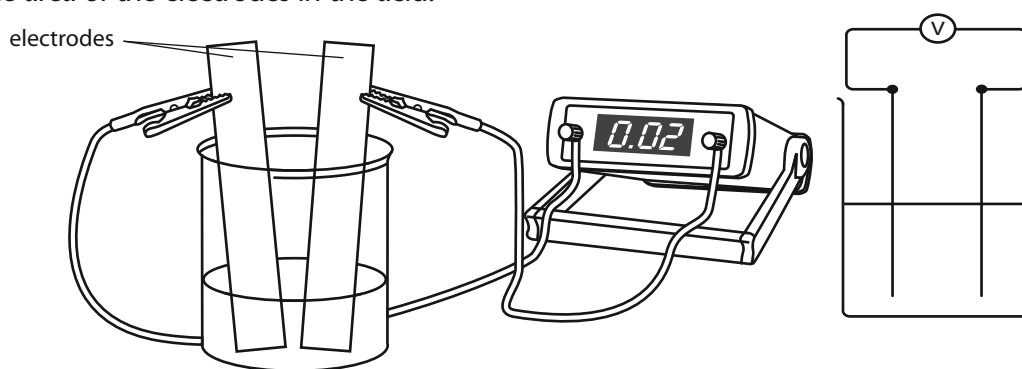




The cells you use in a torch or other portable device are called dry cells. A wet cell uses an acidic liquid and two strips of metal to produce electricity. You can investigate the variables that affect the voltage produced by a wet cell using apparatus like that shown in the diagram.

Some of the variables that could affect the voltage are:

- the type of acid
- the concentration of acid
- the combination of different metals used for the electrodes
- the surface area of the electrodes in the acid.



Plan an investigation into one or more of the variables that could affect the voltage produced by the cell. In this investigation, the voltage is called the **dependent variable**, because it is the one you are finding out about.

The box below lists some of the apparatus you may need. If you need anything else, ask your teacher.

Apparatus

- | | |
|------------------------------|----------------------|
| • strips of different metals | • crocodile clips |
| • emery paper | • different acids |
| • voltmeter | • measuring cylinder |
| • connecting wires | • beaker |

Planning

- 1 a** Which variable will you investigate? (This will be the **independent variable** in your investigation.)

b Why do you think this variable could affect the voltage? Use scientific ideas in your answer.

c How will you choose the values that this variable should have?
- 2 a** What will you need to keep the same to make your test fair? (*Hint*: there are more variables than are given in the list above.)

b The variables that you keep the same are called **control variables**. What values will your control variables have?
- 3** What will you do to make sure you stay safe during your investigation?

- 4 Describe how you will carry out your investigation.
- 5 How will you make sure that your results are as accurate and reliable as possible?
- 6 Show your plan to your teacher before you start.

Recording your results

- 7 How will you record your results?
- 8 When you have recorded all your results, you could present them as a bar chart or a line graph.
 - a Explain which type of graph you will use.
 - b Explain why it is helpful to present results in this way.

Considering your results/conclusions

- 9 Write a conclusion for your investigation that explains what you have found out.

Evaluation

- 10 If your evidence (your results) can directly answer the question then it is **valid**. Is your evidence valid?
- 11 Accuracy is another way to judge how good your evidence is.
 - a Is your evidence accurate?
 - b How could you collect more accurate evidence?
- 12 You can also judge how good your evidence is by thinking about **reliability**. This is how sure you are that your results are correct.
 - a How reliable is your evidence?
 - b How could you collect more reliable evidence?
- 13 Do you have *enough* evidence to be sure of your conclusion? If not, what could you do to gather more evidence?

I CAN...

- plan and carry out a safe and fair investigation
- present my results clearly
- draw a conclusion
- evaluate my evidence and my working methods.