

Conducting fair test investigations

with Primary Connections

Read in conjunction with *Supporting students to write questions for investigation*.

Introduction

Scientific investigations involve posing questions, testing predictions, collecting and interpreting evidence and, drawing conclusions and communicating findings. When scientists plan and conduct a fair test investigation it is to answer a question or test a prediction. Students emulate this in the classroom as they continue to develop their science inquiry skills.

Planning a fair test

All scientific fair tests involve *variables*. Variables are things that can be changed (independent), measured/observed (dependent) or kept the same (controlled) in an investigation.

When planning a fair test investigation, to make it a fair, we need to identify the variables.

By planning for and conducting a fair test, students can make claims about how the variable they have changed in their investigation may have affected what is being measured and/or observed.

To support students to identify variables, and use those variables to inform their planning of a fair test, we suggest this handy mnemonic '**C**ows **M**oo **S**oftly'. This helps students remember the letters **C**, **M** and **S**, representing the three types of variables in a fair test:

Cows: **Change** one thing (independent variable)

Moo: **Measure/Observe** another thing (dependent variable) and

Softly: keep the other things (controlled variables) the **Same**.

For example:

To answer the question 'Does frozen water always cause a bottle to explode?' students could investigate whether the amount of water in the bottle affects whether the bottle explodes.

Students could:

CHANGE	the amount of water in the bottle	Independent variable
MEASURE/OBSERVE	whether the bottle explodes	Dependent variable
KEEP THE SAME	the type of bottle, the initial temperature of the water, the shape of the bottle, the colour of the bottle, the temperature of the freezer into which the bottle is put, how long the bottles are put in the freezer.	Controlled variables

Note: When choosing variables to 'keep the **Same**' we sometimes make decisions on variables that we think will affect the outcome as it is not always feasible to keep everything the same. For example, scientists might prioritise keeping the temperature of and duration of time in the freezer over having bottles that are the same colour or have the same writing on them. Sometimes additional investigation are needed to test these assumptions and this can inform worthwhile discussions with students.