

CAN YOU BE A MATERIALS TESTER?

Working in a group of three, devise a method for solving a problem which involves testing materials.

Here are a few suggestions of what you could do; you might be able to think of some better ones.

- *Which type of clothing fabric is most hard-wearing?*
- *How can wood be treated to resist water damage?*
- *Which metal is easiest to use to fabricate a bracket to hold items onto bicycles?*
- *Which plastics are most suitable for vacuum forming or injection moulding?*
- *Which glue (adhesive) gives the strongest bond?*
(You will have to choose which materials are to be bonded together.)
- *Which mixture of cement, sand and aggregate will make the strongest concrete beam?*
- *Which type of fabric is easiest to dye?*

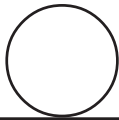
Alternatively, your group could select a product and test a range of materials that could be used to make part of this product. For example, you could select, door handles, a walking frame, a lawn mower casing, chairs, a cassette case and so on.

You should:

- List all of the properties required from the material.
- Explain each one and the reason for it.
- Make a list of possible materials.
- Test them and report your findings.

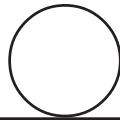
SETTING UP YOUR GROUP

You will probably be working in a group of three. You will work more efficiently if you each agree to be responsible for different aspects of your investigation. Possible descriptions are as follows, but you will have to choose your own if there are not three people in your group.



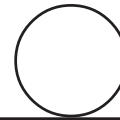
**PROJECT
MANAGER**

- You are in charge of the team.
- You lead group discussions.
- You help with the investigation.
- You are the link between the group and your teacher.
- You are the chairperson when the group gives a report to the class.
- You share responsibility for safety during the practical work.



**MATERIALS
MANAGER**

- You fill in the list of apparatus requirements on the planning sheet.
- You organise the collection of the apparatus at the beginning of each practical session.
- You help with the investigation.
- You are responsible for checking that the workplace is tidy at all times.
- You organise the tidying up of the workplace at the end of each session.
- You share responsibility for safety during the practical work.



**PROGRAMME
MANAGER**

- You record all the main decisions of your group.
- You are responsible for checking the safety of the group's plans.
- You help with the investigation.
- You keep a record of all the results of practical work.
- You make sure that all the members of the group have their own records.
- You coordinate the planning of the presentation of your group's findings to the rest of the class.
- You share responsibility for safety during the practical work.

ANALYSING THE PROBLEM

What tests can you use to decide whether one material is better or worse than another?

What measurement can you make to compare the materials you are testing?

Will you have to consider how much the materials cost?

MAKING A PREDICTION

Identify the properties your material needs to have.

Predict the type of materials that might have these properties.

Select those that are available to be tested.

PLANNING THE INVESTIGATION

You will have to fill in the planning sheet showing all the apparatus, chemicals and other materials which you may need and where you expect to get them from. Then your Project Manager will hand your planning sheet to your teacher for checking. The sort of questions you'll need to answer are:

- What sources of information might have ideas to help you plan your experiments?
- How will you collect any samples you need to carry out the testing?
- What apparatus will you need?
- Is what you need available in school?
- What checks are needed to make sure that your results are valid?
- What variables can be investigated? Which do you need to control?

IN THE LABORATORY

You will probably find that you have to change your plans once you start using the apparatus. Is your procedure likely to give a fair comparison of the materials being tested? If you make measurements, do you need to repeat them to check that your methods are reliable?

ANALYSING THE RESULTS

You must decide how to organise your results so you can see what they mean. Will you present them in a table, as a bar chart or a line graph? You must decide how to combine the results of your tests with other information you may have collected such as cost.

REPORTING ON YOUR FINDINGS

You will be asked to report on your findings to the rest of the class. You may like to look in magazines and newspapers to find some of the methods used to make research into consumer products interesting to the readers.

You may tell others about your results in the form of a wall poster, in a class magazine or as a short talk given by your group. If you are asked to give a talk, each member of the team should say what they have done, then the Programme Manager can sum up by stating the main conclusions.

