

→ X19 What's my job?

In your Year 10 textbook in Unit 1.3 on page 13 you are asked to imagine that your group is setting up a small company to produce plastic rulers. You expect to employ about 30 people.

Discuss the types of job you expect people to do. List these jobs below, and say how many people you need to do each. Give a brief explanation of what is involved in each job.

This table can also be used at other points during the year when the science being studied can be related to job opportunities.

| Title of job | Number of people required | Description of job |
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→ X20 Thinking through a problem

An important part of your learning in Key Stage 3 is developing your *thinking skills and personal capabilities*. In your Year 10 textbook on page 65, Figure 3 outlines some of the processes involved in problem solving and creative thinking. This activity sheet takes you through some of these processes.

Look around you, either at home or in school. Decide if any of the things around you could be made to work more effectively.

In a small group, choose one of these things and list what needs to be done to make it work better. Ask these questions to help you.

- What science and technology do you need?
- What would it cost to do this?
- Would the improvement be cost-effective? (If necessary, find out what 'cost-effective' means.)

You may stop at step 6. However, if you can implement your plan, go on to step 10.

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| 1 What item around you could be made to work more effectively? | |
| 2 What's wrong with it? | |
| 3 What should it be able to do if you improve it? (These are the success criteria.) | |
| 4 In your group, come up with three possible solutions to the problem of improvement | A B C |

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| <p>5 Decide on the most acceptable solution. Describe it.</p> | |
| <p>6 How will you go about implementing this solution? Develop a plan.</p> | |
| <p>7 If possible put this plan into action. To what extent does your implementation meet the success criteria in step 3?</p> | |
| <p>8 What modifications do you have to make to your solution in step 5?</p> | |
| <p>9 How well does your final product work?</p> | |
| <p>10 How much does your modification cost? Do you think it is cost-effective?</p> | |

→ X21 Managing a school science project

In your Year 10 textbook in Unit 4.3 you learned about school science projects. This activity sheet can help you to define your project more specifically, and decide how you intend to go about it.

1 What area of science are you interested in?

2 What could you use as a starting point for a project in this area? Possible starting points are:

- the job of someone you know, related to science or technology
- a book or magazine article you have read, or a television programme you have seen recently
- a hobby that interests you, or a sport you play.

3 In general terms, what do you want to find out?

4 Break down your general project title into more specific questions. Are there relationships you can test?

5 List any information you need to help with your project, and where you can expect to find this.

6 Outline the practical work you need to do. Draw diagrams if you find these useful.

7 Find out from the websites www.sentinus.co.uk and www.esatys.com what are the conditions for presenting your project at *Young Innovators* in Belfast or the *BT Young Scientist & Technology Exhibition* in Dublin. Note particularly the closing dates for entries.

→ X22 Change and continuity

In your Year 10 textbook in Unit 4.8 you learned that the world around us is changing, and that these changes can be temporary, cyclical or permanent. Many investigations outlined in your textbook involve changes, for example, changes in:

- chemical reactions
- the form of waves in sound and light
- the environment.

Choose one investigation in your textbook that involves change, and answer the following questions.

1 What things stayed the same during your investigation?

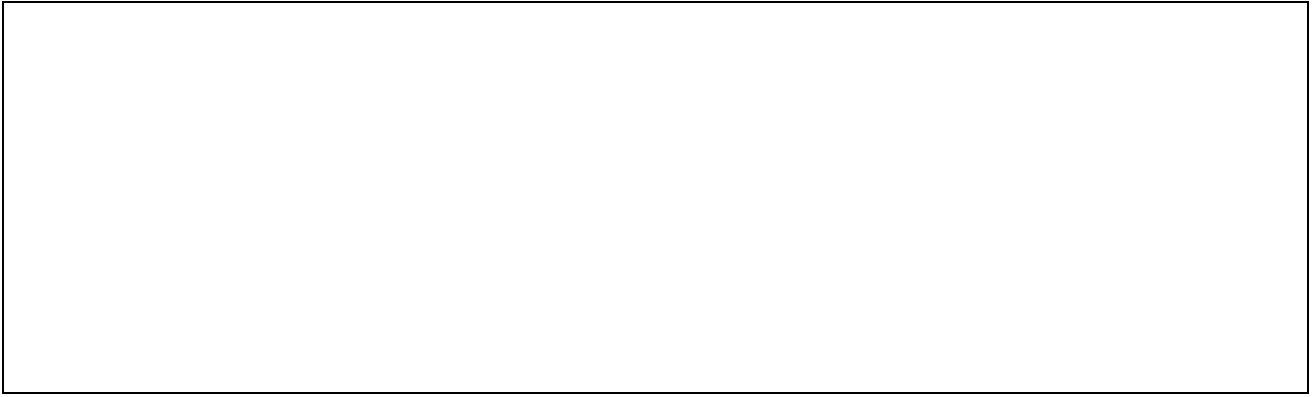
2 What changed during your investigation?

3 What caused the change?

4 Was the change temporary, cyclical or permanent?

5 How long did it take for the changes to occur?

6 What could be done to make the changes faster or slower?



→ X23 Evolution and equilibrium

In your Year 10 textbook in Unit 5.6 you learned that evolution is a series of changes that account for the present form and function of objects and systems, and that equilibrium is the state where change and things that make change balance one another. Examples of evolution and equilibrium are:

- transport during the 20th century
- the development of animal life since the dinosaurs
- the scenery of Northern Ireland since the ice ages.

Choose one of these examples of evolution and equilibrium, or any similar example that shows development over time, and answer the following questions.

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| 1 Describe the situation at the start of the period you are considering. | |
| 2 What changes have there been in the outside environment during this period? List at least three changes – either natural or a result of human activity. | A |
| | B |
| | C |
| 3 How have people or animals adapted to these changes in the environment? | |

| | |
|---|-----------------|
| <p>4 What would have happened if people or animals had not adapted to the changes?</p> | |
| <p>5 List two changes you expect in the environment over the next 50 years.</p> | <p>A</p> |
| | <p>B</p> |
| <p>6 How should humans adapt to these changes?</p> | |

→ X24 Form and function

In your Year 10 textbook in Unit 6.7 you learned that we can tell what an object or system is for (by examining it carefully), about the characteristics that help something function, and how these characteristics help it function.

Choose one example of form and function from either the physical or biological sciences, and answer the following questions.

- 1 What characteristics help your example function? Think in terms of performance, survival, protection, reproduction.

- 2 How do these characteristics help it to function?

- 3 What changes to the form will make it function differently?

- 4 How and why do changes occur?

5 What can happen when changes do not occur?

→ X25 Evidence and models

In your Year 10 textbook in Unit 7.5 you learned what a scientific model is, and that complex ideas can be made easier to understand using models. The example used in this unit was a ball and straw model to show how molecules were made up from atoms, and how they interacted.

Choose one example of a model you could develop from an investigation or your study of science, and answer the following questions.

- 1 What properties of the materials or equipment used did you observe during your study or investigation?

- 2 What patterns did you observe during your study or investigation?

- 3 How could these properties and patterns be used in constructing a model to help explain what was happening?

4 Describe a model you could construct to explain what was happening in your study or investigation.

5 How is your model similar to or different from the natural world?

→ X26 Systems and organisation

In your Year 10 textbook in Unit 9.3 you learned how to define a system, how to identify its components, how these components relate to one another, and what happens to a system when components are damaged or missing.

Choose one example of a system you have studied in either biological or physical sciences, and answer the following questions.

1 What system did you observe?

2 Give a brief description of the system. Draw a diagram if this helps.

3 List four or five key parts of the system, and explain what each of these does.

4 Could some parts be removed without changing how the system functions? If so, what parts?

5 Choose two parts of the system, and say what would happen if these parts were removed or damaged.

6 What would happen if different parts were added to the system?