theme: business & industry

job:
Henry Smith, Client Development Manager, Smartfocus

activity outline

Having watched the video featuring Henry, who works for a company selling analytical software, pupils can create their own ‘software’ – a database for analysing scientific data.

Pupils collect data and build a database to analyse elements, compounds and minerals. They then use their database to sort or order the data.

You are likely to need three lessons (roughly: one to collect data, one to enter it, one to use the database)

Pupils will work individually, but must come together as a class to share the data to build the database.

The pupil sheet provides an introduction and step-by-step instructions for collecting, building and searching the database. It is quite text-heavy, and may be more suited to older, more able groups. Pupils are likely to need guidance.

This activity would benefit from co-operation with the IT department, particularly with regards use of computers. Pupils will need knowledge of databases (it would help if their teacher was IT literate, too!).

Teacher notes overview

1 Curriculum links: where this activity can fit with the 2008 KS3 Programme of Study and Scottish 5-14 Science Curriculum.

2 The Video: providing a synopsis of the video content and ideas for viewing.

3 The Practical: including Equipment lists, Health and safety notes, a Possible approach (a comprehensive, suggested way of planning the lessons) and an Underlying science section (providing detailed information about the various scientific principles involved).

4 Possible extensions: suggestions for other practical activities using the video, or extending the suggested activity.

5 Associated jobs: guidance on how to deliver a plenary activity (or, if you wish, a stand-alone activity) focusing on the video interviewee, including a photo of the interviewee to place at the centre of a spider diagram.
This lesson can be used to help teach part of the 2008 Key Stage 3 Programme of Study (England and Wales):

- **Range and Content:** 3.2c
- **Attainment Targets:** AT1, AT3
- **Key Concepts:** 1.2a, 1.4
- **Key Processes:** 2.1c, 2.2a, 2.3a
- **Curriculum Opportunities:** 4a

This lesson can be used to help teach part of the Scottish 5-14 Science Curriculum:

**Main curricular links**
- E&S2 Materials from Earth

**Attainment Targets**

**Knowledge & understanding:**
- **Level E**
  - Describe how the physical properties of elements are used to classify them as metals or non-metals
- **Level D**
  - Describe some features of the periodic table

**Investigating skills:**
- **Collecting and analysing**
  - Using ICT tools to collect and analyse information, such as databases and spreadsheets...
- **Searching and researching**
  - Using resources such as CD-ROMs and the internet to allow pupils to search for information and to research topics
Watching the video

There are a number of things you might do before showing the video to your class.

1. Preview the video and write a few quick-fire questions. Then you can tell your class that they will be tested on their observation when it’s finished. This is an excellent way of encouraging them to pay attention!

2. Ask pupils to watch the video through once. Then ask them to generate one question that could be answered from the video and one question they would like to ask but the video did not answer. These questions are then exchanged with another pupil and the video is watched a second time. This gives pupils an opportunity to focus on something they may have missed first time, and provides a basis for discussion on what was learnt from the video, and what additional information is needed.

3. Ask pupils what sort of person might become a sales person, or work in marketing. Does anyone in the class think they’d like to work in a job analysing data? When the video has been watched, ask the questions again. Has anyone changed their mind/opinions?

4. Ask pupils to spot the science in the clip.

Synopsis of the video

Among other things, Henry makes these interesting points:

- Henry took three science A levels and a Bio-chemistry degree.
- The analytical techniques learnt during his degree are directly applicable to his current job, which requires a lot of data analyses.
- Other skills learned from studying science – numeracy, team work, problem solving and time management – are also important in his job.
- A good understanding of maths is essential, as all data they collect is numerical.
### the practical

**Equipment**

- ICT facilities with a database program; preferably with which pupils are already familiar.
- Access to a variety of sources (texts, chemical catalogues, data books, electronic databases on CD-ROM and on-line) giving physical and chemical data for common elements, compounds and minerals.
- A sample (empty) database has been provided for you in Excel. It contains fields for the materials listed below. You could reduce or amend the list if required, or you may choose to create your own database.

<table>
<thead>
<tr>
<th>Material</th>
<th>Material</th>
<th>Material</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>aluminium</td>
<td>aluminium oxide</td>
<td>ammonia</td>
<td>bauxite</td>
</tr>
<tr>
<td>bromine</td>
<td>butane</td>
<td>calcium</td>
<td>calcium carbonate</td>
</tr>
<tr>
<td>carbon</td>
<td>carbon dioxide</td>
<td>chalcopyrite</td>
<td>chlorine</td>
</tr>
<tr>
<td>copper</td>
<td>copper carbonate</td>
<td>copper oxide</td>
<td>ethanol</td>
</tr>
<tr>
<td>galena</td>
<td>gold</td>
<td>haematite</td>
<td>hexane</td>
</tr>
<tr>
<td>hydrogen</td>
<td>iron</td>
<td>iron(III) oxide</td>
<td>iron(II) sulfide</td>
</tr>
<tr>
<td>lead</td>
<td>lead oxide</td>
<td>lead sulfide</td>
<td>limestone</td>
</tr>
<tr>
<td>magnetite</td>
<td>malachite</td>
<td>marble</td>
<td>mercury</td>
</tr>
<tr>
<td>methane</td>
<td>nitrogen</td>
<td>oxygen</td>
<td>quartz</td>
</tr>
<tr>
<td>rock salt</td>
<td>silicon</td>
<td>silicon dioxide</td>
<td>sodium chloride</td>
</tr>
<tr>
<td>sulfur</td>
<td>sulfur dioxide</td>
<td>sulfuric acid</td>
<td>water</td>
</tr>
</tbody>
</table>

The properties for which data are required are shown in the pupils' worksheet. Again, others may be added if required, and suitable data is available.
Possible approach

The objective of the pupil activity is to show how large amounts of data from many sources can be collected together into a database, and then used to identify items which have specified characteristics in common. This parallels, on a much simpler scale, the work of Smartfocus.com.

Pupils use data about substances, rather than customers, but the basic principles are the same – the data must be labelled and stored in a way that allows items with one or more specified characteristics to be recognised. That is, a search through the data identifies all items tagged with those particular labels.

The connections between the activity and video will need to be explained to pupils, so that they can understand the purpose.

Pupils collect the required data from a range of printed and electronic sources, and assemble it into a single database. The logistics will depend on their ease of access to ICT facilities – for the initial data-sourcing and inputting the data.

Pupils should work individually or in small groups, each being allocated a batch of materials to research, so that the class between them cover all the materials.

If the activity is conducted in an IT suite, it may be feasible for pupils to input data as they find it. However, they may gain more understanding by separating the two phases – collecting the data and recording it on paper, and then inputting it into the database later. This will require them to record the data in a logical, ordered format under suitable headings before transferring each item into the correct database field.

Warn pupils to check that they are putting data into the correct fields. Data in the wrong places will throw up incorrect information when the database is used for searches.

When the database is filled, pupils should test it by trying the types of searching and sorting suggested in the worksheet. They may need to be taught how to do this.

possible extensions

This database activity could be modified and used, for example, in the biology topic covering classification.
A STEM (Science, Technology, Engineering and Maths) education provides pupils with skills and knowledge that are useful in all sorts of careers. The video demonstrates how Henry, a Client Development Manager at Smartfocus, uses such skills on a daily basis.

Henry works with numerous people – some directly, some indirectly. Some use STEM skills, others don’t. By exploring this network of associated jobs, pupils will, hopefully, begin to see that even those in non-STEM jobs will find STEM skills useful – if they’re communicating with someone “in-STEM”, for example, some knowledge of their work will be a great help.

Henry’s spider diagram

Try placing Henry at the centre of a spider diagram (we’ve provided a photo of Henry which you could use – see overleaf). You could either create worksheets for pupils to complete themselves, or create the diagram on your whiteboard and then pool ideas.

Ask pupils: “who does Henry work with”. They may draw information from the video – Henry talks about other members of his team – or they may come up with new ideas, such as the various clients he has to speak to. Other suggestions might include the software developers and other IT staff.

Now ask pupils which of those jobs are clearly “in-STEM”. Who else might find some STEM skills helpful? Why?

You could extend this by taking any one of the associated jobs and placing them at the centre of a spider diagram, and starting the process again.
Henry Smith, Client Development Manager, Smartfocus

Studying science and maths can transform your career options. Future Morph: become someone.