Smartfocus makes and sells software for companies to collect and analyse data about their customers. They build a database, which sorts data into categories. The company asks the database questions to see who will buy their products.

Databases store and sort all sorts of data – including scientific data. You are going to collect information about elements, compounds and minerals. You will then build a database and use it to sort the elements, compounds and minerals into categories.

Procedure: Collecting data

For each material, find the following information:

- Does it occur naturally?
- Is it a solid, a liquid or a gas?
- Is it an element, a compound or a mineral?
- What are its density, in g/cm$^3$, melting point and boiling point, in °C? (make sure you use the right units!)
- If it’s an element, is it a metal or a non-metal?
- If it’s a compound or mineral, which elements does it contain?

You won’t find all the data in one place. You will need to collect it from various sources.

Think about how to gather the data. Here are some ideas:

- For one material, look up the information using lots of sources. Then do the same for each of the other materials.

Or …

- Look at one source. Find as much information as you can on all the materials. Then try other sources to fill any gaps.

Decide which you think will be quicker and easier.

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Think about how you will record the information as you find it. You’ll need your notes to build the database, so make sure they’re neat, tidy and well ordered.

Look up the information in data books, chemical catalogues, CD-ROM databases and on the internet. Record your findings.

**Procedure: Building your database**

The database will be built up using data from the whole class, so that it covers all the materials. You will input the data that you collected.

1. Make sure that you know which data items are to go into which data fields.
   - A data field contains one data item.
   - If in doubt, ask your teacher. (The database won’t work correctly if information is put in the wrong place, because that place will then hold the wrong data.)

2. For each data item, check that you have accessed the correct blank data field.

3. Enter the data carefully.

**Procedure: Searching your database**

Once the class has input all the data for all the materials, the database is ready for searching.

1. Try some simple searches, using one property at a time. For example, find out which materials:
   - are gases
   - are metals
   - are minerals.

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2 Move on to searches involving two properties, such as:
   - which elements are liquid
   - which compounds are gas
   - which minerals are solid.

3 Find out how to sort and search the numerical data, and perform calculations on them. For example:
   - sort the materials in order of their melting points
   - find the gas with the lowest boiling point
   - identify which metals have a density less than 4 g/cm³
   - compare the mean (average) density of the metallic and non-metallic elements.

4 Make up some search queries of your own, and try them out.

(\textbf{Remember}, they can only be about the properties and materials covered by the database. You can’t, for instance, find which metal is the best electrical conductor.)

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