ACTIVITY: Separating a complex mixture

Imagine you are a member of a team of scientists working together in a laboratory. Your team has been given an important job. You have been given a beaker that contains a mixture of substances to separate.

The mixture contains the following components:

- sand
- iron filings
- salt
- ethanol
- water

Your job is to design a procedure for separating the mixture into its individual components. How would you do that? Your procedure should be summarised in the form of a flow chart.

Before you start, imagine what the mixture would look like. Draw a picture of the a clear container and the different contents in the mixture in the space.

To help you design your procedure, here are a few guiding questions and a template for your flow chart:

1. What is the physical state (solid, liquid or gas) of each of the components in the mixture? Fill these into the table.

Component (substance)	State (solid liquid or gas)	Dissolved or undissolved?

2. Name the solids that will not dissolve in the mixture. These are the undissolved solids. _____

3. Name the dissolved solids in the mixture. _____

4. What would be the best method for separating the undissolved solids from the liquids in the mixture? Write the name of this method in the block numbered 1 of the flowchart below.
5. Write the names of the undissolved solids in block 2 of the flowchart.
6. What remains after the undissolved solids have been removed from the mixture? Write the names of these compounds in block 3.
7. How could we separate the undissolved solids? (Hint: look at the flow chart for some ideas.) Write the name of this process in block 4.
8. Write the names of the two undissolved solids in blocks 6 and 7.
9. How could we separate the liquids from the dissolved solid? We could evaporate them, but then they would be lost. What other option is available if we want to separate the components in a solution? Write the name of this process in block 5.
10. Which liquid would be distilled first? (Hint: which liquid has the lowest boiling point?) Write the name of this liquid in block 8.
11. What remains in the solution when the first liquid is removed? Write the names of these components in block 9.
12. How can we separate the liquid from the dissolved solid? (Hint: this process is the same as the one in block 7.) Write the name of the process in block 10.
13. Write the names of the final two components in blocks 11 and 12.