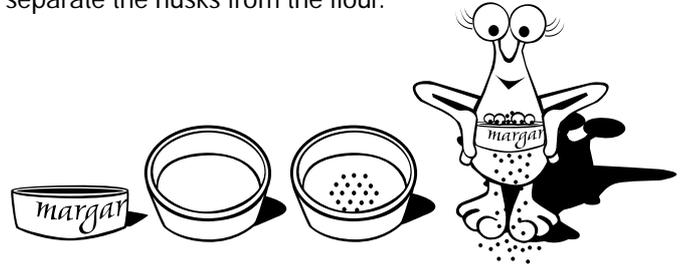
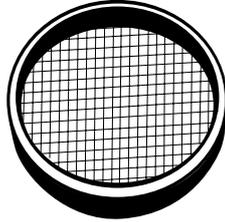


This worksheet is about separating big solids from little solids and liquids from solids that have not dissolved.

## Investigation 1

### Why might you want to separate two types of solid?

If you were a keen gardener or farmer you might want to remove stones from your soil.  
If you grind wheat to make flour you need to separate the husks from the flour.



Try separating some of the examples using a sieve. This is a fine mesh with little holes in.

Make your own sieve by making holes in the bottom of a plastic margarine tub. The holes must be big enough to let the particles of the smallest solid through, but too small for the bigger bits of the other solid.

Try separating rice or lentils from water using a sieve. Sometimes solids are mixed into liquids, for example dirt in water, the bits floating in real orange juice or ground coffee in a coffee maker. If you have made the still lemonade in the worksheet 'Making Still lemonade' try separating the pips and bits of lemon from the juice.

## Investigation 2

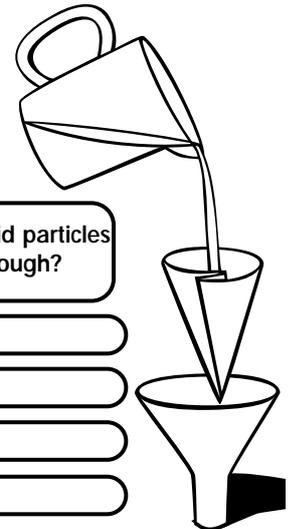
Particles of soil in dirty water and coffee grinds are too small to be sieved - so you need something with smaller holes. This is called a filter. Filters can be made from paper or fabric.

### Try out some different filters.

Cut circles and fold them to make a cone shape. Put the cone in the bottom of a funnel and pour in the mixture.

How can you make sure this test is fair? (Would it be fair to time a bucket of water compared to a glass full?)

Which do you think will be the best?



|                | Which filter do you think will work best? | Time for all the liquid to go through / mins | Did any solid particles get through? |
|----------------|---|--|--------------------------------------|
| paper towel    |   |  |                                      |
| copier paper   |   |  |                                      |
| sugar paper    |   |  |                                      |
| cleaning cloth |   |  |                                      |
| cotton fabric  |   |  |                                      |
| coffee filter  |   |  |                                      |

Which made the best filter? Use the back of this sheet to draw a bar graph of your results.

## Investigation 3

If the particles are heavier than the liquid they will eventually sink to the bottom. You can then carefully pour off the liquid. This is called decanting. Decanting can also be used to separate two liquids that do not mix





# Separating Solids and Liquids - notes



This worksheet involves making mixtures and reversing the changes. Children should become aware that not all solids dissolve. They will also investigate how to separate undissolved solids from liquids and how to separate solids of different sizes. It can also be used to introduce bar graphs.

**Where ever possible it is important to give children a context for their experiments.**

Ask why might you want to separate two types of solid?

If you were a keen gardener or farmer you might want to remove stones from your soil.

If you grind wheat to make flour you need to separate the husks from the flour.

## investigation 1

**Sieving can be used to separate two sizes of solid or larger solids suspended in a liquid.**

**EQUIPMENT NEEDED:** sieves, beakers and containers, old margarine tubs.

**MIXTURES TO SEPARATE:** Soil & stones; flour and rice; water & rice; sand & marbles; jelly tots and loose sugar; Rice crispies from the crushed dust at the bottom of the packet, or anything else to hand

Begin by asking children how they can be separated. Then suggest using a sieve.

**Make a sieve** by piercing holes in the bottom of a plastic margarine tub. The holes must be big enough to let the particles of the smallest solid through, but too small for the bigger bits of the other solid. Sometimes solids are mixed into liquids, for example dirt in water, the bits floating in real orange juice or ground coffee in a coffee maker. Try separating rice or lentils from water using a sieve. If you have made the still lemonade in the earlier example try separating the pips and bits of lemon from the juice.

## investigation 2

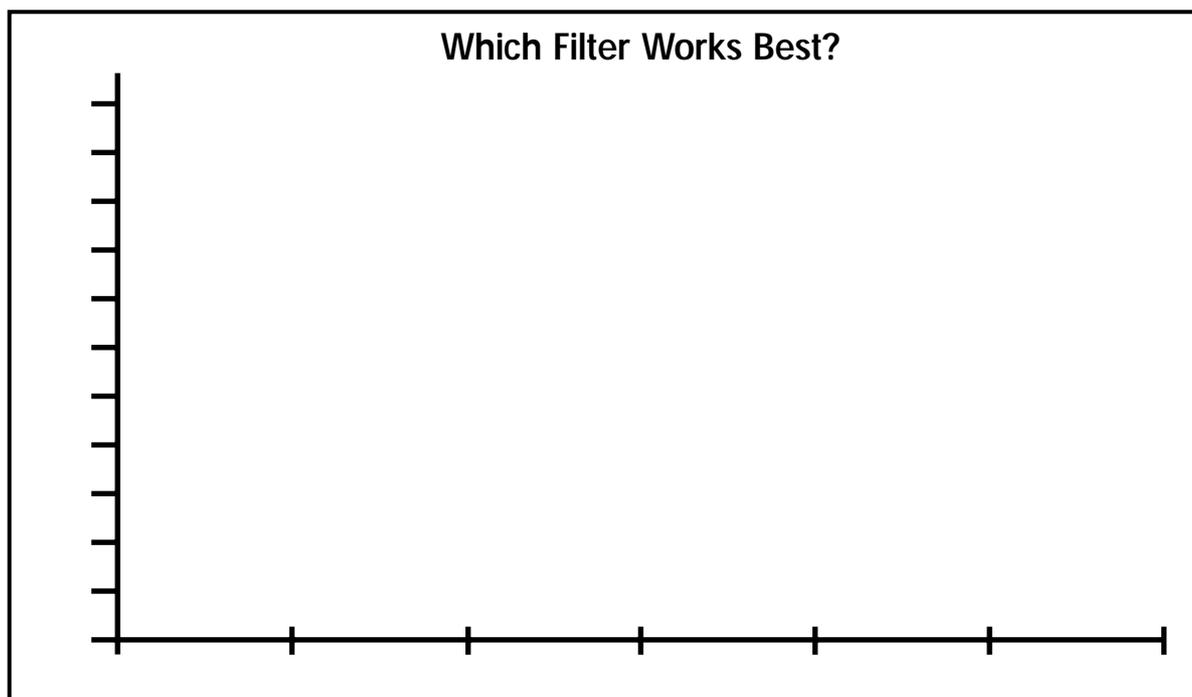
This experiment asks children to predict results and design fair tests. Older children can also time activities. The results can be recorded as a bar graph as each result is discrete from the others.

**EQUIPMENT NEEDED:** funnel, beaker, scissors and a clock with second hand or stopwatch.

**MATERIALS TO TEST:** paper towel; copier paper; sugar paper; cleaning cloth; cotton; coffee filter  
(Make a filter by folding a circle into quarters and forming it into a cone shape).

Ask how this test can be made fair? - By using the same amount of water each time. This answer can be prompted by asking "would it be fair to time a bucket of water compared to a glass full?"

Ask them to predict which will be the best?



## investigation 3

Decanting. If the particles are heavier than the liquid they will eventually sink to the bottom and the liquid can then be carefully poured off.

**EQUIPMENT NEEDED:** jug, beaker, sand & water.

Decanting can also be used to separate two liquids that do not mix

**EQUIPMENT NEEDED:** jug, beakers, cooking oil and water