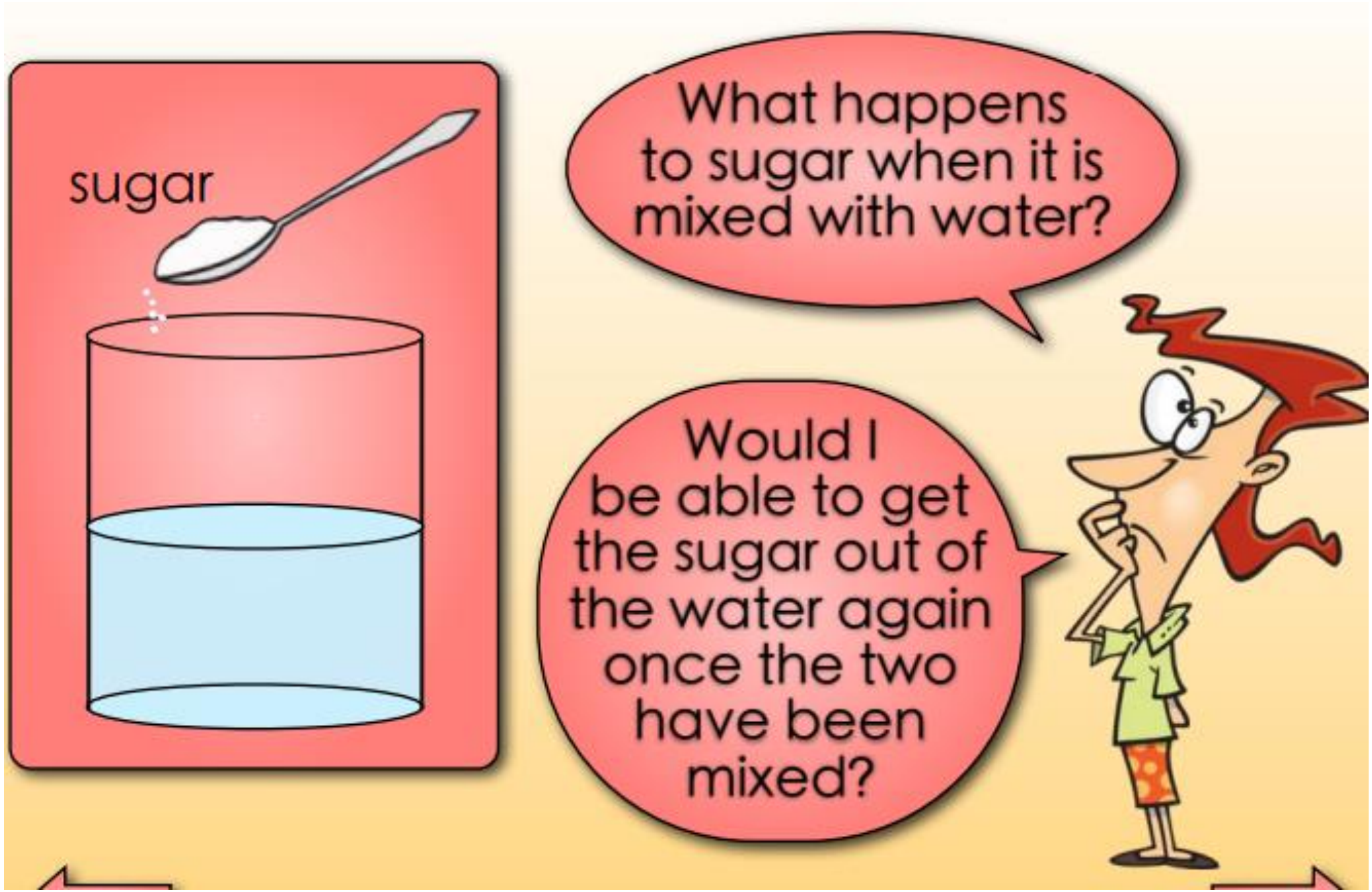
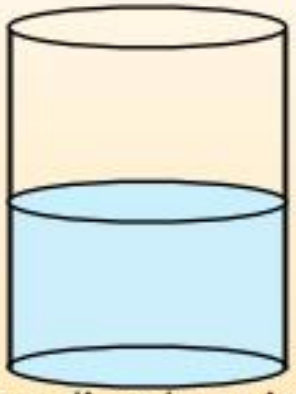
Properties and Changes of Materials

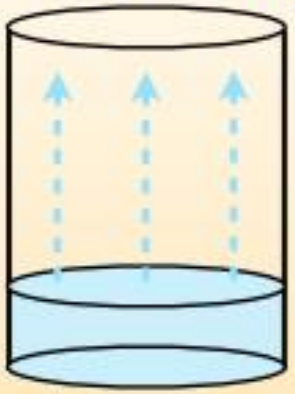
Learning objective:
That some changes of state and dissolving and mixing processes can be reversed through filtering, sieving and evaporating.


sugar
What happens to sugar when it is mixed with water?
Would I be able to get the sugar out of the water again once the two have been mixed?

Soluble materials (materials than dissolve in water) such as sugar and salt are able to be separated from water through evaporation. When the water evaporates, it leaves the salt or sugar behind.



Sugar dissolves in the water making a sugar solution. You cannot see the sugar but it is still there in tiny particles.



The water evaporates. This means that it becomes water vapour. The process will be quicker if the water is heated.

Once all the water has evaporated, the sugar is left at the bottom of the beaker. This is because sugar cannot evaporate.

Mixing water with a soluble material is a REVERSIBLE change because the change can be reversed. You can separate the materials back to their original states after they have been mixed.

BACK

NEXT


What method could you use to separate sand from water?
water
sand
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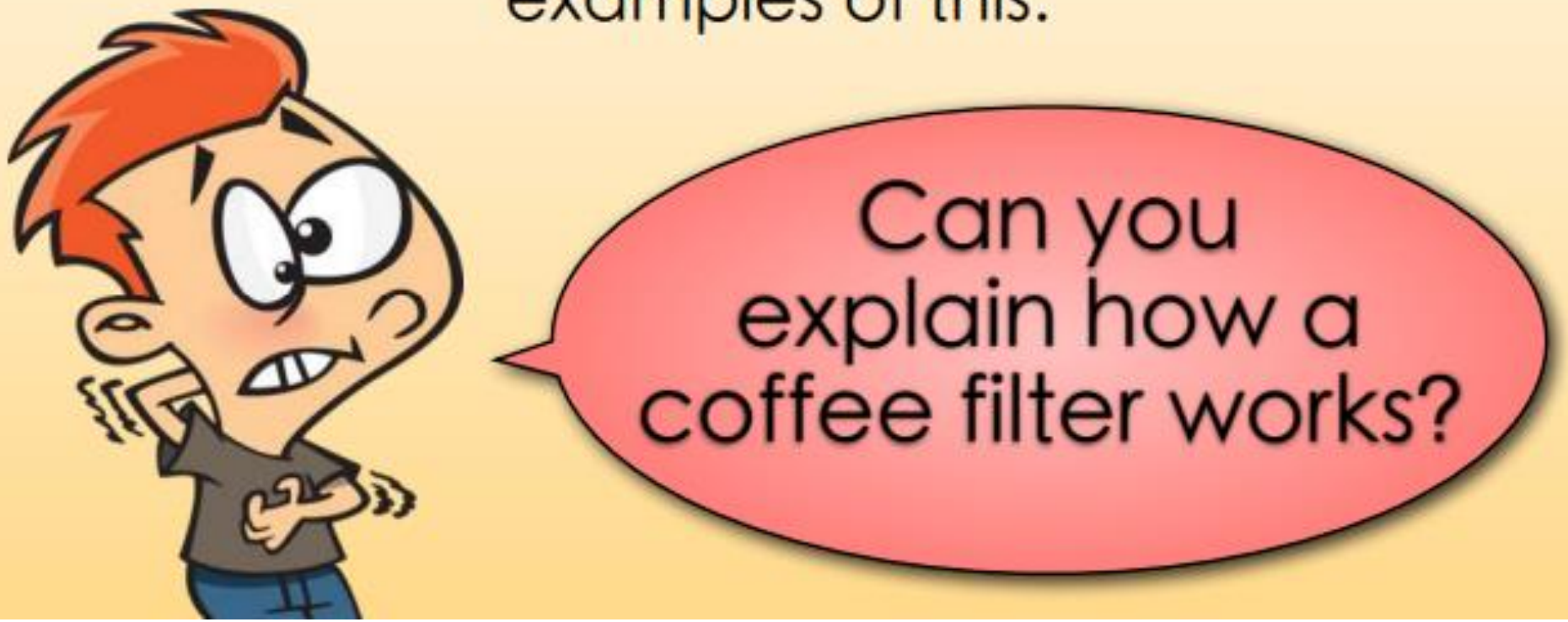
Using a filter is a good way to separate insoluble materials (materials that do not dissolve) from water. A filter is an object that has holes for the water to go through but that are not big enough to let the insoluble material through. Once all the water has gone through the filter, the solid material is left behind. Sieves and coffee filters are good examples of this.



The coffee grounds are placed into the filter.

Hot water is then poured into the filter. The coffee infuses the water and it runs through the filter as coffee. None of the coffee grounds themselves get through.

When all the water has run through the filter, the paper can be removed with all the coffee grounds still inside. Coffee without the bits!

Different filters have different sized holes which means that some are more suitable for separating certain materials than others.

BACK

NEXT

Which of these filters would be most suitable for separating each of these different mixtures? Why?

filter paper

kitchen sieve

garden sieve

marbles and water

sand and water

paperclips and water

tea leaves and water

gravel and water

lentils and water

Plenary

When some materials change state, this can also be a reversible process. For example, during the Water Cycle water can change states between being a solid, a liquid and a gas!

At which points in the Water Cycle can these changes of state occur?