Worksheet answers

Results

Write down your observations as you do the experiment.

INGREDIENT	Is it compressible? (can be squeezed)	Does it change shape?	Does it change volume? (size)
sugar (granulated)	*no*	*yes*	*no*
sugar (cube)	*no*	*no*	*no*
water	*no*	*yes*	*no*
carbon dioxide	*yes*	*yes*	*yes*

Questions

1. Why do you think you were able to change the shape of the balloon of gas when you squeezed it, but the sugar cube stays the same when you poke it?

   Particles of gas have lots of space between them so they can be squeezed closer together but solid particles are already tightly packed together.

2. Explain what would happen to the gas if the balloon popped?

   Particles of gas would spread everywhere.

3. When water is poured from one place to another it flows into the bottom of the container. Why do you think this is?

   Particles of water roll over each other and gravity pushes them towards the bottom of the container.

4. When a sugar cube is poured from one container to another it stays the same shape, but granulated sugar moves into the shape of the container. Does this mean that they are different substances?

   No, they are the same substance, just different size bits of solid.

5. Look carefully at just one grain of sugar. Does it change shape when it is poured?

   No it doesn't. Each grain of sugar keeps its shape. Each little grain is made of particles tightly packed together.

6. Which test would be best to find the difference between a solid and a liquid? Why?

   Pouring it to see if it changes shape. A liquid takes the shape of the new container but a solid keeps its original shape.

7. Which test would be best to find the difference between a solid and a gas? Why?

   Any of the tests tried — compressing, changing shape or changing volume. Solids don't compress, change shape or change volume, but gases compress, change shape and change volume.

8. Which test would be best to find the difference between a liquid and a gas? Why?

   Compressing it would be easiest. Liquids don't compress but gases do. You could also test to see if the volume changes as gases change volume but liquids do not.

9. How do the different properties of sugar, water and carbon dioxide help us to separate a soft drink into its ingredients?

   Sugar, water and carbon dioxide have different boiling points (temperatures where they turn into a gas) because they are in different states of matter at room temperature. This means heating a soft drink can separate them. Once a substance has turned into a gas, particles will escape from the mixture because gas particles spread away from each other.

   If a soft drink is heated, carbon dioxide will separate first as it's already a gas.

   Water will evaporate next — it's a liquid so will turn into gas with a bit of heating.

   Sugar will remain behind as it's a solid and will need a lot of heat to become a gas.