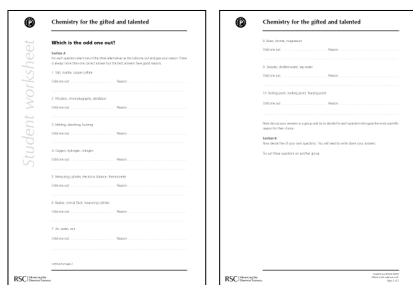
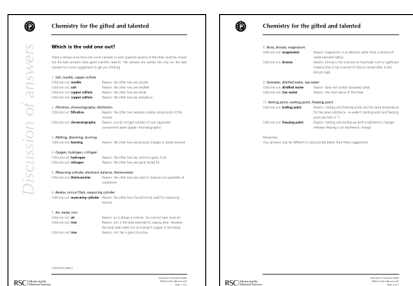


Which is the odd one out?



Student worksheet: CDROM index 06SW



Discussion of answers: CDROM index 06DA

Topics

Metals, alloys, acids and alkalis, particles, apparatus, elements, the Periodic Table, types of reaction, fixed points and separation techniques.

Level

Students in the 11–13 age range, middle to high ability.

Prior knowledge

A general awareness of chemistry taught to the 11–13 age range.

Rationale

This activity is fairly synoptic in nature and should encourage a rapid consideration of the range of concepts met in chemistry taught to ages 11–13. As scientists we often survey the available models or concepts to decide which is most pertinent to the current problem. This activity is designed to develop those skills. The students will need to think laterally in some cases. It may help students develop the skills needed for synoptic exams where the questions could be about a number of topics.

Use

The activity is synoptic and could be used as a stimulus for revision towards the end of a course. The students should be asked to work through the questions in groups of two or three. The answers could be discussed as a whole group or the *Discussion of answers* sheet could be given to the students.

The students should then be encouraged to devise their own questions and answers (perhaps for homework) which could be tested on others in their group.



Chemistry for the gifted and talented

Which is the odd one out?

Section A

For each question select one of the three alternatives as the odd one out and give your reason. There is always more than one correct answer but the best answers have good reasons.

1. Salt, marble, copper sulfate

Odd one out: Reason:.....

.....

2. Filtration, chromatography, distillation

Odd one out: Reason:.....

.....

3. Melting, dissolving, burning

Odd one out: Reason:.....

.....

4. Oxygen, hydrogen, nitrogen

Odd one out: Reason:.....

.....

5. Measuring cylinder, electronic balance, thermometer

Odd one out: Reason:.....

.....

6. Beaker, conical flask, measuring cylinder

Odd one out: Reason:.....

.....

7. Air, water, iron

Odd one out: Reason:.....

.....

.....

continued on page 2



Chemistry for the gifted and talented

8. Brass, bronze, magnesium

Odd one out: Reason:.....

.....

9. Sewater, distilled water, tap water

Odd one out: Reason:.....

.....

10. Boiling point, melting point, freezing point

Odd one out: Reason:.....

.....

Now discuss your answers in a group and try to decide for each question who gave the most scientific reason for their choice.

Section B

Now devise five of your own questions. You will need to write down your answers.

Try out these questions on another group.



Which is the odd one out?

There is always more than one correct answer. In each question anyone of the three could be chosen but the best answers have good scientific reasons. The answers are neither the only nor the best answers but some suggestions to get you thinking.

1. *Salt, marble, copper sulfate*

- Odd one out: **marble** Reason: the other two are soluble.
Odd one out: **salt** Reason: the other two are inedible.
Odd one out: **copper sulfate** Reason: the other two are white.
Odd one out: **copper sulfate** Reason: the other two are anhydrous.

2. *Filtration, chromatography, distillation*

- Odd one out: **filtration** Reason: the other two separate soluble components of the mixture.
Odd one out: **chromatography** Reason: you do not get samples of your separated components easily (paper chromatography).

3. *Melting, dissolving, burning*

- Odd one out: **burning** Reason: the other two are physical changes or easily reversed.

4. *Oxygen, hydrogen, nitrogen*

- Odd one out: **hydrogen** Reason: the other two are common gases in air.
Odd one out: **nitrogen** Reason: the other two are easily tested for.

5. *Measuring cylinder, electronic balance, thermometer*

- Odd one out: **thermometer** Reason: the other two are used to measure out quantities of substances.

6. *Beaker, conical flask, measuring cylinder*

- Odd one out: **measuring cylinder** Reason: the other two should not be used for measuring volume.

7. *Air, water, iron*

- Odd one out: **air** Reason: air is always a mixture. You cannot have 'pure air'.
Odd one out: **iron** Reason: iron is the least essential for staying alive. However, the body does need iron to transport oxygen in the blood.
Odd one out: **iron** Reason: iron has a giant structure.

continued on page 2



Chemistry for the gifted and talented

8. *Brass, bronze, magnesium*

Odd one out: **magnesium**

Reason: magnesium is an element rather than a mixture of metal elements (alloy).

Odd one out: **bronze**

Reason: bronze is the only one to have been such a significant material that it has a period of history named after it (the Bronze Age).

9. *Seawater, distilled water, tap water*

Odd one out: **distilled water**

Reason: does not contain dissolved solids.

Odd one out: **Sea water**

Reason: the most dense of the three.

10. *Boiling point, melting point, freezing point*

Odd one out: **boiling point**

Reason: melting and freezing points are the same temperature for the same substance – ie water's melting point and freezing point are both 0 °C.

Odd one out: **freezing point**

Reason: melting and boiling are both endothermic changes whereas freezing is an exothermic change.

Remember:

Your answers may be different to and possibly better than these suggestions!