# Mixtures

## What do they look like?


This activity accompanies the *Education in Chemistry* article ‘How to teach mixtures and solutions’ by David Paterson: rsc.li/2FxsuyJ

# Preparation

- Prepare a set of containers (eg jam jars, plastic pots) that contain different arrangements of simple objects (eg marbles, beads).
- An example set:
  - Just red, just blue, just yellow and just green beads in separate pots
  - A mixture of red and yellow beads
  - A mixture of green and blue beads
  - A mixture of yellow, blue and green beads
  - A mixture of yellow, blue, green and red beads
  - A mixture of smaller and larger red beads

# Preparation

- Prepare a set of sealed boiling tubes containing:
  - salt
  - sand
  - salt and sand
  - copper turnings
  - zinc granules
  - copper turnings and zinc granules

# Investigation

- You have 2–3 minutes in your groups to look at and discuss the contents of the pots.

- You should think about:
  - Which contain mixtures?
  - How can you tell?
  - What properties of the ‘particles’ are to make this decision?

- Be ready to feedback to the class.

# Group feedback

- Which pots contain mixtures?
- How can you tell?
- What properties of the ‘particles’ are you using to make this decision?

- Do you agree/disagree with what other groups are saying? Explain why.

# Pure substances

- Here we have
  - red ‘particles’
  - blue ‘particles’
  - yellow ‘particles’
  - green ‘particles’

- Each container only contains only one type of particle – so these are pure substances.

# Mixtures

- Here we have
  - red and yellow ‘particles’ together
  - green and blue ‘particles’ together.

- The containers have two different types of particles in – so these are mixtures.

# Mixtures

- Here we have
  - Blue, green and yellow ‘particles’ together
  - Blue, green, yellow and red ‘particles’ together

- The containers have more than one type of particles in – so these are mixtures.

# Mixtures

- Here we have
  - red and yellow ‘particles’ together
- We also have two pots containing only red ‘particles’.
  - small and large ‘particles’
  - medium and large ‘particles’
- All the pots contain mixtures – the ‘particles’ differ by colour **or** size.
- Different properties can make ‘particles’ different.

# Investigation

- You have 2–3 minutes in your groups to look at and discuss the contents of the boiling tubes
- You should think about:
  - Which contain mixtures?
  - How can you tell?
  - What properties of the contents are you using to make this decision?
- Be ready to feedback to the class.

# Group feedback

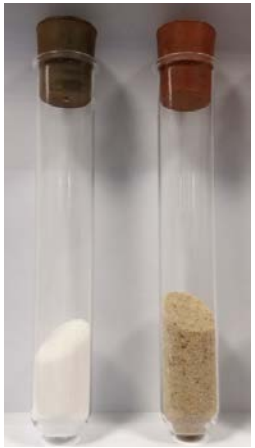
- Which contain mixtures?
- How can you tell?
- What properties of the contents are you using to make this decision?

- Do you agree/disagree with what other groups are saying? Explain why.

# Pure substances

- Here we have
  - salt
  - sand
  - zinc pieces
  - copper pieces

- Each boiling tube only contains one chemical substance – these are pure substances.



# Mixtures

- Here we have
  - sand and salt
  - zinc and copper

- The containers have more than one chemical substance in – so these are mixtures.

# Mixtures

- The ‘particles’ in the pot are the beads. Large red beads are different to small red beads so this counts as a mixture.

- In the tube, the copper pieces are different sizes. However, they are all made of copper atoms, and all copper atoms are the same. Therefore, this doesn’t count as a mixture.