

Properties and changes of materials

Exploring irreversible changes

Year 5
Age 9 - 10

For parents

Thank you for supporting your child's learning in science.

Before the session:

- Please read slide 2 so you know what your child is learning and what you need to get ready.
- As an alternative to lined paper, slide 6 may be printed for your child to record on.

During the session:

- Share the learning intentions on slide 2.
- Support your child with the main activities on slides 3 - 6, as needed.
- Slide 7 is a further, optional activity.
- Slide 8 has a glossary of key terms.

Reviewing with your child:

- Slide 9 gives an idea of what your child may produce.



Properties and changes of materials

Exploring irreversible changes

Key Learning

- Some changes to materials are not reversible. New materials are formed. These are called **irreversible changes**.
- Burning wood, rusting, cooking food and mixing vinegar with bicarbonate of soda are examples of irreversible changes.

I can...

- compare reversible and irreversible changes.
- recognise that new materials are formed during an irreversible change.

Activities (pages 3-6): 30 - 40 mins

Household items to support learning:

- Vinegar
- Bicarbonate of soda
- A cup and teaspoon

Use lined paper, a ruler and a pencil.
Alternatively, print page 6 as a worksheet.



Find out more... (page 7)

- You may like to explore more irreversible changes. There are links to a variety of alternative activities.



Explore, review, think, talk...

*How do we change materials?
(5 – 10 minutes)*

- Look at these pictures.
- Which one do you think is the odd one out?
- Explain your reasons.



*frying
some eggs*

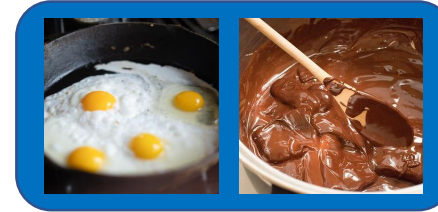


*burning a
bonfire*



*melting
chocolate*

- You may have selected ‘making food’ to choose the odd one out.



- Another way is to compare the type of change taking place. Can you get the original material back again?
- *Watch this clip and think about the changes you see happening.*
- <https://www.bbc.co.uk/bitesize/clips/zc84d2p>



Reversible and irreversible changes

Comparing reversible and irreversible changes
(10 minutes)

- Cooking an egg and burning a bonfire are **irreversible changes**.
- New materials are formed. You cannot reverse the change.



Watch this clip about irreversible changes:
<https://www.bbc.co.uk/bitesize/topics/zcvv4wx/articles/z9brcwx>

- Melting chocolate is a **reversible change**.
- No new material is formed. You can reverse the change by freezing.



- Think or talk about other reversible changes you have learnt about:
 - Mixing materials
 - Dissolving
 - Evaporation



Irreversible changes

Exploring different types of irreversible change
(10 minutes)

Some irreversible changes happen slowly, like **rusting**. Watch this clip:

<https://www.bbc.co.uk/bitesize/clips/zc89wmn>

- We can sometimes see rust on the iron and steel parts of old cars, fences or chains.



Other irreversible changes happen more quickly! Watch this clip:

<https://www.bbc.co.uk/bitesize/clips/z9wkjxs>

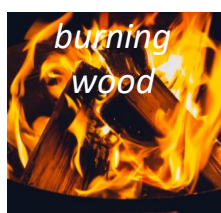
- Mixing vinegar with bicarbonate of soda produces new materials – including carbon dioxide gas.

You can try this with an adult:

- Put one teaspoon of bicarbonate of soda into a cup.
- Pour on a small amount of vinegar.
- *Watch what happens.*



Sort these examples of changes into 'reversible' and 'irreversible'. Explain your reasons.



Add more of your own examples.

I can compare reversible and irreversible changes.

Reversible changes	Irreversible changes



Find out more...

You may like to explore more irreversible changes

Ask an adult if you can investigate more irreversible changes with them:

- Use this link to the PSTT Science Fun at Home 'What a gas!' activity.

SCIENCE FUN AT HOME



- [https://pstt.org.uk/application/files/8615/8814/8781/Science Fun at Home 6 Gases.pdf](https://pstt.org.uk/application/files/8615/8814/8781/Science_Fun_at_Home_6_Gases.pdf)

- Use this link to the RSC's 'Building a rocket' activity - this is only for trying outside!



- <https://bit.ly/3avocm1>

Alternatively, you can try making bath bombs or a lava lamp.

- Use this link for bath bombs:

- https://www.youtube.com/watch?v=wieE0wSVXOQ&list=PLLnAFJxOjzZu0Qhykl_sCKp05sDa_a00kT&index=10&t=0s

- Use these links for a lava lamp:

- https://www.youtube.com/watch?v=v5a408V1BB4&feature=emb_logo

- <https://bit.ly/3aJLcOe>



Glossary of terms

Reversible: A **reversible** change can be undone or reversed; no new materials are formed. Examples of reversible changes include dissolving, mixing, melting, freezing, evaporating and condensing.

Irreversible: An **irreversible** change cannot be undone or reversed; new materials are formed. Examples of irreversible changes include burning wood, rusting and cooking food.

Dissolve: Some materials will **dissolve** in a liquid. For example, salt dissolves in water to form a clear, transparent solution. Water can **evaporate** from a salt solution, leaving the salt behind. It is a reversible change.

Mix: Some materials can be **mixed** and then separated again. When no new material is formed, **mixing** is a reversible change.

Melting: **Melting** is a change of state when a solid is heated and changes to a liquid.

Freezing: **Freezing** is a change of state when a liquid is cooled and changes to a solid.

Evaporation: **Evaporation** is a change of state when a liquid is heated and changes to a gas.

Condensation: **Condensation** is a change of state when a gas is cooled and changes to a liquid.

Changes of state are reversible.
For example:
- Solid chocolate can melt and then freeze again.
- Water can freeze and then melt again.
- Water can also evaporate or boil and then condense again.

Mixing and dissolving are reversible. The materials can be separated by sieving, filtering or evaporating.

Possible learning outcome for reviewing your work:

I can compare reversible and irreversible changes.

Reversible changes	Irreversible changes
Mixing rice and salt - You can sieve them to separate.	Frying eggs - The outside turns from transparent to white.
Melting chocolate - It can freeze back to solid chocolate.	Toasting bread - The bread changes colour.
Freezing ice cubes - They can melt back to liquid water.	Burning wood - The wood turns into black ash.
Mixing sand and water - You can filter them to separate the sand from the water.	Making a cake - The flour, eggs, butter and sugar cook together. You cannot get them back!
Boiling water - The water vapour can condense back into liquid water	Rusting iron - The iron changes colour to red-brown.
Dissolving sugar - You can leave the sugar solution to evaporate and the sugar will be left behind.	Making cement - The cement goes hard and cannot turn into a liquid again.
	Adding vinegar to bicarbonate of soda - It makes a gas.

Irreversible changes can often be recognised by a change of colour. For example, an 'egg white' changes from colourless to white when it is cooked.

New materials are formed in an irreversible change. For example, a cake is a new material made from eggs, flour, butter and sugar.

Irreversible changes sometimes produce a gas.