



STEM By The Book

Charlie and the Chocolate Factory Roald Dahl

Experiences and Outcomes

Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. [SCN 0-15a](#)

Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. [SCN 1-15](#)

By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. [SCN 2-15a](#)

Science Principles and Practice

Develops science inquiry skills, particularly observing and exploring and observation over time.

Resources (Melting chocolate)

- Hot water bottle
- White, milk and dark chocolate buttons or pieces of chocolate
- Aluminium foil or cake cases
- Access to hot water
- Wooden skewers or lollipop sticks



Activity – Melting Chocolate

In the book the chocolate factory has plenty of chocolate, both solid and melted (the chocolate river). In this investigation we look at how different chocolates behave when heated. Will they all melt at the same time, if not why not? Remember to make predictions before you begin and check back once you have completed your investigation.

Fill a hot water bottle with half a litre of hot water (roughly 65°C), gently push out any air and seal the bottle securely. This should be done by an adult.

Select one of each of the chocolate buttons or cubes of chocolate and place them each in a cake case or on a strip of foil. It is important to make sure the chocolate pieces are as close in weight and size as possible to make for a good comparative test.

Place the chocolate in the cake case on a flat area of the hot water bottle and observe what happens (Figure 1).

Changes may happen quite quickly so keep watching! If you can't see any change, use the blunt end of separate wooden skewers to gently prod each piece of chocolate (Figure 2), can you feel a difference? Discuss what has happened to the state of the chocolate, did they all change at the same time, if not why not?

Keep going back at regular intervals to check for any changes.

Look at the ingredients in the types of chocolate you used.

What differences are there? Can this explain your observations?



Figure 1



Figure 2

More resources on melting chocolate are available from [STEM Learning](#) and you can watch Brian Cox carry out a similar experiment [here](#).

Resources

Rainbow sweets
(observation over time)

- Packets of coloured sweets
- Cold water in a jug
- Foam, paper or ceramic plate (white)
- Poster tube ends (optional)



Activity – Rainbow Sweets

The Chocolate Factory didn't only contain chocolate, but sweets of every size, shape and colour. Let's carry out an observation with some more colourful sweets.

Place your plate or poster tube end on a flat surface and arrange different coloured sweets around the outside, place sweets close together in a circle or try spacing them out, try different patterns and see what happens.

Once you have arranged your sweets pour water gently into the centre of your plate until it touches all the sweets and wait to see what happens.



What's Happening

The food colouring and sugar in the sweets are soluble, when water is added they begin to dissolve into the water. The water containing the dissolved food colouring and sugar moves out from the sweets.

Can you see this happening? How long did this take?

Where the different colours meet a line separating the colours should be seen. The colours stay separate at first because the concentration of sugar, food colouring and water is almost identical.

The colours will begin to mix over time, due to the natural random movement of the molecules (diffusion) and any disturbance of the container/surroundings. How long did this take?



Before adding water



5 minutes after water is added

You can watch this investigation on [SSERC TV](#)

Read more about this investigation at [Scientific American](#).

Hints and Tips

This topic is a great introduction to scientific language. During melting chocolate introduce key words; solid, liquid, melting, solidifying, observe and predict.

In Rainbow Sweets learners might encounter words like dissolving, diffusion and concentration.

Take time to discuss these words and their meanings with your learners.

Observation over time, as with the rainbow sweets activity, provides a great opportunity to introduce some digital skills, if you have a smartphone or iPad available try making a time lapse video of your investigation to watch back and share.