

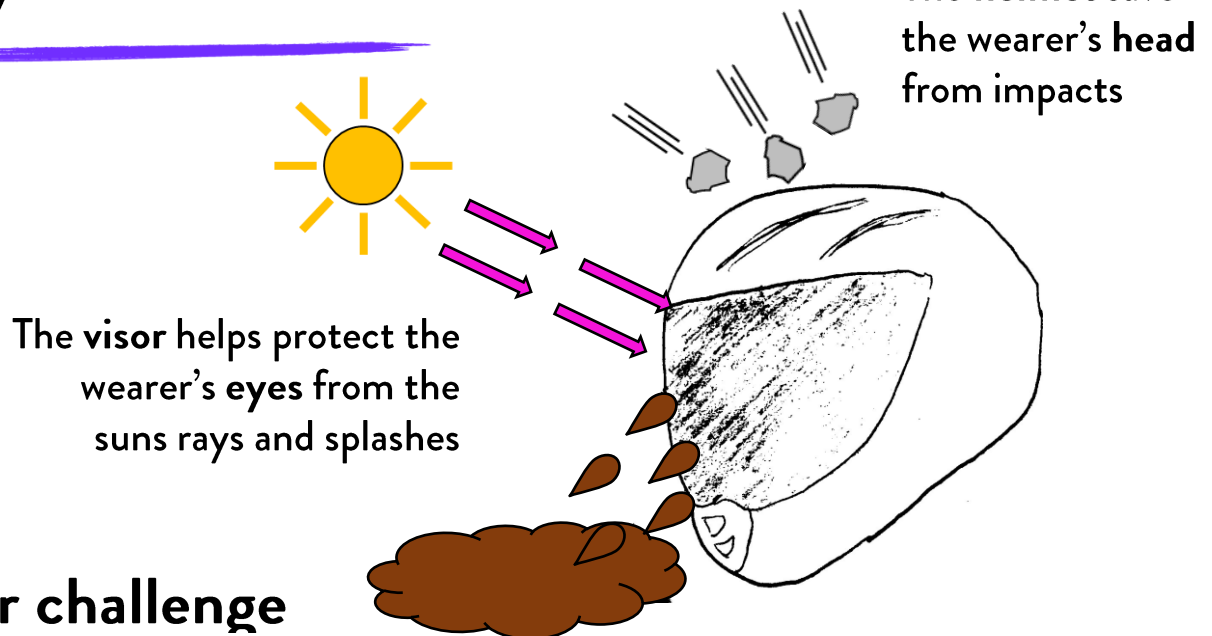
Materials Testing and Helmet design



When would you use a helmet?

Why would you use a helmet?

Why wear a helmet?



Your challenge

You have been hired by a company who wants to make a helmet to protect the wearers head and eyes BUT the only materials available are chocolate bars and sweet wrappers!!

Which chocolate bar will be best to use as a helmet?

Which coloured sweetie wrapper to use as part of a visor?

Good luck.....

Protecting your head

The most important function of a helmet is to protect your head from objects hitting your head by absorbing the energy.

1) Which one these words describes a material that breaks using only a small amount of energy?

Circle your answer

Brittle Shiny Soft Tough Magnetic

2) Which one these words describes a material that takes a lots of energy to break?

Circle your answer

Brittle Shiny Soft Tough Magnetic

3) How do you want your material to behave?

Now it is time to test your helmet materials.....

Chocolate impact testing

Write the % energy absorbed for each of the chocolate bars in the table below

	% of energy absorbed
Crunchie	
Wispa	
Wispa Gold	



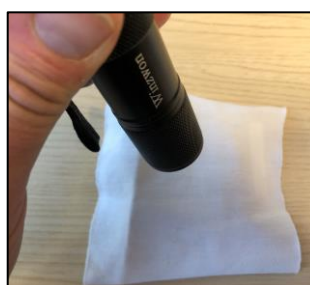
The chocolate bar which is the best to use for a crash helmet is:

Visor design

- We cannot see ultraviolet (UV) with our eyes but it can cause sunburn and damage our eyes. So the visor for a helmet it must stop as much UV light as possible.
- Test different colours of cellophane (the material used to make sweet wrappers) to work out which coloured cellophane would be best to use on a visor.



Step 1 - Take a dish of UV colour changing beads, a UV torch and a sheet of material



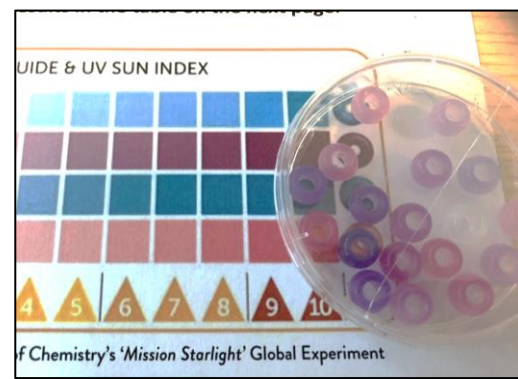
Step 2 - Place the sheet of material on top of the dish



Step 3 - Turn on the UV torch shine it on the sheet of material for 5 seconds



Step 4 Turn off the UV torch, remove the material sheet



Step 5 Compare the colour of the beads to the UV Sun Index chart and write down the number that matches the colour of the beads

COLOUR CHANGE GUIDE & UV SUN INDEX

UV SUN INDEX	1	2	3	4	5	6	7	8	9	10
Row 1	Lightest blue	Light blue	Medium-light blue	Medium blue	Dark blue	Very dark blue	Dark purple	Medium purple	Dark purple	Very dark purple
Row 2	Lightest blue	Light blue	Medium-light blue	Medium blue	Dark blue	Very dark blue	Dark purple	Medium purple	Dark purple	Very dark purple
Row 3	Lightest blue	Light blue	Medium-light blue	Medium blue	Dark blue	Very dark blue	Dark purple	Medium purple	Dark purple	Very dark purple
Row 4	Lightest blue	Light blue	Medium-light blue	Medium blue	Dark blue	Very dark blue	Dark purple	Medium purple	Dark purple	Very dark purple

Remember to write your results in the table on the next page.

Colour of cellophane	UV Sun Index

The best cellophane to use on the visor is _____

Your helmet design

Now that you have done tested your materials draw your helmet design in the box below

Remember to write down which materials you will use for the helmet and the visor (based on the experiments you have done).

