

Science Challenge



Reflective Materials

Being outside in the evening can be relaxing as well as exciting and fun, but it can also be dangerous—especially if you are around roads. At dawn, dusk and during the night, it is difficult for drivers to see pedestrians.

You will need:

- At least two grown-up assistants—one to work with you as an observer (“driver”) and one to test out the different colours in the dark and play the role of a pedestrian.
- Black or dark clothing to cover most of the body of your adult tester
- Brightly-coloured garment or item for your adult tester
- Fluorescent garment or item for your adult tester
- Reflector or item equipped with retro-reflective tape for your adult tester
- Two or more flashlights, including one that is very bright (The more powerful your flashlight, the better! It is meant to mimic a car headlight.)
- An open space with little or no lighting after dark where it will be safe to test the clothing at night



Image from: hivis.co.uk

What to do:

- Have your observer (“driver”) assistant(s) hold the brightest flashlight; stay alongside them to help rate the visibility of the test assistant.
- Have your test “pedestrian” assistant(s) take a flashlight and the three different “colours” of clothing and safely walk out a few metre straight ahead of the observer's flashlight—or until they are no longer very visible in their dark clothing. Once they arrive at a good distance for testing, have them flash a short on/off flashlight signal to alert the observer that it is time to rate the visibility.
- Now work with the observer to rate this “colour” on a scale of 0 (not visible) to 10 (highly visible), imagining that you are in a car, and the flashlight is the headlight. Then signal back (again, a short off/on flashlight light signal) when done.
- The assistant can then take out (and/or put on) the brightly colored item and signal it is time to rate the visibility of that “colour.”
- Rate the visibility with the observer. Were you surprised by this result? Now use your flashlight to signal back for the test assistant to try a different colour—this time the fluorescent one.
- Repeat the process again and then, finally with the retro-reflective item.

Conclusions:

- Is the difference in visibility of the different colours small, medium or large?
- Was your expectation correct? Are you surprised by the results? Does this change what you might wear as a pedestrian at night or in low-light conditions

Activity from: scientificamerican.com

Technology Challenge



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Design a safer bicycle helmet

Using a bicycle helmet helps to protect the brain and neck during a crash. In order to do this effectively helmets must have some sort of crushable material to absorb the shock of a collision and a strap system to ensure that the protection stays in place. The exact design of a helmet will depend on the needs and specifications of the user.

Your challenge:

Design and build a state-of-the-art bike helmet using materials you can find around the house.

Your design should include the following key parts:

- **Hard-shell**
- **Crushable liner**
- **Layer of padding**
- **Strap system**
- **Vents**



Image from: <https://pixabay.com/images/id-4769731/>

To help you, you might want to have a look at a real-life helmet and carry out research online including:

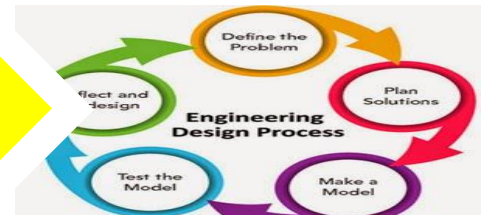
- **different helmets currently being sold**
- **suitable materials that the helmet could be made from**
- **types of straps that could be used**
- **ventilation**
- **aerodynamics.**

Extension:

Can you design an experiment to test out your new design?

Activity from: smile.cosi.org

Engineering Challenge



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Improving Road Safety

As school pupils you will need to make a journey to and from school, Monday to Friday. You may be a cyclist, a pedestrian, a passenger in a vehicle, travelling on your own or as part of a group. There will be some road safety measures already in place to help keep you safe, but are they enough?

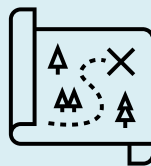
Your task:

- Think about your route to school and how you travel.
- Make a list of all the road safety measures already in place to assist you.
- Can you pinpoint any area where the journey is particularly dangerous or where the road safety measures are not sufficient?
- Is there an area where there are accidents regularly or have occurred in the past?
- Any main roads?

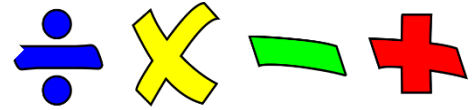
Use the information you have collected from the questions above to help you design a road safety map for your journey to school.

1. Where would you put in additional safety measures?
2. Can you think of a new way to keep people safe on the roads? A type of crossing, a rule or law, cameras, or something more inventive?
3. Would the design changes be for pedestrians, cyclists or motorists?

Draw out a map of your journey and add all the information and changes that you would make to ensure that accidents were less likely and people were safer.



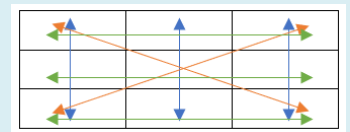
Maths & Numeracy Challenge



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Magic Square

Can you place the numbers 1-9 in the squares so that every column, row and diagonal add up to exactly 15? Remember, you can only use each number once.



This example does not work as all the columns, rows and diagonals don't add up to 15. Where did I go wrong?

3	4	7
1	8	6
9	2	5

Literacy Challenge



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Writing to inform - Adverts and brochures

What's the difference between adverts and brochures?

Adverts encourage you to buy things. They use memorable words and short descriptions. They can be seen on TV, heard on the radio and printed on posters or within different texts.

Brochures use longer descriptions and include detailed information about products and services you can buy.

Activity 1:

Access the online lesson and interactive resources from BBC Bitesize to learn about writing adverts and brochures:

<https://www.bbc.co.uk/bitesize/articles/za8m8hv>

Activity 2:

Create and design a brochure for your **new bicycle helmet** (see Technology Challenge above).

Remember to include some of the key features of brochures:

- catchy title
- subheadings
- pictures
- key Information
- grab the reader's attention
- colourful and informative



Image from: <https://unsplash.com/photos/dNo527UzhE8>

Health & Wellbeing Challenge



Road Safety Game: Take the Lead

Road Safety Week: 15-21 November 2021

Why is road safety important?

- Road crashes are the leading cause of death for children and young people worldwide.
- More than six children are killed or seriously injured on roads every day in the UK.
- Road crashes have a devastating effect on families and communities.
- Pollution from traffic causes respiratory illnesses and other diseases.
- Active travel such as walking and cycling is good for the nation's health and good for the planet.



Image from: think.gov.uk

Take the Lead online game

In this game, you are given different road safety scenarios of which you must make the correct decisions to win the game.

Access the game using the link below:

<https://www.think.gov.uk/resource/take-the-lead-game/>

Social Studies Challenge



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Road Safety

Road Safety Heroes

A road safety hero is someone who helps someone make healthy and safe journeys and supports people to make safe choices on the road.

Have a look at the statements below. Can you place each statement into one of two categories? The categories are, 'Hero' and 'Not a Hero'. Try to think of a reason to justify each of your answers.

Statements

- Drives faster than the speed limit
- Helps children cross roads at safe places
- Makes sure children sit in a child seat when travelling by car
- Uses a phone while driving
- Always wears a seat belt when travelling by car
- Drives after drinking alcohol or taking drugs
- Rescues people from vehicles after a crash
- Takes people to hospital after a crash
- Gives medical care if someone is hurt in a crash
- Designs safe streets for people
- Campaigns for road safety
- Helps someone if they are feeling sad
- Cycles at night without lights
- Parks on the lines outside school
- Wears a helmet when cycling
- Drives slowly in places where people live

www.brake.org.uk

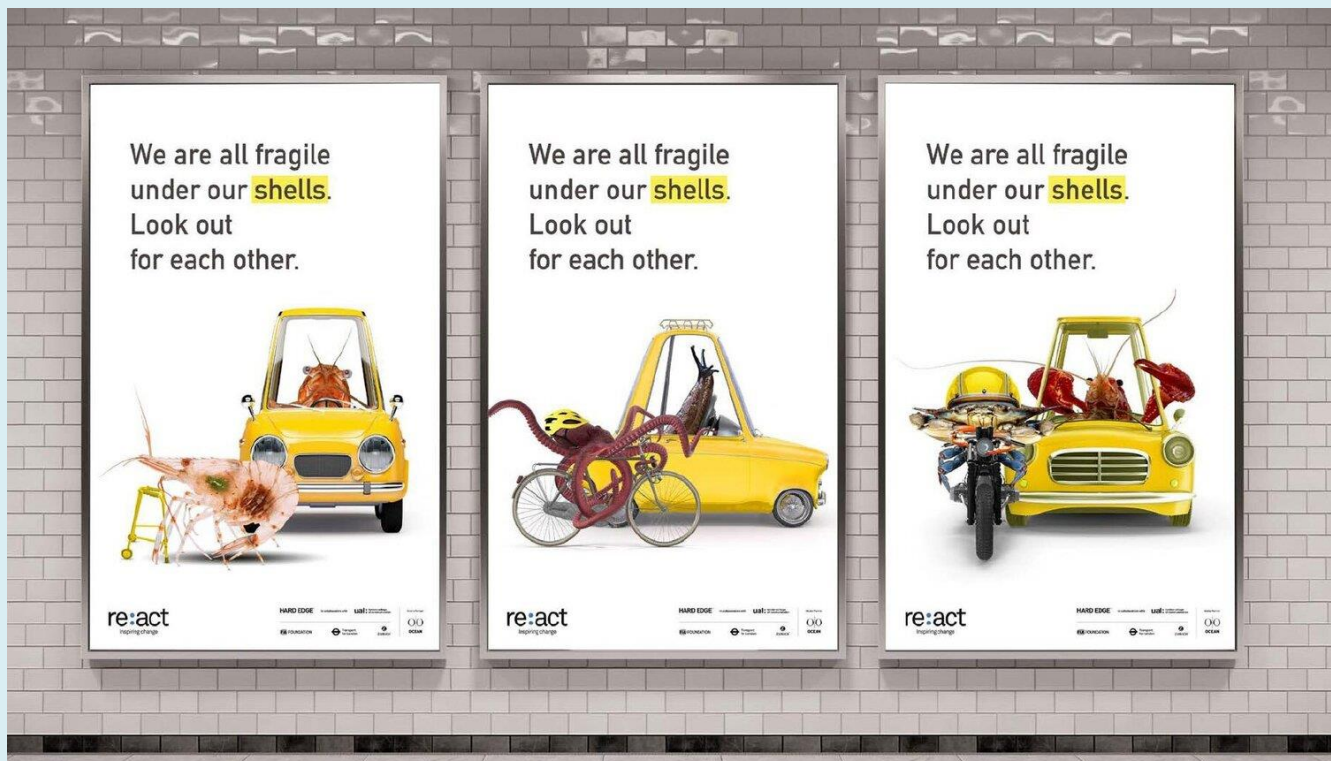
Expressive Arts Challenge



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Road Safety

A clever and eye-catching campaign, created by Agota Rencsenyi, is the selected London campaign for the 2021 Re:act international road safety behaviour change program.



Look carefully at each poster.

Discuss the meaning behind these posters with an adult.

Can you design and create your own poster design to encourage people to look out for each other?

You can use any medium you choose to create your design.

[Reactforchange.com](https://reactforchange.com)

