Year 7 Science: Home Learning Week 14

Hello Year 7, it's our last week of home learning! I hope you've enjoyed doing these activities. This week is all about light and I've included instructions for you to make a pin hole camera. I've added a link to the Royal Society's Summer Science programme, one benefit of our current situation is that a lot of these London based activities are now online. The talks and activities are generally suitable for anyone aged 12 +, there's a family quiz on Monday evening featuring celebrity scientists to test your knowledge.

Take care, stay safe, have a lovely summer break and I'll see you in September

Miss Johnston ☺

Task	Description
1	Watch this video about light: https://www.youtube.com/watch?v=cF5hFdodj7U
2	Read the following information and then answer the questions below:  The shores of the British isles are very rocky, with treacherous currents. There are hundreds of shipwrecks scattered around the coast. One particularly dangerous rock, the Eddystone rock, is 13 miles south of Plymouth. The first offshore lighthouse in Europe was built here in 1698 by Henry Winstanley. Unfortunately 5 years later the lighthouse was destroyed in a terrible storm and Winstanley lost his life as he was in it at the time. John Smeaton built the third Eddystone lighthouse in 1759. He used 24 candles in a chandelier arrangement and the light from them could be seen 5 miles away. Some of the first lighthouses used coal, wood or oil and these needed constant attention to stop them going out. It was not until early in the 20th century that reliable gas burners were used. When electricity came into use, lighthouses were among the first users of electric light. Lamps as big as footballs have been used in lighthouses for many years. Light travels in straight lines from the lighthouse to an observer on a ship. The taller the lighthouse the further away it can be seen. Lighthouses were first built to show sailors where dangerous rocks are but they also serve another function – they help sailors to work out where they are. Lighthouses are painted in particular designs and colours for identification during the day. At night the pattern of flashing or rotating lights given out is unique to each lighthouse. a) Give two uses for lighthouses. b) What is something that gives out light called? c) When and where was the first offshore lighthouse built in Europe? d) How far away could Smeaton's 24 candles be seen? i. Which fuels were used before the 20th century? ii. What was the main disadvantage of using these fuels? iii. Give one advantage of using electricity. e) Why can the light from a tall lighthouse be seen further away? Draw diagrams with rays on them to help your explanation. (*Hint:* Think about the shape of the Earth.) f) How can sailors work out their position by looking at a lighthouse at night? g) Why are lighthouses painted different colours?
5	**Practical Activity: Make a pin hole camera.**

Practical details:

Make a Pin Hole Camera

Why do this?

A pinhole camera is a very simple camera. This version does not use photography paper or chemicals, so you can't develop your picture but it is very similar to the concept of how a camera works. Try making a pinhole camera and examine your home or garden with it.

Safety

- Take care when using scissors
- DO NOT use the pin hole camera to look directly at the sun – doing so can seriously damage the retina in your eye and cause blindness.

Equipment & materials

- Cardboard
- Tracing paper
- Pinhole camera template
- Sticky tape
- A glue stick
- Scissors

Method

1. Glue the camera template to you cardboard and cut it out carefully to make a net.
2. Use a pencil to make a hole on the side with the dot.
3. Cut out the square window and tape the tracing paper in place.
4. Carefully fold the net along the dotted lines to make a box – the tracing paper should be on the inside.
5. Use tape to hold the tabs in place.

Once you've made the camera, place it in a bright room and see what you can see projected onto the tracing paper.

Expected observations and results

You should see an upside down image projected onto the tracing paper.

Background notes

You do need strong sunlight to make this work so if it doesn't, try going outside instead.

Questions and ideas for further investigation

- Did you know that 10% of all photos ever recorded were taken in the last year? Why might that be?
- You could try to make a larger pin hole camera by using a larger box – does it create a larger image?
- How does the size of the pin hole affect the image?
- You can find out about how you can make photographs using a pinhole camera by watching this video from The Royal Institution: https://www.youtube.com/watch?v=O4bf2IO3-Wg . Their home developing technique is really good but the direct positive photo paper that you'd need is very expensive!
- Find out about the invention of cameras here: https://www.youtube.com/watch?v=XaGUL8B-BrE