

6<sup>th</sup> May

## Memory Verse

**Trust in the Lord with all thine heart;** and lean not unto thine own understanding. In all thy ways acknowledge him, and he shall direct thy paths. Proverbs 3:5-6



## Something to investigate

We learned about Isambard Kingdom Brunel, the great Victorian tunnel builder, on 9<sup>th</sup> April. On 6<sup>th</sup> May 1994 the Channel Tunnel was officially opened by the late Queen Elizabeth II and the President of France.<sup>1</sup>

But who tried to build the *first* tunnel under the channel? Why did they give up? What does the picture below have to do with it?

If you ever visit Wrexham in Wales look out for the memorial ceramics in the archway in Argyle Street.<sup>2</sup> They celebrate the work of William Low a mine owner and engineer from Wrexham who drew up the first practical plans for a channel tunnel. Low, from his practical mining experience, realised the importance of ventilation in any channel tunnel project and his plan, drawn up in the 1860s, solved the problem. Between 1878 and 1883 work was begun on the tunnel and continued until over a mile was completed and when worked stopped it was not because of any problems with the work or inadequacy in the design. Defence considerations caused the work to be halted.

In the Bible we read how King Hezekiah had a tunnel dug to ensure the water supply of the city of Jerusalem during a siege.<sup>3</sup>



## Map work

You can find the channel tunnel on a map in your atlas and trace its route. Measure how long it is and how much of the length is actually under water.

## Something to make

Little ones would enjoy crawling through their own tunnel. One can be made simply by arranging the furniture in a suitable way and draping it with sheets, blankets or duvets. Even a small tunnel is fun. The channel tunnel has bends in it in order to follow the strata of chalk under the sea. You can put bends into your tunnel for extra fun and also to make a longer tunnel in a small space. The darker you can make it inside the tunnel the better. If you can manage to make it very dark, a torch would add more adventure to the game.

<sup>1</sup> There is an inspiring video of highlights from the construction here:

<https://www.pbslearningmedia.org/resource/phy03.sci.phys.mfw.bbchunnel/building-the-channel-tunnel>

<sup>2</sup> [www.wrexham-history.com](http://www.wrexham-history.com) picture by kind permission.

<sup>3</sup> See 2 Chronicles 32:2-4 and 2 Kings 20:20. There is a good picture of Hezekiah's tunnel and some information here: <https://creation.com/hezekiah-archaeology-2>

Children who have any kind of train set can make a tunnel out of cardboard, brick Lego or anything suitable.

### Something to read

#### Hindenburg Disaster 1937

For many years the debate went to and fro: did the future of air transport lie in heavier than air machines such as those developed by the Wright Brothers or in lighter than air machines – gas filled balloons? The heavier than air machines claimed the lives of many intrepid pilots in the early days but by the 1930s regular passenger flights in aeroplanes and flying boats were readily available although too expensive for ordinary people.

Lighter than air machines had also had their problems with accidents. The crash of the British R101 in 1929 ended interest in lighter than air machines in this country and Americans also suffered a number of serious accidents. In the USA the use of Helium gas instead of Hydrogen made these dirigibles, as they were called, safer.

On 6<sup>th</sup> May 1937 the passengers of the massive German airship, the Hindenburg were preparing to disembark. They had had a luxurious journey from Europe to New York in comfortable cabins with spacious dining rooms, staterooms and promenade decks. The trip had been a quiet one lasting four days. A thunderstorm broke as the airship was due to moor at its mast so the captain circled the ship round. Suddenly a sheet of flame was seen shooting across the tail of the gas filled envelope. The ship began to fall to the ground, its tail blazing. Despite the nature of the accident, sixty-two of the ninety-seven occupants escaped with their lives but the days of passenger airship travel were over. Passengers would travel in heavier-than-air planes from now on.



### Something to find out

Airships were kept aloft by bags filled with *gas*. There are three states of matter, solid, liquid and gas; can you find out more about the gasses helium and hydrogen? Why would a bag filled with either of these gasses go up in the air? Why was helium better for filling airship gas bags than hydrogen?

Before the hydrogen and helium air ships hot air was used to raise balloons into the air. Hot air rises because it is less dense than cold air. These balloons were limited in what they could do because they were not *dirigible* – that is capable of being steered or propelled. Hot air balloons are still used today but for fun rather than for transport.<sup>4</sup>

### An experiment to do

You can make your own hot air balloon if you have a hair dryer, a bin bag, and an elastic band. An even better balloon can be made if you can find a thinner bag such as the type used to cover dry cleaning. If you use this type of bag you will have to tape over the little hole at the top where the coat hanger sticks through when the bag is in use. Use just a small piece of tape. Arrange the hairdrier in a convenient place with the nozzle facing upwards and turn it on so that it blows hot air upwards. Put a small rubber band over the loose end of the bag. Now stretch open the

---

<sup>4</sup> You can find out more about this here: <https://www.explainthatstuff.com/how-hot-air-balloons-work.html>

end of the bag and put it over the nozzle of the hairdrier which should be on its maximum setting. The bag will fill with air but wait until you feel very hot air rushing out past your fingers. Then release the balloon and watch it float up to the ceiling.<sup>5</sup>



### Art

The Optional Resources file has an example with instructions of how to do shading using an outline picture of a bunch of gas filled balloons. You could print the file or, if that is not possible, the balloon shapes would be very easy to draw by hand and the instructions could still be followed.

---

<sup>5</sup> I tried this experiment and just ended up with melted plastic bags and a cut out hair-dryer. You may do better! You can see a demonstration of a better type of balloon here: <https://www.youtube.com/watch?v=5BS9JU7PwI>