Year 8 Science: Home Learning Week 13

Hello Year 8, there are no BBC Bitesize science lessons this week or next week but I've still put some activities together for you to complete, based on the work of Luigi Galvani and Alessandro Volta – there's an unusual link to English here, their work inspired Mary Shelly to write Frankenstein!

I've included instructions for you to make Oobleck, as always, remember to get permission from an adult before doing any practical activities and clean up after yourself when you're finished!

Take care & stay safe

Miss Johnston ☺

Task	Description
1	Watch this clip about the work of Galvani and Voltare: https://www.youtube.com/watch?time_continue=3&v=FF0Q_7HMYyw
2	Read the following biography text: Dr Luigi Galvani (1737–1798) studied the bodies of frogs at the University of Bologna in Italy in the 1780s. One day he was examining a nerve in a frog's leg, and he noticed that it twitched when a spark was made by a machine at the other end of the laboratory. Galvani thought that the twitch was connected with the spark. He predicted that other sparks of electricity should make a frog's leg twitch, and he tested this idea by hanging a frog's leg outside when there was a thunderstorm. The leg twitched when lightning flashed. Unfortunately for Galvani's theory, he also found that he could get a frog's leg to twitch without lightning. The leg would twitch if he pushed a copper hook into a frog's nerve and hung it on an iron wire. Galvani decided that animals' bodies contained a new kind of electricity, which he called 'animal electricity'. He thought that this animal electricity would make muscles twitch when a piece of metal connected the nerve to the muscles. He published his findings in 1791, leading to people calling electricity 'galvanic current' after Galvani. Alessandro Volta (1745–1827) was a professor of physics at the University of Pavia, in Italy. Volta heard about Galvani's experiments with frogs legs, but he did not believe that the frog's leg had produced the electricity. He thought that the two metals, copper and iron, had made the electricity when they touched. The electricity made by the metals had made the leg twitch. In 1794, Volta started experimenting to test his theory by trying to make electricity without any animal tissue. Eventually, Volta made a cell (or battery) from a pile of pieces of zinc and copper, with each pair of metals separated by paper soaked in salt solution. He demonstrated his cell in 1800, and in 1801 he went to Paris to show it to Emperor Napoleon. Volta's work was so important that his name was used as the unit for measuring the energy carried by electricity, the volt and modern batteries are made from cells, based on voltaire's design. Volta and Galvani were both partly right and partly wrong. Galvani was correct, because we now know that nerves do conduct electricity, but it is not a different kind of electricity. Volta was also correct – the electricity that made the frog's leg twitch was caused by the two different metals, but this is not the only way that electricity occurs in bodies.
3	1. Who started experimenting with electricity first: Galvani or Volta? 2. When Galvani studied frogs' legs… i. What was his first observation? ii. What was his theory to explain this observation? iii. What did he do to test this observation? iv. Did this experiment support his theory? 3. What other observations did Galvani make? Did these other observations support his theory? 4. What was Galvani's new theory to explain all his observations? 5. When did Galvani tell other scientists about his findings? 6. What was Volta's theory to explain Galvani's observations? 7. How did Volta test his theory? 8. Who was right? Explain your answer.
4	**OPTIONAL PRACTICAL ACTIVITY: Make oobleck**

Practical details:

Making Oobleck Slime

Why do this?

Fancy making a weird slimy concoction that acts like a liquid but behaves like a solid when you hit it? Most liquids behave in a predictable manner, but non Newtonian liquids like oobleck slime do not stick to the rules and acts in a very curious way, crossing the boundaries between solids and liquids.

Safety

- This activity is hands-on and rather messy, so make sure you're not wearing your best clothes!
- When you've finished, do not pour the slime down the sink as this could clog the pipes, instead spoon the mixture into a zip-lock bag, fasten it tightly and dispose of it in a bin.
- Don't eat the slime, it won't taste very nice and could be full of bacteria if you've put your hands in it.

Equipment & materials

- Large mixing bowl
- Measuring jug
- Cornflour
- Water
- Spoon
- Clear re-sealable storage bag

Method

To make the oobleck:

1. Place some cornflour into a large mixing bowl
2. Little by little, add water and use your hands to mix it into the cornflour.
3. Keep mixing until the cornflour and water have blended together and the slime is the consistency of thick honey.

Once you've made your slime, try out a few experiments to see how your slime reacts. Do you think your slime is a liquid or a solid? Why not try the following? Test out:

- Punching the slime and drawing back your hand quickly
- Scooping some of the slime into your hand and rolling it into a ball between your palms
- Leaving your slime out over a few days/overnight and seeing if you can you make it slimy again once it has dried out
- Spooning some of the slime into a re-sealable storage bag until its two-thirds full, and then gently pushing a delicate object (e.g. a biscuit) into the mixture. Then try dropping the bag from a tall height (around 2m) and see how high you can you drop it from before the object breaks

Expected observations and results

You should find that oobleck behaves like a liquid when handled gently, but like a solid if handled forcefully. This is because the cornflour doesn't actually dissolve into the water, so the oobleck is a mixture of water particles and the very small cornflour particles. The mixture binds together tightly under stress.

Background notes

- Make sure you add the water slowly and carefully otherwise the cornflour might clump together or the mixture could be too runny.