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July 2020

Week 12 #SolveItWithSTEM@Home Experiment Pack for Secondary Schools *featuring Alice and Eddie - our STEM Gurus*

Reminder: Make sure you do the experiment safely and with an adult present!



Hey, it's Eddie here! We have swiftly moved onto Week 12.

This week we have introduced 'Inspirational STEM Figures' – we will be introducing a new figure for the next three weeks.

Our first STEM figure has played an important role in inclusion and diversity within the STEM community. Why don't you have a look...



Inspirational STEM Figure: Mary Jackson

For the next three weeks, we will be focussing on inspirational STEM figures from around the world. This week, our STEM figure is Mary Jackson! Mary Jackson was an American mathematician and aerospace engineer.

In 1951 she started working at the National Advisory Committee for Aeronautics (NACA), where she was a member of its West Area Computing unit - the West Computers, comprising African American female mathematicians - and Mary's supervisor was Dorothy Vaughan. The women provided data that were later essential to the early success of the U.S. space program. At the time, NACA was segregated, with black employees required to use separate bathrooms and dining facilities.

In 1953 Jackson left the West Computers to work for engineer Kazimierz Czarnecki, conducting experiments in a high-speed wind tunnel. He suggested that Mary enter a training program that would allow her to become an engineer. Since Virginia's schools were still segregated, she had to obtain special permission to take classes with white students. Mary ultimately completed the necessary courses, and in 1958 she became the first black female engineer at NASA, which had been established earlier that year; NACA had been incorporated into it.

Mary worked as an aerospace engineer for some 20 years. Much of her work centred on the airflow around aircraft. Despite early promotions, she was denied management-level positions, and in 1979 she left engineering and took a demotion to become manager of the women's program at NASA. In that post, she sought to improve the opportunities for all women at the organisation.



Inspirational STEM Figure: Mary Jackson

In 2016, a film called **Hidden Figures (PG)** was released – based on a team of female African-American mathematicians who served a vital role in NASA during the early years of the US space program. **Worth a watch!**

Last year, NASA renamed the street outside its headquarters as Hidden Figures Way. "Hidden no more, we will continue to recognise the contributions of women, African Americans, and people of all backgrounds who have made NASA's successful history of exploration possible," Mr Bridenstine (NASA Administrator) said in a statement.

"Mary W Jackson was part of a group of very important women who helped NASA succeed in getting American astronauts into space," Mr Bridenstine added. "Mary never accepted the status quo, she helped break barriers and open opportunities for African Americans and women in the field of engineering and technology."

From a recent article (just last week on 25 June 2020), NASA will name its headquarters in Washington DC after Mary Jackson!



To celebrate the incredible work and dedication by Mary Jackson, we have based a few slides on all things space and NASA related!
We hope you enjoy...

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Imagery and information from: [Britannica](#), [BBC World News](#), [IMDb](#)

Experiment #20: Make a cloud in a bottle

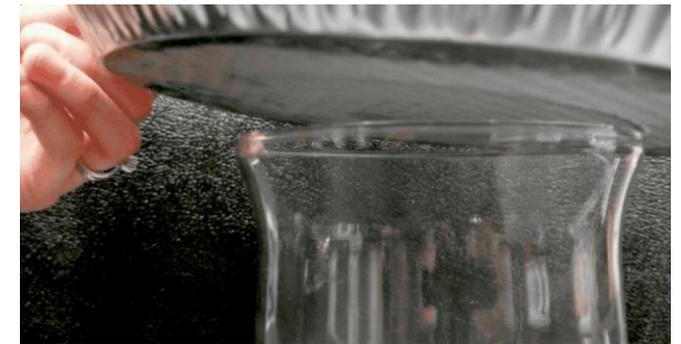
(Make sure you have an adult help you with this experiment)

Items Required:

- Transparent glass jar
- Warm tap water (not boiling)
- Metal tray or hard-plastic frozen ice pack
- Ice
- Spoon
- Match

Instructions:

- 1. Form the water vapour:** Fill a jar with 2 inches (5 cm) of warm water and stir. The warm water will form water vapour through a process called evaporation. Evaporation is the process of liquid changing into gas. The water vapour will begin to rise inside the jar. You will not be able to see the water vapour. It is an invisible gas.
- 2. Form smoke particles:** Ask an adult to light a match, blow it out and quickly drop it into the jar. The smoke particles will provide a surface for the water to condense on.
- 3. Cool it:** Immediately place an ice-filled metal tray or hard-plastic frozen ice pack on top of the jar.
- 4. Watch the cloud appear:** Observe the inside of the jar carefully. A misty cloud should appear near the top of the jar. Why does this happen? The warm water vapour mixes with air and smoke particles. It rises inside the jar and then cools when it comes near the tray of ice. As the water vapour cools, it condenses into very tiny droplets on the smoke particles. When enough condensation occurs, we see it as a cloud. If you have a hard time seeing the cloud, slightly lift the metal tray or ice pack from one side of the jar and look for wisps of cloud escaping the jar.
- 5. Make it disappear:** Remove the metal tray or ice pack. What happens? The cloud disappears. Why? As the cold cloud warms up, the condensed water droplets evaporate once again and turn into water vapour.

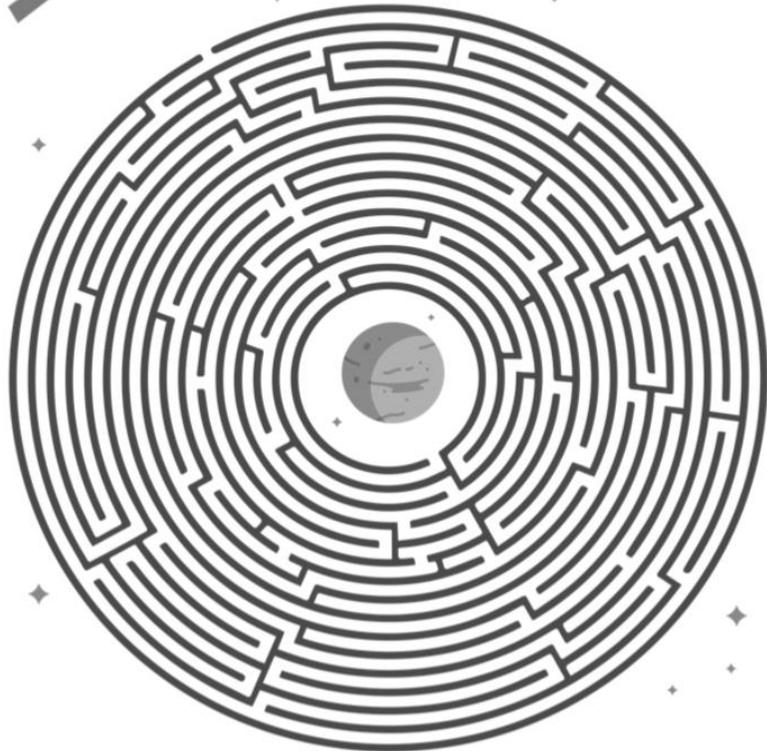
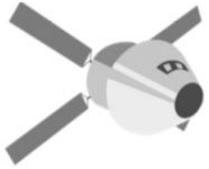


This exact process occurs naturally in our environment. The particles aren't always from smoke. They can be particles of various materials, including dust and pollen. Evaporated water condenses to form clouds. These clouds may later produce rain or snow, which is commonly called precipitation. Together, evaporation, condensation and precipitation play an important role in the water cycle.

Experiment taken from
[NASA.gov website](https://www.nasa.gov) –
check it out!

Space puzzles and activities!

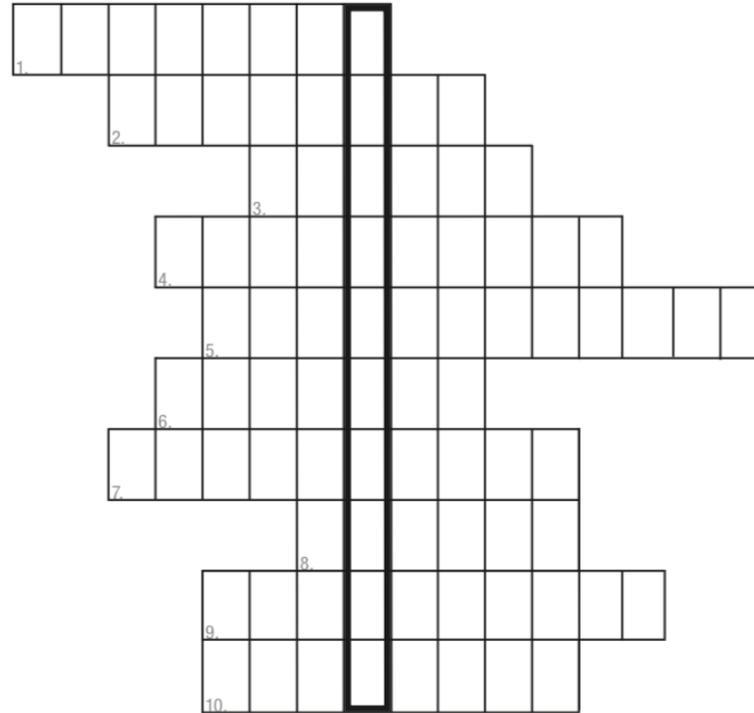
Help Orion find Mars!



Orion is a spacecraft that will carry astronauts to Mars and beyond. It will be NASA's most advanced spacecraft in order to keep crew safe during their mission. It is designed to support long periods of space travel and to withstand the harsh environment of reentry into atmosphere.

Hidden Word

Fill in the spaces with the names of everyday objects that NASA technology has impacted. Clues to the items are below. The letters in the bold box make a secret word.



1. Worn to the pool or beach
2. What your bed sheets cover
3. A noisy machine that cleans floors
4. Squeezed from a tube to freshen your breath
5. Used to hit a ball back and forth across a net
6. Footwear used for a sport that takes place on snowy slopes
7. Tool to provide light in dark places
8. Storage box for keeping food and drinks cold
9. Protects your eyes from brightness
10. Soft, easy-to-eat food for infants

Why not give these activities a go...we will include the answers to *Hidden Word* next week!



Activities taken from the [NASA.gov](https://www.nasa.gov) website!

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Week 12 – Maths brain teasers!

Which 4-digit number multiplied by 4 gives the same number in reverse?

$$ABCD \times 4 = DCBA$$

What number should replace the question mark?

$$A + B = 76$$

$$A - B = 38$$

$$A / B = ?$$

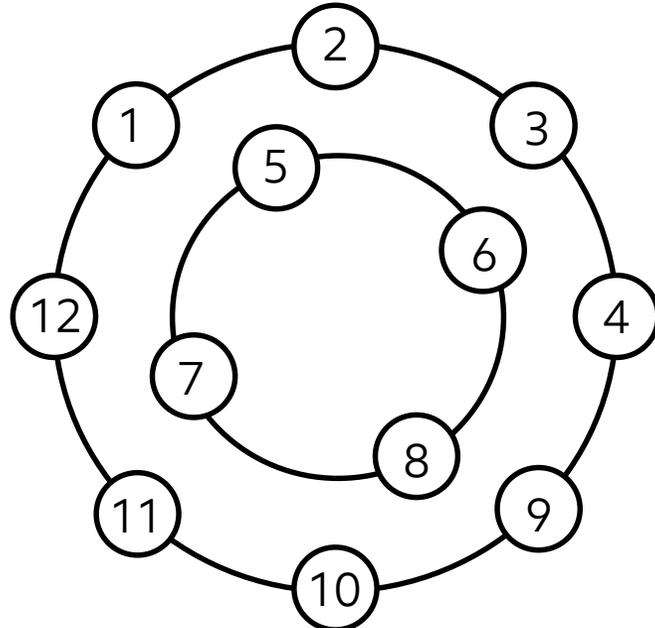
Why not give these a go!
The correct answers will be included within next week's pack...stay tuned.



Week 11 – Answers to the Maths brain teasers!

30	1	12	7
11	8	29	2
5	10	3	32
4	31	6	9

Magic Square with
a constant of 50



There are a number of different solutions – the inside circle must add up to 26, then the remaining numbers add up to 52.

We hope you enjoyed the Week 12 activities.

Week 13 will be coming soon.

Just to let you know, Week 14 will be our last #SolveItWithSTEM week as we take a break during the Summer Holidays – we hope you have found the packs fun and educational! Keep an eye out for new packs next term!

Best wishes

The ExxonMobil Fawley #SolveItWithSTEM Team!