

# Sky and Earth Badge

Over the next few weeks we will be sharing some activity ideas with you so that you can still enjoy some Guide activities whilst you're at home.

This term we were due to start the 'Sky and Earth Badge', so let's start with that one!

Send us an email with everything you've done so that we can sign off your badge. We'll keep a record of all of the badges you earn, and we will give them out when we are next all together at Guides.

We've tried to make sure the activities can be done at home without the need to go and buy resources – we are flexible though so please adapt the activities if needed. 😊

Chose to do any 4 out of the following activities (you don't need to do all 6). You can tick off the 4 activities when you've completed them.

Make a pinhole camera	
Features of the moon	
Defy Gravity experiment	
Eat like an astronaut	
Model space station	
Stargazing	



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## Make a pinhole camera

You don't need fancy glasses or equipment to watch one of the sky's most awesome shows - a solar eclipse. With just a few simple things you can make a pinhole camera that lets you watch a solar eclipse safely and easily from anywhere.

### What you need

- Two pieces of white card
- Kitchen foil
- Tape
- Paper clip or pin

## Instructions

1. Cut a square hole into the middle of one of your pieces of card roughly about 4cm x 4cm. Tape a piece of kitchen foil over the hole and use your pin or paper clip to poke a small hole in the middle.
2. Place your second piece of card on the ground and hold the piece with the foil above it (foil facing up). Stand with the Sun behind you and view the projected image on the card below! The further away you hold your camera, the bigger your projected image will be.
3. To make your projection a bit sharper, try putting the bottom piece of card in a shadowed area while you hold the other piece in the sunlight.

For extra fun, try being creative and poking multiple holes in your foil, making shapes, patterns and other designs. Each hole you create will turn into its own projection of the eclipse, making for some cool effects.

## Important reminder

You should never look at the Sun directly without equipment that's specifically designed for looking at the sun. Using binoculars or a telescope could severely damage your eyes. Solar eclipses themselves are safe, but looking at anything as bright as the Sun is NOT safe without proper protection. And no, sunglasses do NOT count.

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## Features of the Moon

The Moon has lots of features such as valleys, mountain ranges, craters and water such as lakes and seas.

Lots of features are named after people e.g. Mary Blagg, the astronomer has a crater named after her, and Archimedes the Ancient Greek mathematician and inventor also has a crater and a mountain named after him.

Did you know if you went to the Moon you could visit the Sea of Cleverness or the Ocean of Storms? Or perhaps you would rather visit the Lake of Happiness or the Bay of Rainbows?

Your challenge is to research the features of the Moon – share your research with us as a poster, a vlog, a painting, collage, photographs, however you want. Be creative!

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## Defy Gravity Experiment

Gravity is the force that pulls matter toward the Earth. It is why objects fall to the ground when dropped and why when you jump into the air, you come right back down. Gravity is what holds the planets in orbit around the Sun and what keeps the Moon in orbit around Earth. Gravity is what gives you weight.

Is there a way to defy gravity? Can something that normally falls to the ground simply not fall? Why don't you find out by carrying out this simple experiment?

### What you'll need:

- Large bowl of water

- Food colouring
- Small clear glass or cup

### **Instructions**

1. Fill the bowl with water and add a bit of food colouring, mix well. The colour isn't essential, but it will make it easier to see what happens.
2. Place a small glass in the bowl so it fills with water. Ideally, you want the glass submerged.
3. While keeping the glass under the water as much as possible, turn the glass upside down in the bowl. The glass should be full of water with no air.
4. Carefully lift the glass until the top of the glass is just below the surface of the water. Notice that the water is still in the glass and isn't falling back into the bowl. The water seems to defy gravity. Lift the glass above the surface of the water, what happens to the water?

### **What happened?**

There are two forces at play in this experiment – gravity and air pressure. Gravity is always pulling matter to the Earth and the same is happening with the water in the glass. While the glass is being lifted out of the water, gravity is trying to pull the water to the Earth and out of the glass.

Air pressure is always at work as well, constantly pushing on matter. In this case, it is pushing down on the water around the glass. This pressure is enough to overcome the force of gravity on the water, which stays in the glass instead of falling back into the bowl. When the glass is lifted out of the water, air rushes to the top of the glass and forces the water to fall out.

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## **Eat like an astronaut**

Astronauts in space cannot eat food like we can on earth. If an astronaut tries to put down a sandwich, the lack of gravity would cause the pieces of the sandwich to float into the air in separate chunks. So, what do astronauts eat in space?

Astronauts eat foods that are dehydrated or packaged in vacuum sealed bags which are then hydrated with water in space.

### **What you'll need**

- Ziplock plastic food bags
- Wide straw
- Foil
- Sticker with meal info written on it
- Sellotape
- Recipes ingredients as below or make up your own

### **Instructions**

1. Make up the food any way you like or use one of the simple recipes below, or make up your own recipe!

2. The consistency of the food should be thin enough to be sucked through the straw. Spoon it into the ziplock bag and place the straw in, then close the bag squeezing out as much air as possible using sellotape to hold the straw in place.

### Recipe one

Combine three cups of cubed watermelon, one cup of frozen strawberries and two teaspoons of lemon juice in a blender and chill until required.

### Recipe two

Make or buy a simple apple sauce, this can be served warm or cold.

### Recipe three

Use a whipped dessert mix made up with milk.

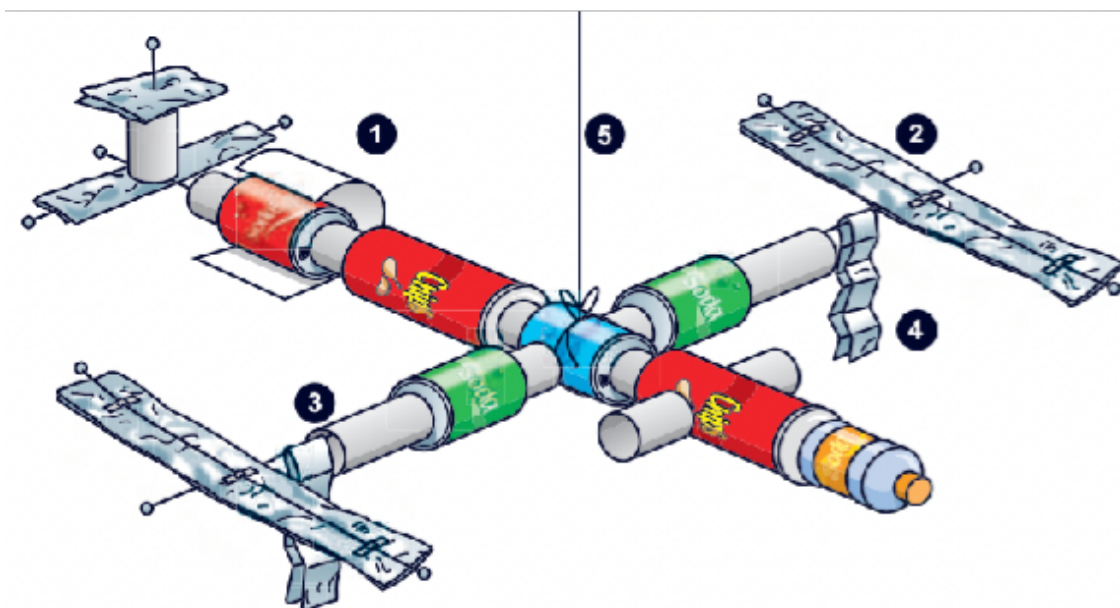
### Recipe four

Stir-fry some chicken and vegetables and boil some rice. Blend it in a food processor and add a little boiling water. The mixture will cool whilst you are putting it into the bag, or alternatively you could make this in advance and reheat before serving.

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## Model space station

Build your own space station. Use cans and aluminium foil or other material that looks like the Space Station's modules and solar panels.



### What you'll need

- Empty soft drink cans and crisp tubes
- Toilet roll tubes
- Wooden skewers or sticks
- Kitchen foil
- String
- Paper
- Felt-tip pens
- Glue
- Scissors

## Instructions

### 1. Modules

For the modules, like the European Columbus laboratory, you can use empty cans or crisp tubes. Use paper and coloured felt-tip pens to decorate each of your modules and give them a name.

### 2. Solar panels

The solar panels are long and flat. Cut aluminium foil into strips that are 12 cm wide and as long as the sticks (for the bigger solar panels). Put two 5cm sticks in the middle of the foil and fold it round them. To attach the solar panels, put a stick through the panel and the toilet roll.

### 3. Nodes

To connect two modules together, glue half a toilet roll in between the two parts. This makes it look like the corridor units (called nodes) that fix the different modules together.

### 4. Radiators

The space station needs radiators as these help control the temperature on board. They release heat as infrared radiation and work together with the life support system on board which controls the air quality for the astronauts.

Without thermal controls, the temperature of the orbiting Space Station's sun-facing side would rise to 121 degrees, while thermometers on the dark side would plunge to -157 degrees!

Cut two strips of white paper to 3cm wide and 20cm long. Fold the strips in half and make an 'accordion' and fold it over a stick (you can secure it by putting tape around it). Let the radiators hang over the sticks and point downwards.

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## Stargazing

Try stargazing. Let us know what constellations you get to see!

There are some good free apps for phones / tablets which might help you – if you don't have a phone or a tablet ask your parents for their help. If it's too cloudy for stargazing research some constellations and have a go at painting or drawing them.