

Into Our Skies: Space in Schools

Classroom Activity: How do we know Earth is a sphere?

National Curriculum Learning Outcome: Describe the Sun, Earth, and Moon as approximately spherical bodies.

Focus of this activity: Pupils will undertake a practical to see what evidence there is that the Earth is spherical.

Resources required: per group/pair of pupils you will need:

A ball, a toy car/boat/figure, a flat surface such as a table, a pencil, paper/workbook.

Starter: Use the dance session on spherical bodies to recap with pupils the difference between a disk and a sphere – a disk is flat, but a sphere is 3 dimensional.

Teaching Questions:

- What is the difference between a circle and a sphere? Can you think of some objects that are flat/3D?
- If you look up at the Moon, what does it look like? What did it look like to the Apollo astronauts?
- Clearly now we have been to the space we can see that Earth and the Moon are both spheres, as we've flown around them! But how what evidence was there the Earth being spherical before we went to space?

Student Activity:

Is the Earth Flat?

Pupils should perform the two experiments below and compare what they see at each point on the flat surface and sphere.

Part 1.

- Place the toy on the table just in front of you and draw a diagram of what you see. Do you see all of the toy? How big is it?
- Move the toy further away from you. Do you see all of the toy? What has changed? Draw another diagram to compare to your first diagram.
- Move the toy even further away, to the other side of the table. Do you see all of the toy? What parts of the toy do you see? Draw another diagram and compare it to the other two.
- Make a prediction. If the Earth was flat, how would an object change as it got further away from us?

Part 2.

- Repeat the experiment but instead of the table use the ball.
- Place the toy on the top of the ball, what parts of the toy can you see? Again, draw a diagram to remind you.
- Move the toy just over the edge of the ball, what parts of the toy can you see now? Has anything changed? Draw a diagram and compare to the previous diagram.
- Move the toy so it is on the side of the ball (remember it's wheels/feet should still be flat on the ball), what parts of the toy can you see now? Draw what you see. Has anything changed?
- Make a prediction. If the Earth was a sphere, how would an object change as it got further away from us?

Conclusion

On a flat surface the object gets smaller and smaller as it moves away but we can still see it all.

On a spherical surface the object disappears from the bottom upwards, so if the object was a car, the wheels would disappear, then the doors, then the roof.

What do we see with ships sailing over the horizon?

Do you think Earth is flat or spherical?

Extension:

- What stars would you see in the night sky if the Earth was flat? Would they stay the same or change as you moved across the world?
- You can use the FREE Stellarium app to view the movement of the stars over time <http://stellarium.org/>
- Re-visit the scale of the planets. Can you use playdoh/ blue tack to scale the size of the Earth and Moon? (this link might be useful <https://www.bbc.co.uk/bitesize/topics/z8c9q6f/articles/z6tkw6f>)

Additional Links:

- BBC Bitesize video including information about Aristotle's observations <https://www.bbc.co.uk/bitesize/clips/z9r634j>
- Game-show approach on science history including Copernicus and Galileo and the heliocentric model <https://www.bbc.co.uk/programmes/p0118w9l>