



## Getting the Right Perspective - Teacher's Notes

### Getting the Right Perspective

Our Sun is the star that lies at the center of our solar system.

The Earth is one of eight planets that orbit the Sun.

The Moon is one of many natural satellites that orbit the planets.

#### Some Cultural Background

Our ancestors used the Sun to estimate time during daylight and the phases of the Moon to note the passing of months. The Sun and Moon were worshipped as powerful deities. There are many cultural stories of Aboriginal and Torres Strait Islander peoples where the Sun is described as a woman travelling across the sky. These stories also describe the Moon as a man becoming thinner and fatter throughout the lunar cycle. The Celts thought the Moon was the goddess Arianrhod (Silver wheel).

Our solar system formed out of a cloud of nebular dust from an exploded large star about 4.6 billion years ago. Static electricity first bound these dust particles into clumps. Gravity then pulled most of them together towards the center of the swirling disc to form a large ball. The remainder became the solar disc from which planets, moons, meteorites and asteroids formed. The rocky planets and asteroid belt circle our Sun and further out lies the gassy planets. They all rotate on their axes and orbit the Sun.

**The Sun**, like all stars, creates its own energy (heat, light, radioactivity and other forms of radiation). It is a rotating ball of gas and plasma and it contains 99.8% of all the mass in the solar system. Its diameter is roughly 109 times that of the Earth and you could fit almost one million Earths inside it. Because it is gas and plasma, when it rotates the equator spins faster than the poles and different parts spin at different rates.

The stars we see in the sky lie outside our solar system, some have their own solar systems of planets rotating round them.





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**The Earth** is a rocky planet that orbits round the Sun. It depends on the Sun for heat and light. It rotates once every 24 hours and orbits the Sun every year. One orbit takes approximately 365.25 rotations. Leap year adjustments (February 29<sup>th</sup>) every fourth year, try to make up for the difference but every so often an extra minute is added or lost to the year and all clocks are adjusted. Even such small differences build up over time. We now all use the *Gregorian* calendar. To keep things in synch, Pope Gregory ordered that 10 days be dropped from the then *Julian* calendar. Peasants revolted because they thought that meant they had lost 10 days of their lives!

**The Moon** is a natural satellite of the Earth. It was formed about 4.5 billion years ago when a large body, possibly the size of Mars, crashed into the Earth re-melting its surface and throwing some material into space to create the Moon. We have evidence of this through oxygen isotope ratios. The Moon makes one rotation every month as it makes one orbit of the Earth. This means that the same side of the Moon is always facing Earth. With the Earth, it also orbits the Sun. Like the Earth it does not make its own energy but depends on the Sun for heat and light.

### Student misconception 1

The Sun and Moon are the same size because they look the same size in the sky.

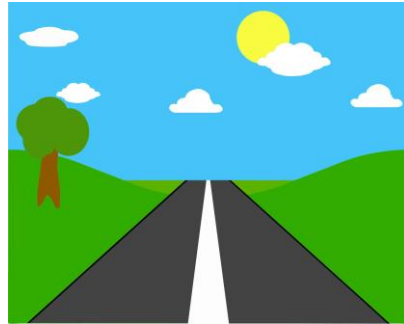
The Sun's diameter is about 400 times greater than the Moon's. It is also 400 times farther away. They only seem the same because of perspective. As things move away, they appear to become smaller. Artists, to give the impression of depth in two dimensional paintings and drawings, have used this "trick of the eye". They call it perspective.





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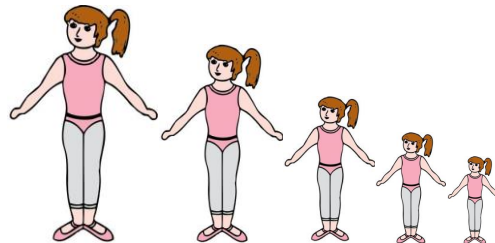
This picture was drawn to show a straight road "disappearing" into the distance.



Does the road really get narrower? **No**

Do things actually shrink when they move away? **No. Distance makes things appear smaller.**

This artist's trick of making things seem far away by drawing them smaller is called **PERSPECTIVE**.



### Materials

- Pairs of students
- A ruler for each pair
- An open space such as the school oval or long corridor
- Worksheet and pen or pencil

### Method

1. Students stand in pairs with both of them facing in the same direction, one behind the other. If doing this activity in a large space





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- like an oval, get students to stand in two lines.
2. The student at the back of the pair remains stationary and holds a ruler vertically at arm's length. They will measure the apparent height of their partner against the ruler.
  3. The other student starts walking forward (with their back to their partner still) counting each step.
  4. When the walking student appears to be the same height as the ruler the standing students shouts for them to stop.
  5. Record the number of steps on the worksheet.
  6. Exchange roles and re-test.

Take a ruler and a partner out onto the oval. Find out how far away your partner has to walk until they *seem* as tall as the ruler.

How many steps did it take? **X steps**

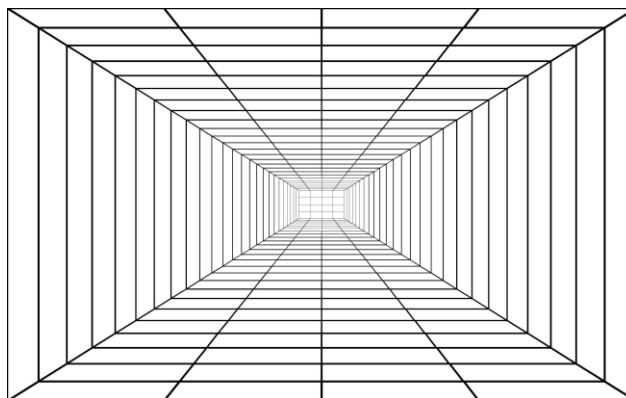
Exchange roles and re-test. How many steps did your partner take? **X steps**

Did students appear to grow smaller when they moved away? **Yes**

Compare your results with those of the class. Did everyone take the same number of steps? **No**

Why would this be? **You will find that results vary, as students will be of different heights and have different strides.**

The size a person *appears* is due to their original size and to the distance from the viewer.



Perspective grid





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Use the grid to draw a stick figure getting proportionally smaller to demonstrate perspective.

(Advertisements for beds and furniture often use small actors to make the goods seem large and space lavish. Show homes have smaller scale furniture to make the rooms look big.)



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