Online Answers

Achievement Standard 90954 (Science 1.15)

Unit 8: Practice assessments (page 258)

Practice assessment 1: Temperature (page 258)

Note: Your answer should be presented in paragraphs, without the headings given here. It should include diagrams.

(Why does the Sun 'rise' in the sky in the morning and 'go down' in the afternoon?)

Achievement: Earth spins on its axis once every 24 hours. It is day on the side of Earth that faces the Sun, and night on the side of Earth not facing the Sun. As the Earth turns towards the Sun, the Sun appears to rise in the sky; as the Earth turns away from the Sun the Sun appears to get lower in the sky.

Merit: Earth rotates on its axis once every 24 hours. The axis is an imaginary line passing through the North and the South poles. As the part of the Earth with New Zealand on it turns towards the Sun, the Sun appears over the edge of Earth at sunrise and then rises in the sky. As the Earth keeps on turning the Sun gets higher until the Earth starts to turn away from the Sun. Then the Sun appears to get lower until it disappears behind the Earth. The Sun is not actually rising and sinking, it only appears that way to us.

For diagram, see page 213.

(Why is the temperature in the middle of the day in your chosen region warmer than the temperature at each end of the day?)

Achievement: Sunlight causes the temperature to rise. The more sunlight there is, the warmer the day, because more energy of the Sun is hitting the Earth's surface. At the beginning and the end of the day, the Sun is low in the sky and the temperature is lower because there is less energy from the Sun. The ground is cooler. In the middle of the day the Sun is highest in the sky and there is more energy from the Sun. The ground heats up more.

Merit: Sunlight causes the temperature to rise. The more sunlight there is, the warmer the day, because more energy of the Sun is hitting the Earth's surface. At the beginning and the end of the day, the Sun is low in the sky and the sunlight is striking the Earth at an indirect angle, so the temperature is lower because the heat energy from the Sun is spread over a large area. As the Sun rises in the sky, the Sun's rays falls more directly on the Earth, and the heat energy is concentrated in a smaller area so the temperature is higher.

(A good diagram showing angle of sunlight when direct and indirect would enhance an answer).

For diagram, see page 212.

(Why is the Sun higher in the sky in summer than it is in winter, and why does the Sun remain longer in the sky in summer than it does in winter?)

Achievement: The tilt of the Earth on its axis is 23°. The tilt causes the seasons as the Earth orbits the Sun. When the southern hemisphere (which New Zealand is in) is tilting towards the Sun it is summer and there are long days. When the southern hemisphere is tilted away from the Sun it is winter and there are shorter days.

Merit: The tilt of the Earth on its axis is 23° and the direction of this tilt never changes, causing the seasons as the Earth orbits the Sun. This means that the amount of sunlight reaching different parts of the Earth changes with the seasons. When the southern hemisphere (which New Zealand is in) is tilted towards the Sun, more of the southern hemisphere gets more sunlight. The Sun is also higher in the sky for longer. So the southern hemisphere has summer and long days. The part tilted away, the northern hemisphere, has winter and shorter days, because it experiences a lower Sun, which is in the sky for less time.

For diagram, see page 221.

(Why is the temperature in your chosen region higher throughout the day in summer than it is throughout the day in winter?)

Achievement: My chosen region is Nelson, New Zealand. Nelson has warm summers and cool winters. The seasons are caused by the fact that the tilt of the Earth never changes as the Earth orbits the Sun. When the southern hemisphere is tilted towards the Sun it receives more direct energy for longer. So the southern hemisphere has summer and long days. When the southern hemisphere is tilted away from the Sun, it is winter. The days are shorter and the Sun is low in the sky and Nelson experiences more indirect energy.

Merit: My chosen region is Nelson, New Zealand. Nelson has warm summers and cool winters. The seasons are caused by the fact that the Earth is tilted on its axis at 23° and the direction of this tilt never changes as the Earth orbits the Sun. When the southern hemisphere is tilted towards the Sun it receives more solar energy at a more direct angle for longer. So the southern hemisphere has summer and long days. When it is winter, the southern hemisphere is tilted away from the Sun. The days are shorter and the Sun is low in the sky, which results in more indirect solar energy. The angle that solar energy, hits the surface of the Earth affects the temperature during the day; the more direct the solar energy, the more concentrated (less spread out) the solar energy is. The more indirect the solar energy the more spread out the solar energy is.

(A good diagram showing the tilt of the Earth relative to the Sun, plus relevant Sun rays, would enhance an answer)

For diagram, see page 227.

Practice assessment 2: Moon and tides

Note: Your answer should be presented in paragraphs, without the headings given here. It should include diagrams.

(How does the orbit of the Moon around Earth cause the phases of the Moon?)

Achievement: The Moon orbits the Earth every 29.5 days. As the Moon orbits, the Sun shines on it at different angles. At 'new Moon', the Moon is between the Earth and Sun, and the Moon cannot be seen from Earth. After a week, the Moon is half lit up – a 'half Moon'. One week later, the Sun, Earth and Moon form a line. The Moon is fully lit up by the Sun, and is a 'full Moon'. One week later again the Moon has moved so that sunlight is now shining on the other half of the Moon – another half Moon. A week later, the Moon is a new Moon again.

Merit: The Moon orbits the Earth every 29.5 days. At 'new Moon', the Moon is between the Earth and Sun, and the side of the Moon facing Earth receives no sunlight. As it moves around the Earth, the side we can see gradually becomes more lit up by sunlight. After a week, the Moon is 90 degrees away from the Sun in the sky and is half lit up – a 'half Moon'. One week later, the Moon is 180 degrees away from the Sun, so that Sun, Earth and Moon form

a line. The Moon is fully lit up by the Sun, becoming a 'full Moon'. One week later again the Moon has moved so that the Sun's light is now shining on the other half of the Moon – another half Moon. A week later, the Moon is back to its new Moon starting position.

For diagram, see page 231.

(How do we see each phase of the Moon from Earth?)

Achievement: As the Moon orbits the Earth, the Sun shines on it at different angles. When it is 'new Moon' the Moon is directly between the Earth and Sun, and the side of the Moon facing Earth is receiving no sunlight. As the Moon moves around the Earth, the Moon gradually becomes more lit up by sunlight. Right after the new Moon is a thin crescent Moon that gets bigger each day until after a week the Moon is half lit up – a 'half Moon'. Then the half Moon gets bigger each day until the Sun, Earth and Moon form a line. The Moon is then fully lit up by the Sun, becoming a 'full Moon'. Then the Moon gets smaller each day until the Sun's light is now shining just on the other half of the Moon – another half Moon – and then the Moon is back to its new Moon starting position.

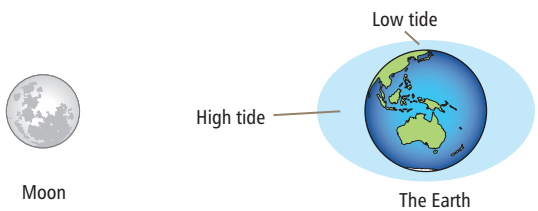
Merit: As the Moon orbits the Earth, the Sun shines on it at different angles. When it is 'new Moon' we do not see anything because the Moon is directly between the Earth and Sun, and the side of the Moon facing Earth is receiving no sunlight. As the Moon moves around the Earth, the side we see gradually becomes more lit up by sunlight. Right after the new Moon we see a thin crescent Moon that gets bigger each day until after slightly more than a week the Moon is half lit up – a 'half Moon'. Then the half Moon gets bigger each day until the Sun, Earth and Moon form a line. The Moon is then fully lit up by the Sun, becoming a 'full Moon'. A full Moon rises in the east at dusk and can be seen in the sky for the whole evening before it sets in the west. Then the Moon gets smaller each day until the Sun's light is now shining on just the other half of the Moon – another half Moon – and then the Moon is back to its new Moon starting position.

For diagram, see page 232 and page 233.

(How does the Moon orbiting around the Earth cause tides?)

Achievement: Tides are caused by the Earth and the Moon being attracted to each other because of the force of gravity. The Moon causes the ocean to bulge out in the direction of the Moon. Another bulge occurs on the opposite side. Since the Earth is rotating while this is happening, two tides occur each day.

Merit: Tides are caused by the Earth and the Moon gravitationally attracting each other. The gravitational attraction of the Moon causes the ocean to bulge out in the direction of the Moon. Another bulge occurs on the opposite side, since the Earth is also being pulled toward the Moon. Since the Earth is rotating while this is happening, two tides occur each day. The areas of the Earth where the bulge is occurring have high tide, and the other areas lower tides.



For diagram, see above.

(How do the Sun, Earth and Moon cause neap tides and spring tides?)

Achievement: Spring tides are especially strong tides that occur when the Earth, Sun, and Moon are in a line. The gravitational forces of the Moon and Sun combine to pull the ocean. Spring tides occur when the Moon is full or new.

Neap tides are especially weak tides. They occur when the gravitational forces of the Moon and the Sun are perpendicular to one another. Neap tides occur when we see half Moons.

Merit: Spring tides are especially strong tides; i.e. there is a large tidal range between high tide and low tide. Spring tides occur when the Earth, Sun, and Moon are in a line. The gravitational forces of the Moon and Sun combine so that the tidal bulge is much larger than at any other time. Spring tides occur when the Moon is full or new.

Neap tides are especially weak tides; i.e. there is a small tidal range. They occur when the gravitational forces of the Moon and the Sun are perpendicular to one another (with respect to the Earth). Neap tides occur when we see half Moons.

For diagram, see page 239 and page 240