ANSWER GUIDE

Term 3, 2022

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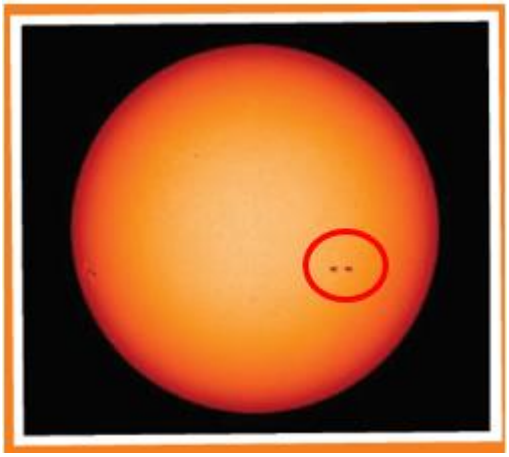
Activity title	Answers
Solar activity	
Space invaders: Investigate	Space junk within a few hundred kilometres of Earth can return to Earth and often burns up upon re-entering our atmosphere so it doesn't cause much of a problem. Space junk at higher altitudes can stay in orbit around Earth for hundreds or thousands of years and occupy the same depth of space that communications and weather satellites are placed as well as the International Space Station (ISS) where astronauts live. This makes collisions with satellites likely. If satellites don't get out of the way they can be hit and damaged or destroyed. Satellites must perform collision avoidance manoeuvres to prevent this.
Space invaders: Evaluate	student's own response consider things such as tethering items to themselves; only take the items they need for that job

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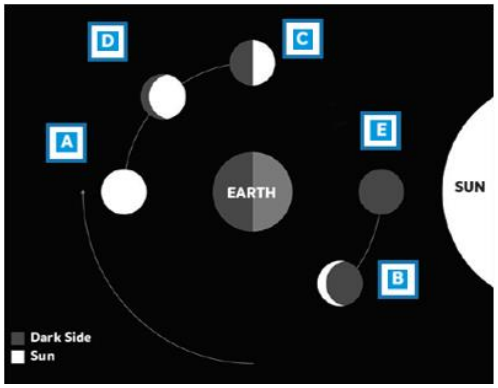
Activity title	Answers
Phases	
Space rocks	Phobos

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Activity title: Planets

Answers

	Mercury	Venus
Colour	dark grey	yellow-white
Type	rocky	rocky
Moons	0	0
Rotation time (day)	59 Earth days	243 Earth days
Orbit time (year)	88 Earth days	225 Earth days
Cool fact	possible answer: smallest planet in our Solar System and orbits closest to the Sun	possible answer: hottest planet in our Solar System

	Earth	Mars
Colour	blue, brown, yellow and green with white clouds	rusty red
Type	rocky	rocky
Moons	1	2
Rotation time (day)	24 hours	24 hours, 39 mins
Orbit time (year)	365.25 days	687 Earth days
Cool fact	possible answers: only planet to have just one moon; a year on Earth is actually 365.25 days which is why every 4 years we add an extra day to our calendar (leap years)	possible answer: Earth has sent rovers to Mars which drive around taking pictures and measurements

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Activity title: Planets

Answers

	Jupiter	Saturn
Colour	white, orange, brown and red	yellow-brown
Type	gas giant	gas giant
Moons	79	53
Rotation time (day)	10 hours	10.7 hours
Orbit time (year)	11.8 Earth years	29 Earth years
Cool fact	possible answer: biggest planet in our Solar System	possible answer: the rings around Saturn are made of chunks of ice and rock

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<table>
<tr><th>Activity title</th><th>Answers</th></tr>
<tr><td>Planets</td><td>
<table>
<tr><th></th><th>Uranus</th><th>Neptune</th></tr>
<tr><td>Colour</td><td>blue-green</td><td>blue</td></tr>
<tr><td>Type</td><td>ice giant</td><td>ice giant</td></tr>
<tr><td>Moons</td><td>27</td><td>14</td></tr>
<tr><td>Rotation time (day)</td><td>17 hours, 14 minutes</td><td>16 hours</td></tr>
<tr><td>Orbit time (year)</td><td>84 Earth years</td><td>165 Earth years</td></tr>
<tr><td>Cool fact</td><td>possible answer: only planet in our Solar System that spins on its side</td><td>possible answer: it is furthest from the Sun</td></tr>
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</td></tr>
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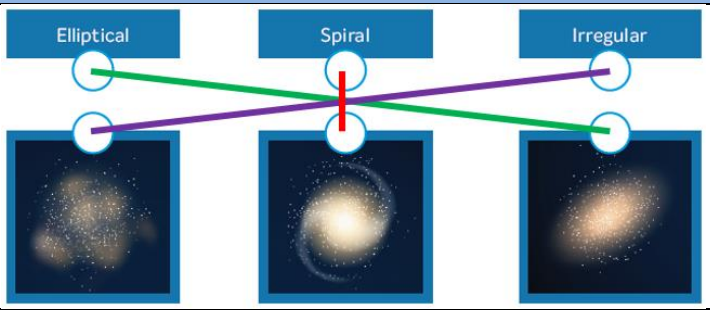
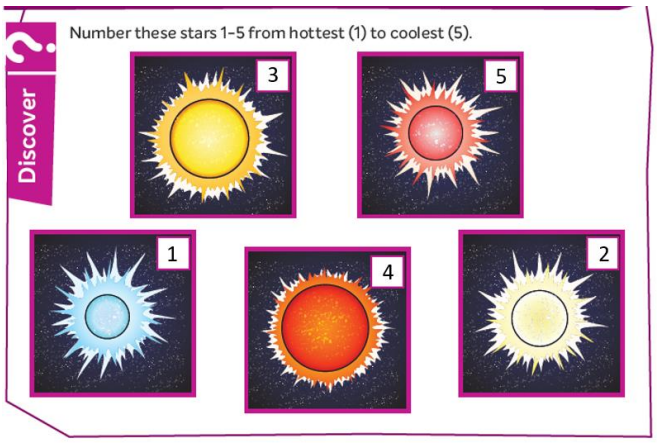
<table>
<tr><th>Activity title</th><th>Answers</th></tr>
<tr><td>Going intergalactic</td><td> 
</td></tr>
<tr><td>Explore</td><td>spiral</td></tr>
<tr><td>Star light, star bright: Explore</td><td>The Sun looks bigger than other stars because it is so much closer to Earth. The further away an object is, the smaller it appears, even if it is very big.</td></tr>
<tr><td>Star light, star bright: Discover</td><td> 
</td></tr>
<tr><td>Light and dark</td><td>A region where matter has collapsed in on itself. Its gravity is so strong even light can’t escape.</td></tr>
<tr><td>Stellar recycling</td><td>both massive and average stars</td></tr>
</table>

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Activity title	Answers
Where did it all come from?	13.8 billion years ago
Proving a theory	Europe

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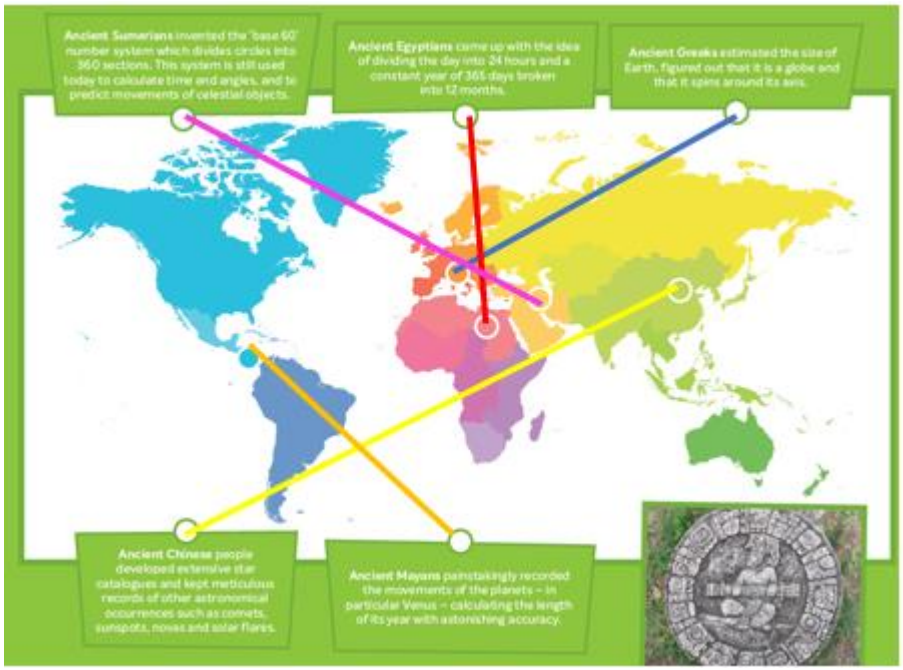
Activity title	Answers
Thousands of years of knowledge	student's choice of accurate facts
Same rock, different ideas	

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Activity title	Answers
Important events: Investigate	From top to bottom: 1687, 2011, 1828, 1543, 1944, 1610, 1781, 1924
Which is which?	top picture: Ptolemaic system bottom picture: Copernican system
Important events: Explore	student's choice of accurate facts

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Activity title	Answers
The race begins	Student's own answer
First human in Space	Age: 27 How long: 89 minutes Landing: ejected from his spacecraft at 20,000 feet and used a parachute

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Activity title	Answers
A team effort	D C A B

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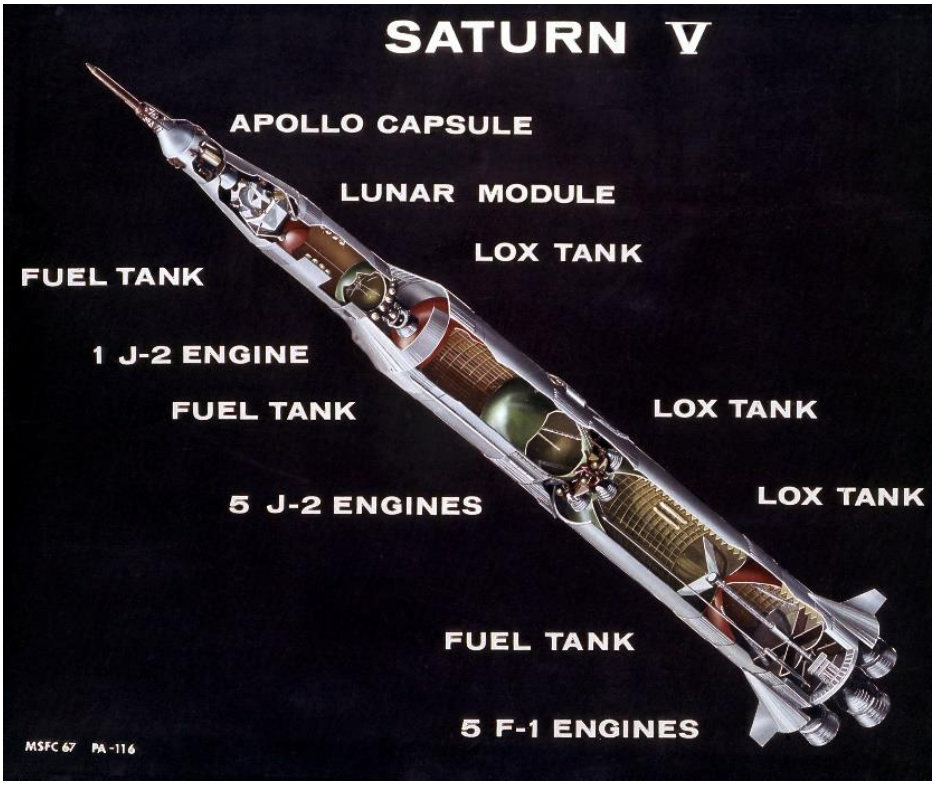
Activity title	Answers
Getting there (and back)	Student's own response
Draw a rocket	 image source: NASA

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Activity title	Answers
Onwards and upwards	student's own response
Tools of the trade: Explore	Top to bottom: observatory, probe, rocket, spacecraft, satellite, telescope, rover, radio dish, camera, computer

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Activity title	Answers
Tools of the trade: Discover	
Next level	possible answers: discovered two moons of Pluto, Nix and Hydra; helped determine the rate at which the universe is expanding; discovered that nearly every major galaxy is anchored by a black hole at the centre; created a 3D map of dark matter

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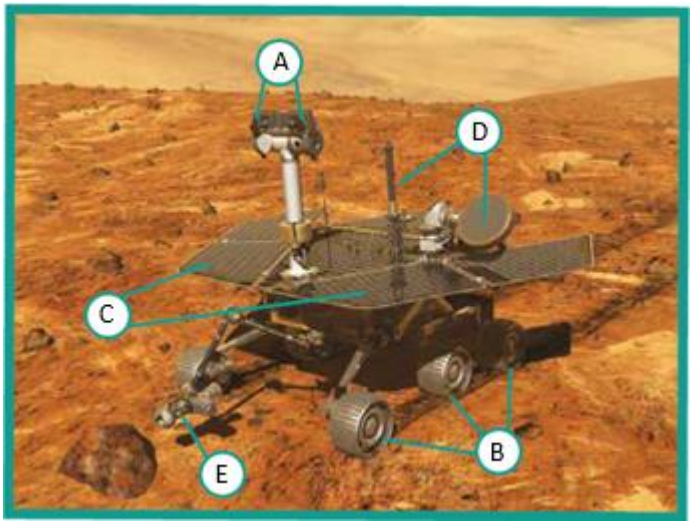
Activity title	Answers
Explore	From top to bottom: true, false, true, true, true
Space buggies: Explore	
Space buggies: Innovate	student's own response

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<table>
<tr><th>Activity title</th><th>Answers</th></tr>
<tr><td>City of lights</td><td>60 year anniversary</td></tr>
<tr><td>New Norcia Deep Space Ground Station: Investigate</td><td>
<table>
<tr><td>BepiColombo</td><td>orbit Mercury and study it from different vantage points to learn about the planet’s composition, geophysics, atmosphere, magnetosphere and history</td></tr>
<tr><td>Mars Express</td><td>search for sub-surface water on Mars from orbit, as well as study the geology, atmosphere, surface environment, history of water, and potential for life on Mars</td></tr>
<tr><td>Gaia</td><td>create a 3D map of more than a thousand million starts throughout the Milky Way and beyond, to help us understand the origin, structure and evolutionary history of our galaxy</td></tr>
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</td></tr>
<tr><td>New Norcia Deep Space Ground Station: Evaluate</td><td>student’s own response</td></tr>
</table>

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<table>
<tr><th>Activity title</th><th>Answers</th></tr>
<tr><td>Read all about it</td><td>student’s own response</td></tr>
<tr><td>Where in WA?</td><td> 
</td></tr>
</table>

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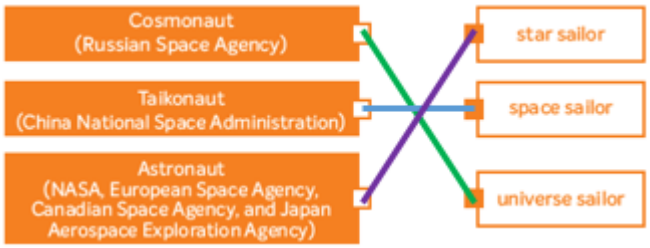
Activity title	Answers
Life in Space	Sound is vibrating air, so where there is no air there is no sound. Inside a spaceship, space station or an astronaut's helmet there is air, so sound can be heard. However if something blew up in Space there is no air surrounding it so no sound is made.
Same job, different title	
The right stuff	student's own response

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Activity title	Answers
Defying gravity	From top to bottom: yes, no (sponge bath instead), yes, no, yes, no, no (the air is filtered but it's the same air that's been in the station or shuttle since it left Earth), no (can float away and damage equipment or get in people's eyes, NASA has made a liquid alternative)
Free falling	28,000 kph
Studying siblings	Identical twins are an almost perfect physical and genetic match; it's as close as you can get to testing the same person in different conditions. It can be assumed that if Scott remained on Earth, he and Mark's test results would be almost the same so any differences can be attributed to being in Space.

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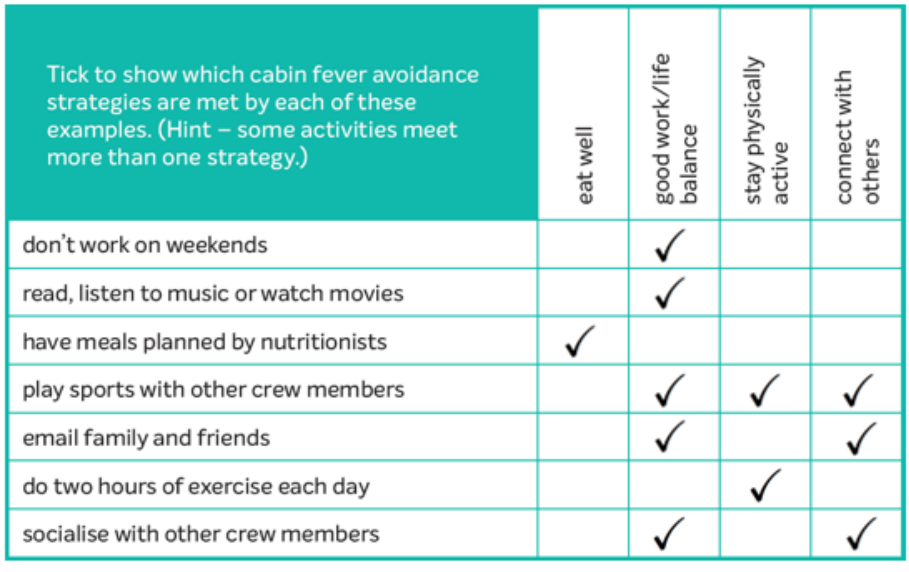
Activity title	Answers
Space fun	student's own response
Cabin fever	

Tick to show which cabin fever avoidance strategies are met by each of these examples. (Hint – some activities meet more than one strategy.)	eat well	good work/life balance	stay physically active	connect with others
don't work on weekends		✓		
read, listen to music or watch movies		✓		
have meals planned by nutritionists	✓			
play sports with other crew members		✓	✓	✓
email family and friends		✓		✓
do two hours of exercise each day			✓	
socialise with other crew members		✓		✓

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Activity title	Answers
Coping with confinement	student's own response
Keeping fit	On the ISS they use a bicycle – no wheels and no seat (since they wouldn't stay on the seat anyway), they grip the handle bars and sit up against a back pad to stay in position, treadmill – strapped into it with a harness and bungee cords, and a 'weightlifting' machine (Advanced Resistive Exercise Device) – specially designed device that they can pull against to replicate the use of weights.
Pack light	student's own response

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Activity title	Answers
Floating food	student's own response
Safe Space snacks	• dehydrated vegetables – yes • chips – no, chips are banned as they make too many crumbs • canned vegetables – yes • tortilla wraps – yes, they are used instead of bread as they make little crumbs and can be stored for longer. • dehydrated ice cream was taken to Space only once (in 1968 on Apollo 7) • pureed fruit – yes • fresh fruit – yes, but must be eaten quickly as it doesn't last as long as packaged foods • chocolate – yes • fresh sandwich – no, bread is banned in Space due to crumbs • carbonated drinks – no, are banned in Space, in microgravity the gas and liquid don't separate leading to "wet burps"
Light meals: Explore	Top to bottom: C, A, B
Light meals: Discover	Freeze-dried food: space ice cream Thermo-stabilised food: moon beans Fresh food: apple

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Activity title	Answers
Astronaut exhibition: Evaluate	student's own response
Astronaut exhibition: Explore	student's own response
Astronaut exhibition: Innovate	student's own response

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<table>
<tr><th>Activity title</th><th>Answers</th></tr>
<tr><td>‘Star’ appeal</td><td>
<table>
<tr><th></th><th>Where is it</th><th>What can you see/do</th></tr>
<tr><td>Scitech</td><td>West Perth</td><td>watch a variety of shows about Space in the Planetarium, upcoming Astronaut exhibition</td></tr>
<tr><td>Carnarvon Space and Technology Museum</td><td>Carnarvon, 900km north of Perth</td><td>sit in a full size Apollo capsule, watch documentaries, planetarium, interactive displays</td></tr>
<tr><td>Perth Observatory</td><td>Bickley, 25km east of Perth</td><td>night sky tours, day tours, lunar photography workshops, school tours</td></tr>
<tr><td>Gravity Discovery centre</td><td>Gin Gin, 1 hour north of Perth</td><td>observatory, day and night tours, Aboriginal astronomy, timeline of the universe, Solar System walk, school holiday program</td></tr>
<tr><td>Astrofest</td><td>Curtin University, Bentley</td><td>event on Saturday 29 October 2022 look through big telescopes, listen to astronomer talks, universe tour, astrophotography exhibition, make a Lego radio telescope</td></tr>
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Activity title	Answers
Thinking outside the globe	student’s own response possible answers: Star Wars, Star Trek, Space Invaders, The Martian, Lightyear, From the Earth to the Moon, Space Odyssey, Home, Lilo and Stitch, Planet 51, Space Jam, Space Buddies, Treasure Planet, Mars needs Moms, Monsters vs aliens, Astroboy, Wall-e, The kid who came from Space, Even aliens need snacks…
What a ride	weightlessness or microgravity
Waste not, want not	student’s own response
Story starter	student’s own response
To infinity and beyond	Draws children’s attention toward Space, which supports NASA's goal of attracting and retaining students in science, technology, engineering and mathematics.
Life imitating art	90

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Activity title	Answers
Beneath our radiant…	Top left to bottom right: Samoa, Australia, Brazil, Papua New Guinea, New Zealand

PAGE 23 CONT.

Activity title	Answers
Mityan	In Boorong astronomy, Unurgunite is an ancestral figure with two wives. The Moon is called Mityan, the quoll. Mityan fell in love with one of Unurgunite's wives and tried to take her for himself. Unurgunite found out and attacked and defeated Mityan. The Moon has been wandering the heavens ever since, the scars of the battle still visible on his face.
What's the story	student's own response
When stars align	answers will vary depending on student's birthdate

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Activity title	Answers
What has Goldilocks got to do with aliens?	similar size to Earth (only 10% bigger); similar distance from its sun (within habitable zone); Sun is similar to ours
Infinite possibilities	student's own response
Little green men?	student's own response