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| **Science Unit Seven: Earth, Space and Forces (six week mini-project)**  **Carne and Readymoney Autumn 1 2021** | |
| **What should I already know?**   * We have four seasons (autumn, winter, spring and summer). * The Sun is a source of light but the Moon is not. * Know that a shadow is caused when an object blocks light from passing through it. * The properties of a sphere.Properties of the earth (hemispheres, continents, oceans and lands). * Know what a force is and be able to explain that a push and pull are types of forces. * That when forces are applied to an object they allow them to move or stop moving. * The strength of the force determines how far and fast an object moves. * Friction is the resistance of motion when there is contact between two surfaces * The force that causes objects to move downwards towards the ground is gravity. * That magnets have poles, and that opposite poles attract, while similar poles repel. | **Key Knowledge**  **The Earth and The Sun**  The Earth rotates on its axis anti-clockwise and makes a complete rotation over 24 hours (a day).  This makes it appear as the Sun moves through the sky but the Earth’s rotation causes day and night.  Different parts of the Earth experience daylight at different times - this means that it is morning, afternoon and night in different places. This is also the reason why we have time zones.  Because of the Earth’s tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. This tilt causes the seasons.  As the Earth rotates, shadows that are formed change in size and orientation.  The Earth, moving in its orbit around the Sun and spinning on its axis, appears to make a closed,... [+] unchanging, elliptical orbit. If we look to a high-enough precision, however, we'll find that our planet is actually spiraling away from the Sun.The Earth takes 365 and a quarter days to orbit the Sun.  Because of the extra quarter day it takes to orbit the Sun, every four years on Earth is a leap year!  **The Moon**  The Moon orbits the Earth anticlockwise and takes  approximately 28 days. It spins once on its axis every time it orbits Earth. This means that we only see one side of the Moon.  The Moon has different phases depending on where it  is in its orbit.  The Moon’s gravity causes high and low tides    **The Solar System**  There are 8 planets in our Solar System (Mercury,  Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune). Pluto has not been officially classified as a planet since 2016.  They all orbit the Sun, which is a star, and they all  have moons.  Our understanding of the solar system has changed over time. It was once commonly believed that the Earth was the centre of our solar system and that the planets and the sun revolved around our planet. This is called a Geocentric model.  Now we use a Heliocentric model- where we understand that our planet is one of 8, which orbit a central sun.  The first four planets are relatively small and rocky, while the three outer planets are gas giants (Jupiter and Saturn) or ice giants (Uranus and Neptune).  There are also asteroids, meteoroids and comets in the Solar System.  The Solar System is in a galaxy called the Milky Way. The galaxy is in the universe.  **Forces**  Forces are pushes and pulls. These forces change the motion of an object. They will make it start to move or speed up, slowit down or even make it stop.  For example, when a cyclist pushes down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves. When the cyclist pulls the brakes, the bike slows down and eventually stops.  Friction is a force - it is the resistance of motion when one object rubs against another.  Other forces that create resistance of motion include water resistance and air resistance.  Gravity is the force that pulls objects to the centre of the Earth.  Air resistance pushes up on a parachute, opposing the force of gravity. This makes the parachute land more slowly. <https://youtu.be/Aoy3j9tbOk0>  Water resistance is the friction that is created between water and an object that is moving through it. Some objects can move through water with less resistance if they are streamlined.  **Mechanisms**   * Levers allow us to do heavy work with less effort. For example, trying to pick up a large heavy box is difficult, however if a lever is used it becomes much easier to move it. * Pulleys also allow us to do heavy work – objects are attached to ropes and pulley wheels, and so instead of lifting heavy object upwards, we can pull on the pulley rope downwards. * Gears are toothed wheels. Their ‘teeth’ can fit into each other so that when the first wheel turns, so does the next one. This allows forces to move across a surface. * Springs can be stretched by pulling them or squashed by pushing them. The greater the force pulling or pushing the spring, the greater the force the spring uses to move back to its normal shape. |
| **Key Vocabulary**   |  |  | | --- | --- | | **Key Term** | **Definition** | | asteroid | a rock that orbits the Sun in a belt between Mars and Jupiter | | axis | an imaginary line through the middle of something | | comet | a bright object with a long tail that travels around the Sun | | galaxy | an extremely large group of stars and planets. Our galaxy is called the Milky Way. | | gravity | the force which causes things to drop to the ground | | leap year | a year which has 366 days. The extra day is the 29th February. There is a leap year every four years. | | meteorite | a rock from outer space that has landed on Earth | | orbit | the curved path in space that is followed by an object going round and round a planet, moon or star | | planet | a large, round object in space that moves around a star | | shadow | a dark shape on a surface that is made when something stands between a light and the surface | | Solar System | the Sun and all the planets that go round it | | sphere | an object that is round in shape like a ball | | spin | turns quickly around a central point | | attract | If one object attracts another object, it causes the second object to move towards it | | friction | the resistance of motion when one object rubs against another | | force | the pulling or pushing effect that something has on something else | | gear | a part of a machine that causes another part to move because of teeth which connect the two moving  parts | | lever | a basic tool used to lift or pry things open motion the activity of changing position or moving from one place to another | | opposite | Opposite is used to describe things of the same kind which are completely different in a particular way. For example, north and south are opposite directions | | pulley | a simple machine that makes lifting something easier. A pulley has a wheel or set of wheels with grooves  that a rope or chain can be pulled over | | repel | When a magnetic pole repels another magnetic pole, it gives out a force that pushes the other pole away | | resistance | a force which slows down a moving object or vehicle | | spring | a spiral of wire which returns to its original shape after it is pressed or pulled | | streamlined | A streamlined vehicle, animal, or object has a shape that allows it to move quickly or efficiently through  air or water | | surface | the flat top part of something or the outside of it |   **Key Experiences**  Visit to Goonhilly Earth Station  Visit Spaceport Cornwall at Newquay Airport |