**P8 Space Learning Journey**

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| 1 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | The **Hierarchy** of the **Universe** is:  **Universe, Galaxy, Solar System, Star, Planet, Dwarf Planet, Moon, artificial satellite**.  There are 8 **planets** in our **solar system** – **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune**.  **Pluto** is no longer considered a **Planet**. |
| 2 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | The Lifecycle of a **small star** begins with a **dust and gas cloud** called a **Nebula**.  **Gravity** pulls material together and it **coalesces** into a **Proto-star.** As more particles collide the temperature rises until it becomes hot enough for **Hydrogen** to **fuse** into **Helium**.  The **Main Sequence** stage is the longest lasting stage (10 mn years) and is very **stable** as the **inward force of gravity is balanced** by the **outward pressure**.  As the star starts to run out of **Hydrogen** the star starts to fuse bigger and bigger atoms up to **Iron**. It also cools and swells hence the name – **Red Giant**.  The outer layer of dust and gas is **ejected** leaving behind a **White Dwarf**.  This continues to lose **energy**, **cooling** until it becomes a **Brown** and then a **Black Dwarf**. |
| 3 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | The Lifecycle of a **Large Star** is very similar up to **Red Giant** only it is termed a **Super red Giant**.  This **swells and contracts** and eventually **explodes** – **Supernova**.  **Supernova** leave behind a very **dense core** called a **Neutron star** which may **collapse** on itself to form a **Black Hole**.  The **dust and gas** thrown out from a s**upernova** can **coalesce** and form a new **Nebula**.  The **energy** released in a **supernova** is **sufficient** to allow **fusion** of atoms **larger than Iron**.    The presence of these atoms on **Earth** indicates that **our sun is a second generation star**. |
| 4 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | **Gravity** is the force which keeps objects in their **roughly circular orbits**.  **Gravity** pulls **orbiting objects towards** them but **instantaneous velocit**y tries to make them move away so the object ends up travelling in a **circle**.  **Faster** moving objects will move in a stable orbit with a **smaller orbit**. |
| 5 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | The **Doppler Effect** is the **perceived** change in **wavelength** and **frequency** when an object moves **relative to an observer.**  Waves **compressed** when moving **towards** you – (**higher frequency/shorter wavelength**) and then **spread back** out as they move **away from** you (**longer wavelength, lower frequency**).  **Red shift** is the observed increase in wavelength of light from **distant galaxies**. As explained by the Doppler effect if waves are moving away their wavelength increases so the light shifts towards the **red end of the spectrum = Red Shift**.  The **faster** they are moving the **greater the Red Shift**. **Blue shift** is the **opposite**. |
| 6 C:\Users\rca\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\542FDEB4.tmp | Evidence suggest that the **Universe** started with a **Big Bang** – a massive explosion from a the **very tiny dense and hot space** the universe previously occupied - which brought all **matter**, **energy** and **time** into being.  The **evidence includes** looking at the **Red Shift** of various galaxies. All Galaxies show Red Shift so they are moving away from us. Those **furthest away have a greater Red Shift** suggesting that they are moving **faster** – which is what we see with an explosion.  **Cosmic Background Microwave Radiation** (seen as snow on an un-tuned TV) is the remains of the energy released.  New knowledge of **Dark Matter** and **Dark Energy** may mean that we have to change this theory. |