

# Nova's Solar System Expedition: A Planetary Sort

*Learning objective: To describe the movement of the Earth and other planets relative to the Sun in the solar system, and to understand the geocentric versus heliocentric models.*

Nova the owl is preparing her star charts. Below is a list of celestial bodies and characteristics. Your task is to sort these items into two categories: 'The Inner Terrestrial Planets' and 'The Outer Gas Giants'. Then, use your knowledge of the solar system to explain the relationship between the Sun and the planets.

*Word bank: Mercury · Venus · Earth · Mars · Jupiter · Saturn · Uranus · Neptune · Rocky surface · Gaseous atmosphere · Heliocentric · Orbit*

**1. Sort the eight planets into the two categories mentioned in the instructions. Explain why the inner planets have a different composition to the outer planets. (4 marks)**

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**2. Define the term 'Heliocentric'. How does this model differ from the historical 'Geocentric' view where people once believed the Earth was at the centre of the universe? (3 marks)**

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**3. Explain why Earth takes approximately 365 days to complete one full orbit around the Sun, while Neptune takes roughly 165 Earth years. (3 marks)**

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**4. Justify your answer: If you were to travel to a planet in the outer solar system, would you expect to find a solid landing site for a spacecraft? Why or why not? (3 marks)**

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**5. Compare and contrast the gravitational pull of a large Gas Giant like Jupiter compared to a smaller planet like Mercury. How does mass influence the way objects orbit? (3 marks)**

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**6. What might happen to the stability of our solar system if the Sun's gravitational force were suddenly to decrease by half? Explain your reasoning. (4 marks)**

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**Draw:** Draw a diagram of the solar system showing the orbits of the planets. Label the Sun at the centre and include an arrow showing the direction of the orbit for Earth.



*Extension challenge: Nova wants you to design a mission patch for a space probe travelling to the asteroid belt. Research the location of the asteroid belt and explain why a probe must navigate through it carefully.*