Year 12 Science: Planetary systems: formation, orbits and exoplanets

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Why did the solar nebula flatten into a disc as it collapsed?

2. Why could water ice exist as a solid beyond the frost line but not close to the Sun?

3. Jupiter is 5.204 AU from the Sun. Use $T^2 = a^3$ to find its period in years.

4. A star dims by 1% during a transit. What is the planet's radius as a fraction of the star's?

5. Give two pieces of evidence that Phobos may be a captured asteroid.

Exam-style question: TRAPPIST-1

TRAPPIST-1 is a small, cool red dwarf about 40 light-years away with seven Earth-sized planets. They were found by the transit method.

6. Describe a protoplanetary disc.

7. Explain how rocky planets like these form from the disc, referring to changes in temperature.

8. Explain how the transit method detected these planets.

9. Explain why the habitable zone of TRAPPIST-1 is much closer to its star than the Sun's habitable zone is to the Sun.

10. Earth's Moon has rock very like Earth's mantle but a tiny iron core. Explain how this evidence supports the collision theory and rules out capture.

Fix the mistake

11. Correct this statement: "There is no gravity in space, so planets just keep moving."

12. Correct this statement: "The gas giants are big because they are further from the Sun's gravity."

13. Correct this statement: "Earth's Moon was captured as it flew past."

14. Correct this statement: "The habitable zone is the same distance from every star."