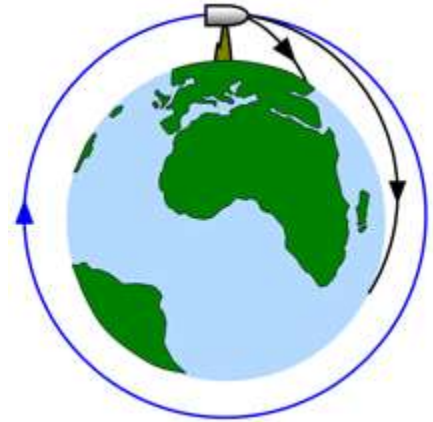


Name: _____ Period: _____ Date: _____

Orbital Motion and Tides Study Guide
Astronomy



Nerd Words:

1. Inverse Square Law –
2. Field –
3. Circular Velocity –
4. Geosynchronous Satellites –
5. Center of Mass –
6. Closed Orbit –
7. Escape Velocity –
8. Open Orbit –
9. Angular Momentum –
10. Spring Tides –
11. Neap Tides –

Review Questions:

1. Newton used which of the 3 laws of motion to help him better understand gravity?
2. What does the inverse square law mean when it comes to gravity?
3. When measuring gravitational distance, where must we measure from with each object (especially the bigger ones like moons and planets)?
4. Give the formula for mutual gravitation and explain what all of the variables represent.

5. Compare and contrast orbital and tidal motion. How are they similar and how are they different?
6. Who was the first to figure out that orbiting objects are technically falling?
7. If an object is falling, what direction is it falling in?
8. What are the benefits of geosynchronous satellites? How often do they orbit Earth and at what distance in the sky?
9. Gravity is mutual, even in situations like the moon and the Earth where it doesn't appear that way. Explain how this happens.
10. Compare and contrast open and closed orbits. How are they similar and how are they different?
11. What is the formula for circular velocity? Write out what each variable stands for.
12. What is the unit needed for the gravitational constant?
13. Why is the term *radius* used rather than *distance*?
14. What is the unit needed for orbital velocities?
15. Is there still gravity outside of the orbit field? Explain.
16. What is the formula for escape velocity? Write out what each variable stands for.
17. What is the mathematical difference between circular and escape velocity?
18. What is Kepler's first law and how is it different from his second? Define each and explain.

19. What is Kepler's third law and how does it directly relate to his first and second laws? Explain.
20. What does the energy of motion depend on in Kepler's third law?
21. The gravitational attraction energy depends on the size of the orbit. This goes back to what law?
22. What is the most visual effect that the moon has on the Earth when it comes to gravity?
23. What does the water do in the ocean which faces the moon?
24. What happens to the ocean opposite to the moon?
25. What happens when an ocean goes into a tidal bulge?
26. How often do the tides change?
27. What phases of the moon need to be present for spring tides and what does *spring* term actually refer to?
28. How are spring tides similar to neap tides? How are they different?
29. What is the angle needed between the sun and moon during neap tides?