

## 8th Grade Science – Week 10

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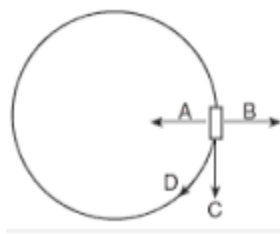
$$\text{Centripetal Force} = F_C = \frac{mv^2}{r}$$

$$\text{frequency} = f = \frac{1}{\text{Period } (T)}$$

$$F_G = G \frac{m_1 m_2}{r^2} \text{ where } G = 6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2 / \text{kg}^2$$

$$\text{Kepler's Third Law: } T^2 = R^3$$

Questions 1-3 refer to the diagram below. The diagram represents a car of mass  $m$  rounding a curve on a road. The car is being viewed from above and is rounding the curve in a clockwise motion.



1. What point shows the direction of the acceleration of the car?  
(A) Point A  
(B) Point B  
(C) Point C  
(D) Point D
2. What point shows the direction of the velocity of the car?  
(A) Point A  
(B) Point B  
(C) Point C  
(D) Point D
3. If the car is 1200 kg and is traveling at 15 m/s and the curve in the road is at a radius of 20 m, what is the force of friction on the road?  
(A) 900 N toward point A  
(B) 900 N toward point B  
(C) 13500 N toward point A  
(D) 13500 N toward point B

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4. If the distance between two particles is doubled (distance  $\times 2$ ), then the gravitational force between them:
  - (A) Decreases by a factor of 4
  - (B) Decreases by a factor of 2
  - (C) Increases by a factor of 2
  - (D) Increases by a factor of 4
  
5. A moon has a mass of  $6 \times 10^{24}$  kg and it orbits a planet that has a mass of  $6 \times 10^{24}$  kg. The distance between the two planets is  $3 \times 10^6$  m. Which of the following is true?
  - (A) Force of the moon experiences is 100 times greater than the force that the planet experiences.
  - (B) Force of the moon experiences is 10 times greater than the force that the planet experiences.
  - (C) Force of the moon experiences is 100 times less than the force that the planet experiences.
  - (D) Force of the moon experiences is equal to the force that the planet experiences.
  
6. Which of the following is one of Kepler's Laws?
  - (A) An object in motion remains in motion
  - (B) Planets move on elliptical orbits with the Sun at one focus
  - (C) Gravitational force between two objects decreases as the distance squared
  - (D) Inner planets orbit in a different direction than outer ones
  
7. Which can be concluded using Kepler's Laws?
  - (A) Planets exhibit equal and opposite forces of gravitational attraction upon one another.
  - (B) Planets move in a circular orbit around the sun with a velocity tangent to the curve.
  - (C) Planets move with moons orbiting them and rotate the same direction around the sun.
  - (D) Planets move faster when they are nearer to the sun than when they are further away.
  
8. According to Kepler's Third Law of Planetary Motion, if a planet has an average radius (distance) from the sun of 4 A.U. (astronomical units), what is its orbital period?
  - (A) 8 years
  - (B) 4 years
  - (C) 2 years
  - (D) 1 year
  
9. What is it called when the sun is behind the moon?
  - (A) Full moon
  - (B) New moon
  - (C) Pink Floyd's Dark Side of the Moon
  - (D) Crescent moon
  
10. How do we get our phases of the moon?
  - (A) The phases of the moon show the earth's shadow and are therefore always round.
  - (B) The phases of the moon depend on the rotation of the moon and the rotation of the earth.
  - (C) The phases of the moon depend upon the tides of the oceans on earth.
  - (D) The phases of the moon depend on how much of the sunlit side of the moon faces the earth.