EXIT TICKET TEACHER GUIDE

1) In a two-mass system, the mass of one of the objects and the distance between the objects was doubled.

a) Explain which factor would matter more to the force of gravity calculation.

Fg= Gm1m2r2

The equation shows that the distance between the objects is squared, and so a change in distance is a more important factor than the mass of one of the objects.

b) If both factors were doubled, explain if the overall force of gravity would increase, decrease, or remain the same.

Force of gravity is directly related to one of the masses (Fg m1 or m2), and so doubling the mass of one object would double the force of gravity. Force of gravity is directly related to the inverse of the distance squared (Fg 1r2), and so doubling the distance and squaring it would create one quarter of the force of gravity. The overall effect of doubling both variables is to cut the force of gravity in half (decreases force of gravity).

2) In a two-mass system, the two spherical objects are located .6m apart. If one of the masses is 1,000 kg, the force of gravity between the objects is 5 x 10-5N and the Gravitational Constant is 6.67 x 10-11 Nm^2 / kg^2, then what is the mass of the other object?

$$F_g = \frac{Gm_1m_2}{r^2} \Rightarrow m_2 = \frac{F_g \cdot r^2}{G \cdot m_1{}^2} = \left(\frac{(5 \times 10^{-5} N)(.6m)^2}{(6.67 \times 10^{-11})(1{,}000\ kg)}\right) =$$

$$F_g = 269.9\ kg$$