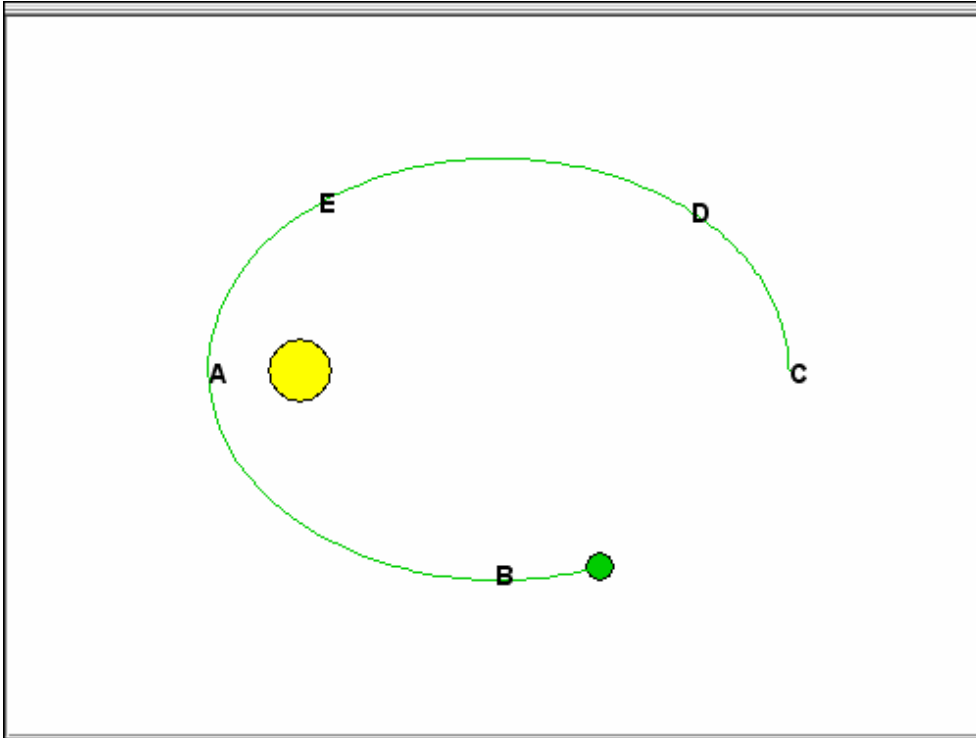


Worksheet for Exploration 12.3: Properties of Elliptical Orbits



A planet (green) orbits a star (orange) as shown in the animation.

Above sketch vectors for the velocity, radial component of acceleration, and tangential component of acceleration for the planet. The length of the vectors should be indicative of the magnitude of the vectors.

- a. Rank the points, A - E, according to the speed of the planet at that point. (fastest first)

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

- b. Rank the points, A - E, according to the gravitational potential energy of the planet (low to high).

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

- c. Rank the points, A - E, according to the kinetic energy of the planet (most first).

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

d. Rank the points, A - E, according to the total energy of the planet.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

e. At which of the points, A - E, is the planet's acceleration in the same direction as the velocity?

f. What can you say about the direction of the planet's acceleration at any point on its path? Would you call this acceleration a tangential acceleration or a radial acceleration?

Click in the simulation (link at the bottom) to view the velocity vector (blue) and acceleration vector (red). Compare what you see to your answers (a) - (f).