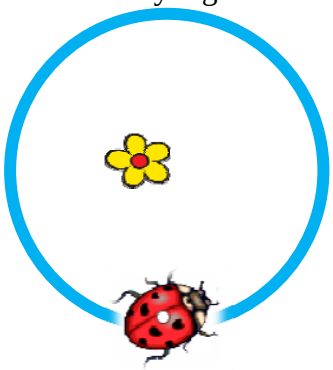
Student directions ***Ladybug Motion 2D*** activity 1: Vector controls for circular motion
Homework

Learning Goals: Students will be able to draw motion vectors (position, velocity, or acceleration) for an object is moving while turning.

Directions:

1. A Labybug was crawling in a circle around a flower like in the picture below.



a. Sketch what you think the velocity and acceleration vectors would look like.

b. If the flower is the "zero" position, what would the position vector look like?

c. Use ***Ladybug Motion 2D*** to check your ideas. Make corrections if necessary

2. Suppose the bug crawled along concentric circles like Figure 1.

a. Draw what you think the **position** vectors would look like at the locations shown in Figure 2.

Figure 1

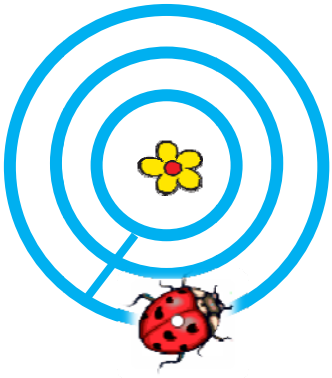


Figure 2

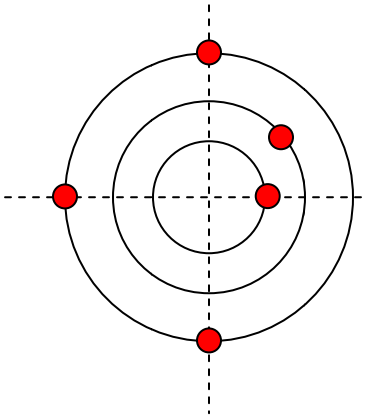
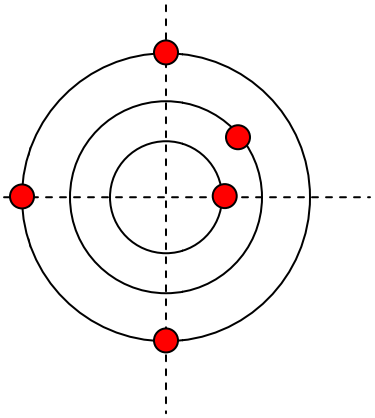


Figure 3 (corrections)



b. Use ***Ladybug Motion 2D*** to check your ideas. Make corrections if necessary on Figure 3.

c. Draw what you think the **velocity** vectors would look like at the locations shown in Figure 4.

d. Check your ideas and make corrections on Figure 5. You may want to use ***Ladybug Revolution*** simulation too.

Figure 4

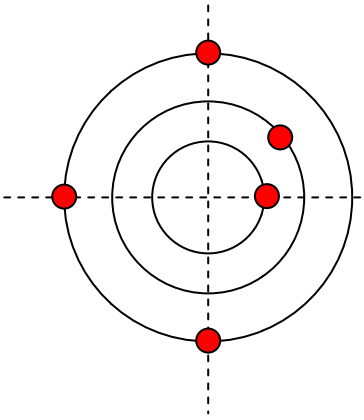
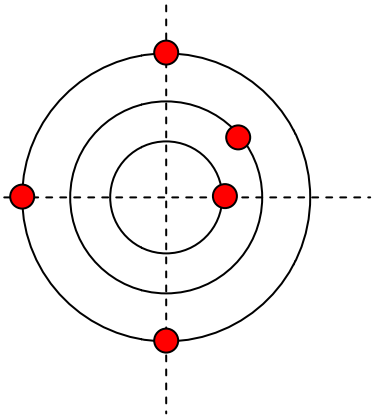


Figure 5



e. Draw what you think the **acceleration** vectors would look like at the locations in Figure 6.

f. Check your ideas and make corrections on Figure 7. You may want to use ***Ladybug Revolution*** simulation too.

Figure 6

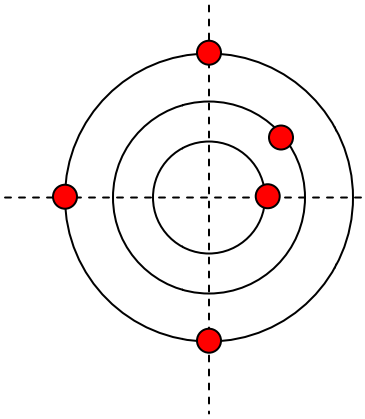
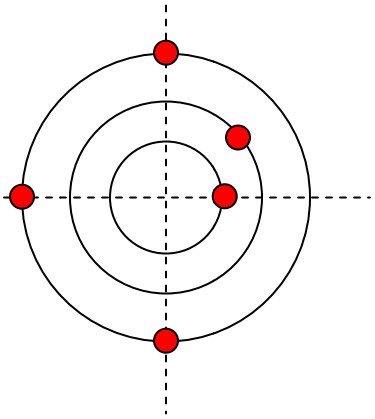


Figure 7



3. A Labybug was crawling in an elliptical path around a flower like in the picture below.
   a. Sketch what you think the position, velocity, and acceleration vectors would look like on Figure 8-10 at the red dots.
   b. Use ***Ladybug Motion 2D*** to check your ideas. Make corrections if necessary

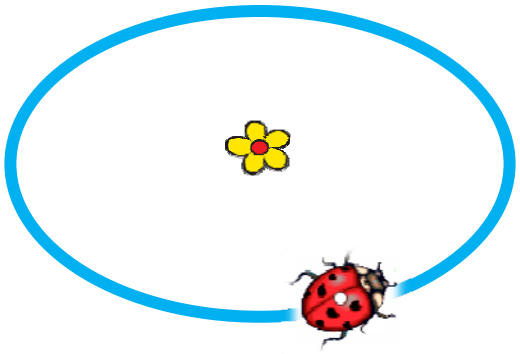


Figure 8 Position

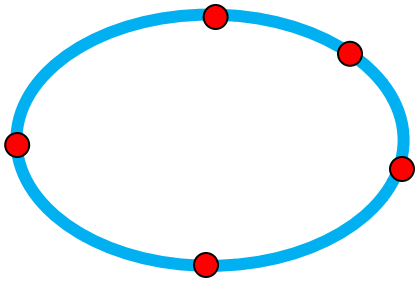


Figure 9 Velocity

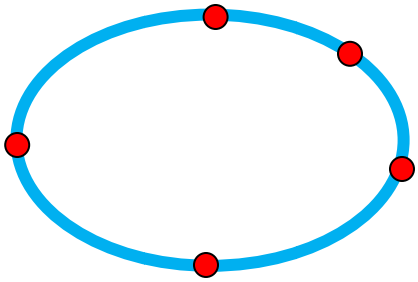
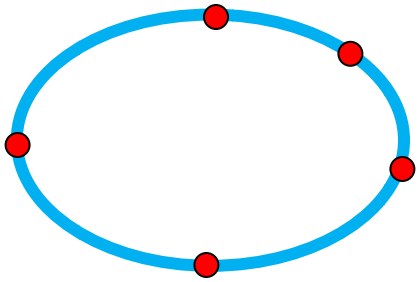


Figure 10 Acceleration



4. Compare and contrast what you saw between circular and elliptical motion in terms of vectors.