



Dynamics

UCM and Gravity

UCM Investigation

Name _____

Teacher _____

Period _____

Purpose - Investigate the vector relationship between velocity, acceleration and position vectors for an object in uniform circular motion.

Materials – Computer, <http://phet.colorado.edu/en/simulation/ladybug-motion-2d>
<http://www.stmary.ws/highschool/physics/home/animations3/centripShoot.html>

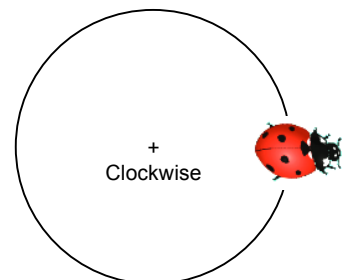
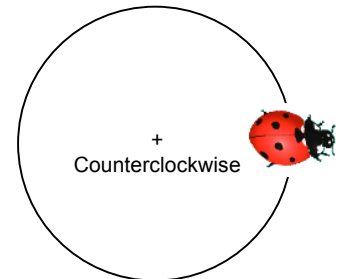
Directions:

1. Go to GravityKills.net, Regs and PreAP Links and launch UCM Vector Investigation.
2. Set the simulation control panel along the left side of the simulation to the following settings:
 - i. **Vectors** – Hide Vectors
 - ii. **Choose Motion** – Manual
 - iii. **Trace** – Line
3. Place the cursor on top of the ladybug. Left click and hold. Drag the ladybug around into a path of a circle.
4. Pause the simulation when you are satisfied with your circle.
5. Adjust the simulation control panel to the following settings:
 - i. **Vectors** – Show both
 - ii. **Choose Motion** – Manual
 - iii. **Trace** – Line
6. Place the cursor on top of the ladybug. Left click and hold. Drag the ladybug around into a path of a circle.

Question - Do the velocity and acceleration vectors point in the same direction?

7. Pause the simulation when you are satisfied with your circle.
8. Adjust the simulation control panel to the following settings:
 - i. **Vectors** – Show both
 - ii. **Choose Motion** – Circular
 - iii. **Trace** – Line
9. The ladybug will automatically begin to move in a circle.

Question - What is the relationship between the orientation of the velocity, acceleration and position vectors? Make two sketches on the circles to the right of the relationship. Draw one sketch when the ladybug is traveling counterclockwise and one when traveling clockwise.



10. Go to GravityKills.net, Regs and PreAP Links and launch UCM Game.
11. How many UFOs did you hit?

