Physics Web Search: Rotational Motion Name_____
Period _____

Open the Physics Animations Folder

Open **motion-2d** (http://phet.colorado.edu/simulations/sims.php?sim=Motion_in_2D)

1. Click "Show Both" at the top, and "Circular" at the bottom
2. Which color vector represents velocity, and which represents acceleration?
   Circle: Velocity = Green or Blue specifically, tangential or angular?
   Acceleration = Green or Blue specifically, tangential, radial, or angular?

Open **rotation** (http://phet.colorado.edu/simulations/sims.php?sim=Ladybug_Revolution)

1. Set the angular velocity to 90°/sec
2. Hit play, and notice the size of the green velocity vector and pink acceleration vector.
3. Reset, and move the lady bug to the very edge of the platform.
4. Set the angular velocity back to 90°/sec
5. What happens to the velocity vector? _____
   What happens to the acceleration vector? _____
6. Use the ruler to determine the distance of the lady bug to the axis of rotation. (Assume each numbered division is a cm, not a meter). r = _____
7. Calculate the tangential speed $v = \omega r$ (be careful of angle units):

8. Calculate the radial acceleration:

9. What is the tangential acceleration?
10. Click the tab at the top left that says rotation
11. Set the angular velocity = 90°/sec.
12. Sketch the graph of the Angle, and the graph of Angular Velocity. (Don't worry about numbers, just give the shape of the graph)

13. Reset all
14. Click the third option down on the right under “Show graphs” (θ, ω, v)
15. On the Velocity graph, click all three boxes: Show speed, show X - Vel, show Y - Vel
16. Set the angular velocity = 90°/sec.
17. Graph all three lines in the velocity graph

18. What relationship can you make about the red, blue, and green lines? (Stop at any point and use the given numbers to verify your answer).

19. Reset all
20. Click the second option down on the right under “Show graphs” (θ, ω, α)
21. Set the angular acceleration = 30°/sec^2.
22. Sketch the graph of the Angle, Angular Velocity, and Angular Acceleration (Don’t worry about numbers, just give the shape of the graph)

23. Reset all
24. Click the forth option down on the right under “Show graphs” (θ, ω, a). Check “Show Acceleration.”
25. Set the angular velocity = 90°/sec.
26. Why does the acceleration remain constant despite the changing direction of the lady bug?