

PS Comp 2 Animating and Modeling your Mass on a Spring

In this problem set you are going to learn about loops, animating the objects you can now create and finally you will model a mass on a spring.

If you have experience and want a challenge rather than another introduction try "uphill climb" activities. Both sets of activities will get you to the same goal of using vPython in this course. **Everyone should do each of the TASKs for this assignment.**

Part A. Animating with Loops (easy walk) want an uphill climb? Skip the tutorial and just do the task.

Watch the tutorial [Vpython for Beginners 4 - Animating with Loops](#)(13:37) and [Answers for vPython - Animating with Time](#) (8:05)

TASK: Animation basics: Create any object you want. (A list of possible shapes can be found here: <http://www.glowscript.org/docs/VPythonDocs/primitives.html>) Animate it so that it oscillates back and forth across the screen.

Part B. Modeling a Mass on a Spring

TASK: Create an animation of a horizontal mass on a spring. First open a new program and title it "firstinitiallastinitial Mass on a Spring" Then, [Click here](#) for code to copy and paste into your program.

Question 1. Name all of the objects that this coder has created. (Hint: there are 4)

Question 2: In lines 9 and 10 the author of this program defined $t = 0$ and $dt = 0.1$.

a. what do those two variables stand for?

b. What happens when you change dt to 0.5?

Question 3: When will the motion of the animation stop?

Question 4: Look at the derivation of the equation for the acceleration of a mass on a spring below and then at the code. Where in the code (which line(s) specifically) does the author.

a. Define the acceleration of the mass on the spring?

b. Update the position of the mass spring system?

c. What kinematics equation does the author use to update the position?

d. Update the instantaneous velocity of the mass?

$$\begin{aligned} F_{NET} &= F_s \\ ma &= -kx \\ a &= \frac{-kx}{m} \end{aligned}$$

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- e. What kinematics equation does the author use to update the position?