Name: _____

Class: _____

Due Date: _____

Physics Topic 38 – Damping and Resonance

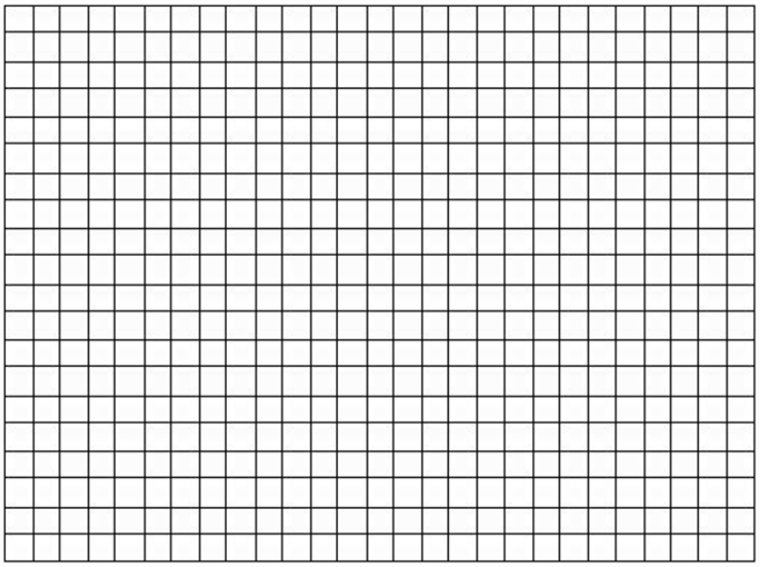
Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. C: What is a *restoring force*?

2. C: What are some characteristics for *simple harmonic motion?*

3. C: Define *free oscillation.*

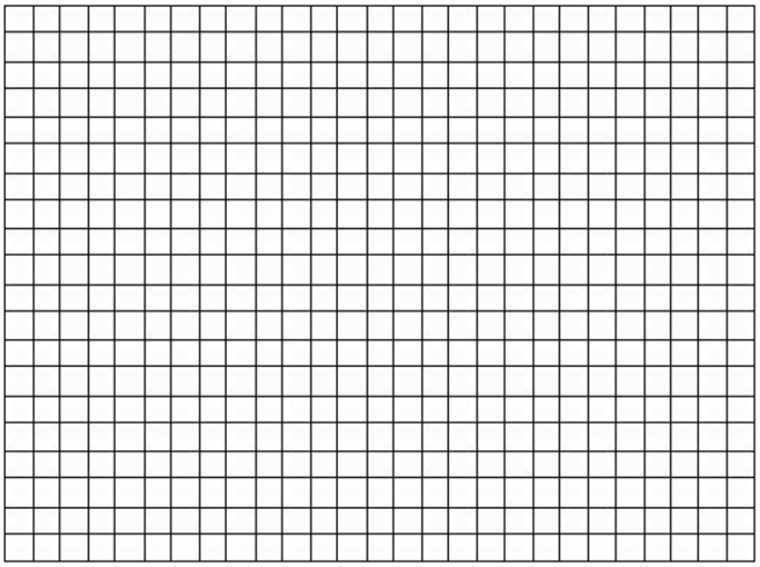
4. C: **Use a pencil!** Label and draw a *displacement vs. time* graph for a *free oscillation.*



5. C: Define *damping.*

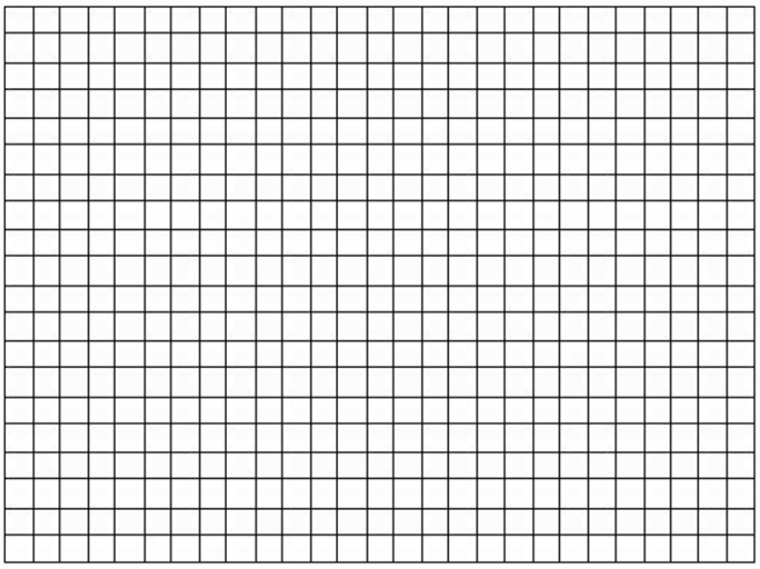
6. C: Define *underdamping* (or *light damping*).

7. C: **Use a pencil!** Label and draw a *displacement vs. time* graph for an *underdamped system.*



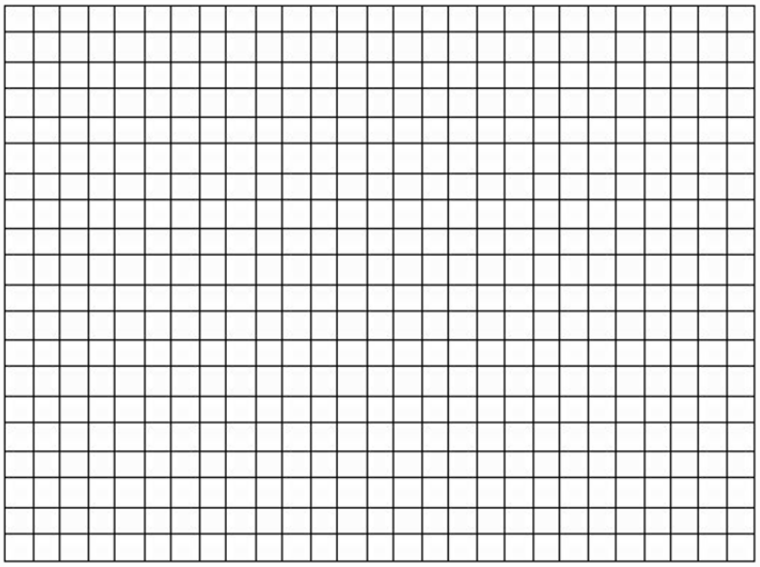
8. C: Define *overdamped motion*.

9. C: **Use a pencil!** Label and draw a *displacement vs. time* graph for *overdamped* motion.



10. C: Define *critically damped motion*.

11.C: **Use a pencil!** Label and draw a *displacement vs. time* graph for a *critically damped system.*



12.C: What is a *driving force?*

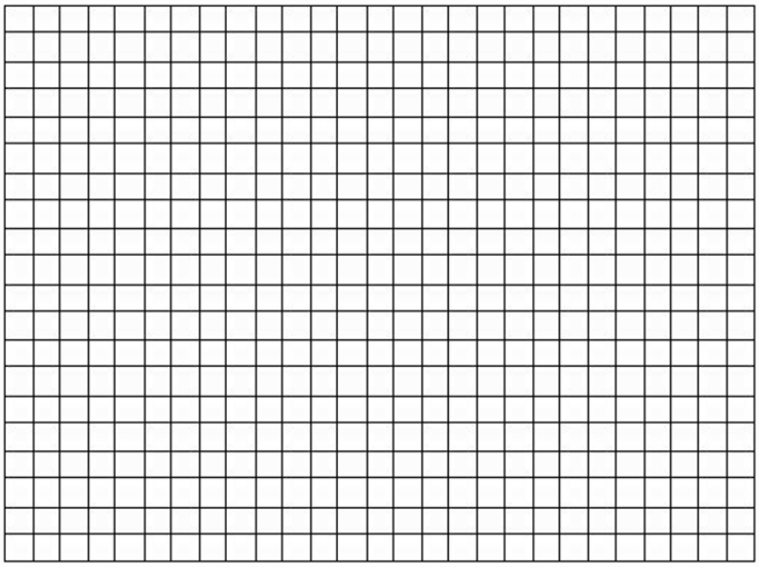
13.C: Define *natural frequency.*

14.C: Define *resonance*. When does *resonance* occur?

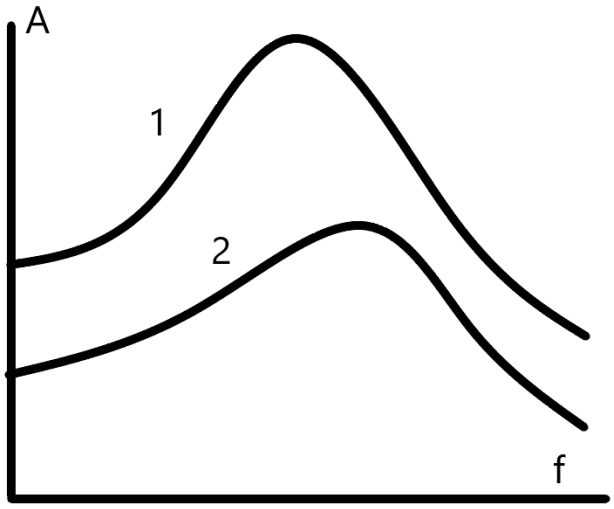
15.C: What happens to the amplitude of an object when the *natural frequency* of the object is much lower or much higher than the *driving frequency*?

16.C: What happens to the amplitude of an object when the *natural frequency* of the object is approximately equal to the *driving frequency*?

17.C: Draw an *amplitude vs. frequency* graph of an object oscillating with a driving force and a damping force.



18.E: Two oscillators are experiencing forced oscillations at a frequency near to the natural frequency of each oscillator. The graph below shows the amplitude with forcing frequency for each oscillator:



a. Which system, 1 or 2, has a greater amount of damping?

b. Which system, 1 or 2, has a greater natural frequency of oscillation?

19.C: List some effects of resonance in the real world.