Name: _____ Date: _____

m_r^β Physics Practice: Periodic behavior

Periodic behavior means that something we are observing returns to the same state at regular intervals. It might be an entire system, or a characteristic of a system.

1. List examples of periodic behavior

a. _____

b. _____

c. _____

d. _____

2. If something is periodic, what do we mean by *period* T?

_____

_____

3. What do we mean by *frequency* f?

_____

_____

4. What do we mean by *amplitude* A?

_____

_____

5. Research *Hooke's Law*. What is it?

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The remaining questions refer to the online spring lab at `https://phet.colorado.edu/en/simulation/mass-spring-lab`. Set $g = 0$ to simulate an experiment conducted in deep space, and set friction to **none**. Adjust the dashed line so that it is aligned with the bottom of the spring. Align the ruler so that the 30cm mark is aligned with the dashed line.

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6. Pause the system, and attach the 250g mass to the first spring. Move the weight to align the spring with the 10cm mark. Start the watch, and then start the simulation by going into 1/4 time. When the mass has made 10 cycles, note the time.

a. What is the time for 10 cycles?

b. What is the period T for the 250g?

c. What is the frequency f?

d. What is the amplitude A?

e. At what point(s) on the ruler does the mass reach maximum velocity?

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f. At what point(s) on the ruler does the mass have maximum acceleration?

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7. Set up the system as you did in the previous example. Using the pause and 1/16 time feature, create a t-chart showing time and relative position of the mass at approximately 0.1s intervals for 2 seconds.

a. Graph your data using `http://desmos.com`.

b. Superimpose the graph of $y = A\cos\dfrac{2\pi x}{T}$.

c. What do you notice?
