Name_____Teacher_____ Per_____ Date_____

Frequency and Period Activity

Learning Goals: Students will be able to:

- Give examples of everyday things that oscillate
- Calculate the frequency and period of an oscillating object
- Write a description of frequency and period that includes illustrations

Warm-Up Questions:

1. The cartoon pictures show two different types of jumping.
    a. Which one do you think would be more fun for an amusement park?

Pool jumper **Bungee jumper**

    b. Why do you think it would be more fun?

    c. How do these two jumpers move differently?

2. Assuming these cartoon characters could move into action, what would be similar about the motion of all of these cartoons?

3. Joe walked from his house to a tree. How is his motion different from the motion of the cartoons in the second slide?

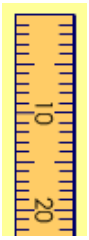
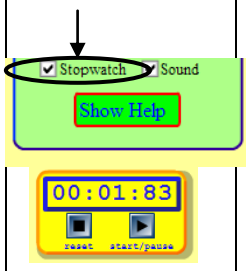
Simulation Questions:

Do parts #1 and #2 and be ready to get back together as a class in 20 minutes.

1. Angelica the Amusement Park Designer is designing a bungee jumping. She is going to use a PhET simulation to study how bungee jumpers move.
    a. Open the PhET simulation "Masses and Springs". How is the motion of the mass similar to a bungee jumper?

    b. Angelica is worried that people might get sick if they bounce too much on the ride. What do you think she might mean by "bounce too much"? Using the simulation, list some things that could define the "amount of bounciness":

c. Angelica's boss wants to know exactly how much bouncing is "too much." She needs to be able to **measure** "bounciness", and give her boss **numbers**. Help Angelica by using the simulation tools to measure how much the mass bounces.

Tool I used	What I did with the tool	My measurement or Calculation:
Ruler 		
Stopwatch 		

d. Talk to your neighbors and see what they did to measure "bounciness." If they used a different method, try their method, too! Show your work here:

2. When you tell Angelica what you found out she says she wonders if **a person's mass affects how much they bounce**. Help her design an experiment that tests how mass affects "bounciness." Explain what you did by drawing a picture and explaining in words.

Picture	Explanation of procedure
Results: What did you find?	

a. When you explain your results to Angelica, she has a hard time understanding that one mass bounces "more often" than another. Help her count how often each mass bounces by tapping your finger on the table each time the first mass is at its highest point. Then do the same for the second mass.
b. Which mass made you tap faster?
c. Which mass made you tap more **frequently** (more often)?

d. How do you think you could find the **period of time** between each tap?

e. Angelica understands your results now, and she wants to apply this new knowledge to her bungee jumping ride. Write an explanation of how you think a small girl (with a mass of 40 kg) might bounce differently than a large man (with a mass of 150 kg):

f. How do you think Angelica could design the bungee ride so that the small girl and the large man bounce about the same amount?

**** Wait now for our all class discussion.** If you're done, try seeing what else you can measure, or try to figure out what the mass of each colored objects is. **

3. **Practice finding frequency and period.** Choose **two different** masses and find the period and frequency as they bounce. Complete this table.

Draw a picture of the mass & spring	What did you measure?	Show your calculation for frequency	Show your calculation for period

   a. Describe what frequency means, in your own words. Draw a picture to go along with your description.

   b. Describe what period means, in your own words. Draw a picture to go along with your description.

4. This girl is swinging back and forth.

   a. How could you find the frequency of her swinging?

   b. How could you find the period?

5. Give another example of something that oscillates. Describe it in words and draw a picture.

Description and Picture	Measuring the oscillation
	<u>How could you find its frequency?</u> <u>How could you find its period?</u>