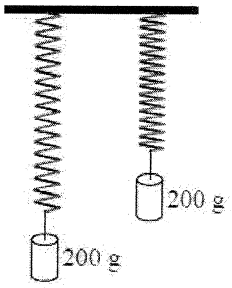
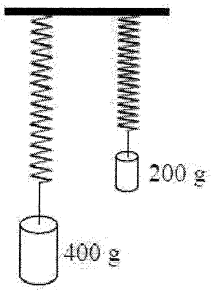
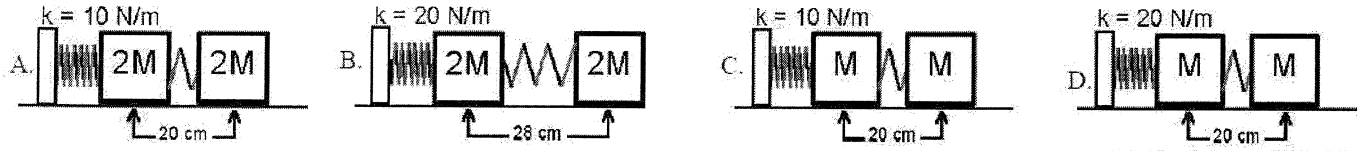
1. Which of the springs has the bigger spring constant? Right
2. How do you know for certain? Assuming no motion, the right spring hangs lower
3. Which will vibrate faster? Right



4. Two different masses are suspended from springs with the same spring constant, which will have the faster period? Right
5. Why? Less mass faster acceleration





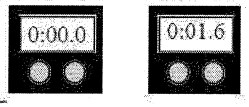
6. What is the amplitude of spring A? 10cm
7. What is the amplitude of spring B? 14cm
8. A or B will have the fastest period? B
9. A or C will have the slowest period? A
10. What is the period of spring D? $2 \times 1.6 = 3.2$ sec
11. Find the mass on spring D.

$T = 2\pi\sqrt{\frac{m}{k}}$

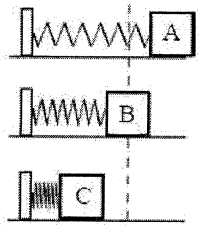
$3.2s = 6.28\sqrt{\frac{m}{20N/m}}$

$.51 = \sqrt{\frac{m}{20}}$

$.2601 = \frac{m}{20} = 5.2kg$



12. Which position or positions?
    - A. B Has maximum velocity?
    - B. C Maximum + force?
    - C. B Acceleration = 0?
    - D. B Maximum kinetic energy?
    - E. B No potential elastic energy?
    - F. C X is a negative maximum?
    - G. B Zero amplitude.



13. Positive or negative displacement (x):
    - A. − A compressed spring (the spring gets shorter)
    - B. + A stretched spring (the spring is longer)
    - C. + Pulling on a spring so it stretches.
    - D. − Pushing on a spring so that it compresses.
    - E. + Hanging a mass on a spring.
14. In F = −kx, is F the spring or what's pulling on the spring?
15. If I pull on a spring with 20 N, then the spring pulls back with how much force? 20N
16. A 5 kg object stretches a spring 20 cm.
    - A. How much force is pulling on the spring ?

$F_w = 5kg \cdot 10m/s^2 = -50N$

    - B. Find the spring constant.

$F = -kx \quad -50N = -k \cdot .20m \quad k = 250\ N/m$

17. A 300 g mass stretches a spring 50 cm. find the spring constant.

$F_w = .3kg \cdot 10m/s^2 = 3N$

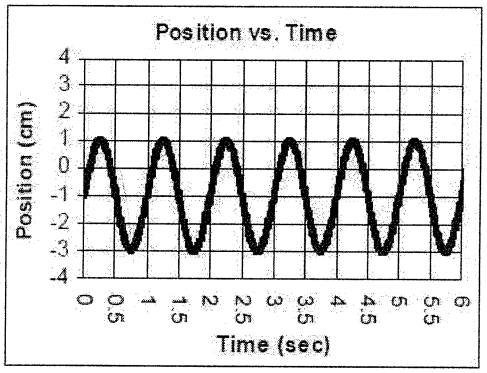
$F = -kx$

$3N = -k \cdot .50m \quad k = 6\ N/m$

18. Find the period of a spring mass system that has a 5.4 kg mass and a 60 N/m spring constant.

$T = 2\pi\sqrt{\frac{m}{k}} = 6.28\sqrt{\frac{5.4kg}{60\ N/m}}$

$T = 1.885$ sec



19. What is the amplitude of the above graph? 2cm
20. What is the period of the above graph? 1sec
21. If it has a 3 kg mass on it, what is its spring constant?

$T = 6.28\sqrt{\frac{m}{k}} \quad .025 = \frac{3}{k}$

$1 = 6.28\sqrt{\frac{3kg}{k}} \quad 120\ N/m$