In Class Fall Final Review

Skills:
- Using and Reading Equations
- Graphs
  - Linear Equations
  - Transferring Graphs
  - Integrating Graphs
- Scientific Method
  - Multiple Trials Reducing Error
  - Experiments:
    - Experimental Variables
    - Control Variable
    - Control Setup
    - Procedures
    - Calibration of Instruments

Concepts:
- Vectors and Components
- Forces
- Energy
- Conservation of Energy
- Loss of Energy and Efficiency
- Simple Machines
- Conservation of Momentum
- Equilibrium

1. What is the difference between accuracy and precision?

2. Why do are significant figures...significant?

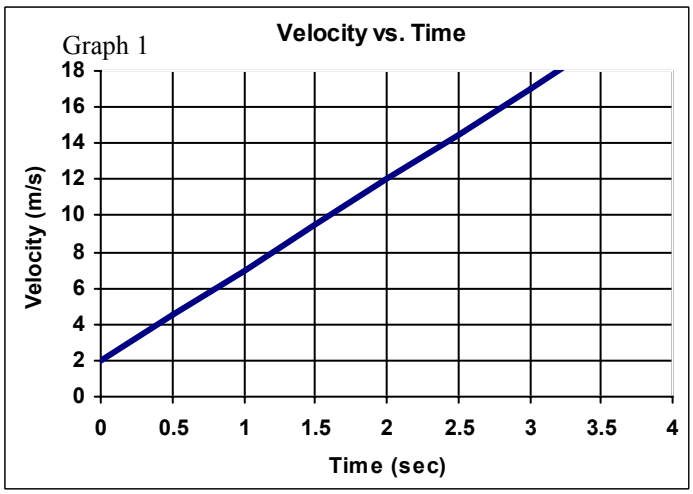
3. What are the two things you should look for on graphs?

4. How do you figure out what they mean (the two things from the previous question)?

5. Using Graph 1.
   A. What does the slope mean?
   B. What does the area mean?
   C. What does the y-intercept mean?
   D. What is the dependent variable?
   E. Where will the object be at 6.2 seconds?

   F. How far did the object go in the first 2 seconds?

Graph 1



6. What is the difference between mass and weight?

7. An object goes 2 complete times around a circular track with radius of 15 meters.
   A. What was its displacement?

   B. What distance did it travel?

   C. If it traveled the two times in 10 seconds, find its velocity.

   D. Find its speed.

8. When an object is thrown into the air. Answer the following for the very top of its trajectory.
   A. How fast is it going?
   B. Is it at equilibrium?
   C. Afterwards v is + or -?
   D. At the bottom its velocity is?
   E. What is the acceleration?
   F. Just before v was + or -?
   G. Just afterwards the velocity is?

9. An object is thrown into the air at 25 m/s. How long will it take for it to get to its highest point?

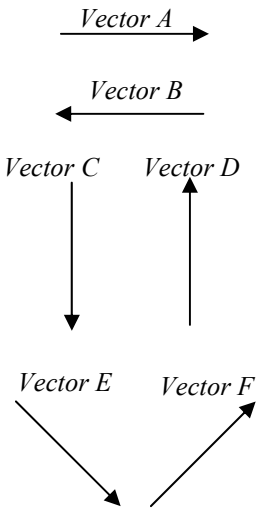
10. What kind of energy did it have at the top?
11. Where did this energy go?

12. What Law allows us to know this?

13. How high does it go?

14. Projectile Motion Questions:
    A. If shot from ground to ground Δx =
    B. If shot from above the ground Δx =
    C. The acceleration in the x direction =
    D. The acceleration in the y-direction =
    E. The Vx initial =
    F. The Vy initial =
    G. If shot from ground to ground how does Vyf and Vyi compare?
    H. How does Vxf and Vxi compare?
    I. If a rock is thrown at 35° at 12 m/s from 5 m above the ground, find its range:

15. Vector Questions
    A. Vectors have _____ and _____.
    B. Speed is a _____ while velocity is a _____.
    C. A vector that is positive can _____ a vector that is negative and equal in size.
    D. Kinetic energy can or cannot be negative?
    E. Is kinetic energy a vector?
    F. Graphically add these vectors: D + F –2B + E:



    G. A boat going 12 m/s at 20° N of E hits a current going 5 m/s north. Find their final velocity.

16. What causes motion?

17. Forces cause what (give all examples):

18. Where do forces come from and what can the make?

19. When lifting an object you are lifting against:

20. When climbing a vertical ladder for every 1 meter you climb you have to lift your weight how far?

21. Imagine a ramp that is 10 m long with the vertical distance of 2 m.
    A. What is it's mechanical advantage?
    B. For every 1 meter you climb along the ramp, how far do you lift your weight?

22. So, how do simple machines multiply your force?

23. Using a the same 10 m long ramp you push with 45 N to move a 130 N object up to the back of a 2 m tall truck bed.
    A. How much work do you put in?

    B. How much work do you get out?

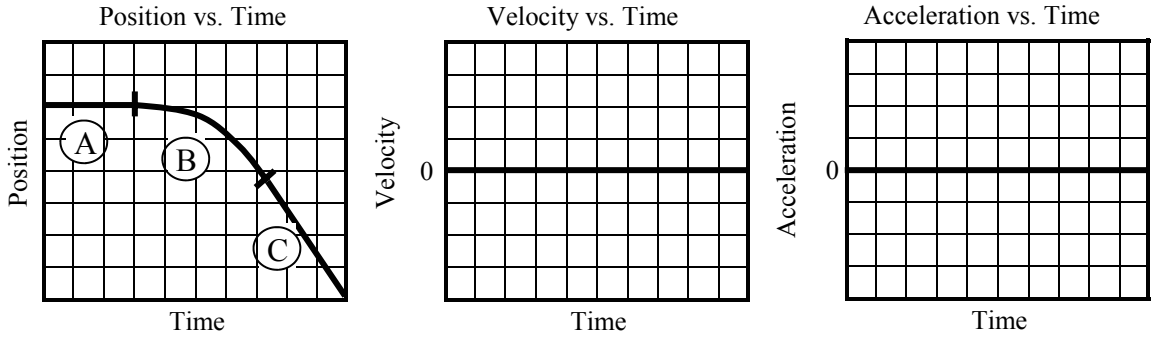
    C. Find the efficiency of the ramp.

    D. Did you do more or less work using the ramp?
    E. Did you use or less force using the ramp?
    F. Where did the extra work go?

24. A mechanical advantage is useful when?

25. Draw 2 levers. Lever A with a greater MA.

26. Transfer the following graphs.

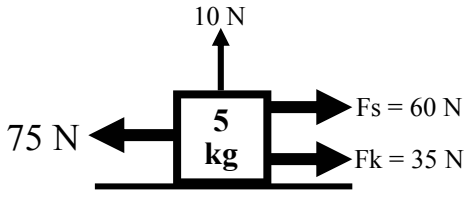


27. Will the following object move or not and why?

28. Find the acceleration of the object.

29. What was the normal force on the object?

30. What equation would you use to find the two μ?



31. Consider an object in space:
    A. Does it have weight or mass?
    B. Does it have inertia?
    C. To give it the same acceleration as on the earth will you use a bigger or smaller force?
    D. If you push on it what happens to you?
    E. Which of Newton's Laws tells us this?
    F. Which of you will move with the greater acceleration?
    G. Which of Newton's Laws tells us this?
    H. Once you push on it, you will keep moving in a straight or curved line?
    I. Which of Newton's Laws tells us this?
    J. If the object has 30 kg of mass and you have 60 kg of mass and the object ends up going 4 m/s to the right, find how fast you are moving.

32. Give the three conditions of equilibrium:

33. Which falls faster a heavy or light object (and give conditions):

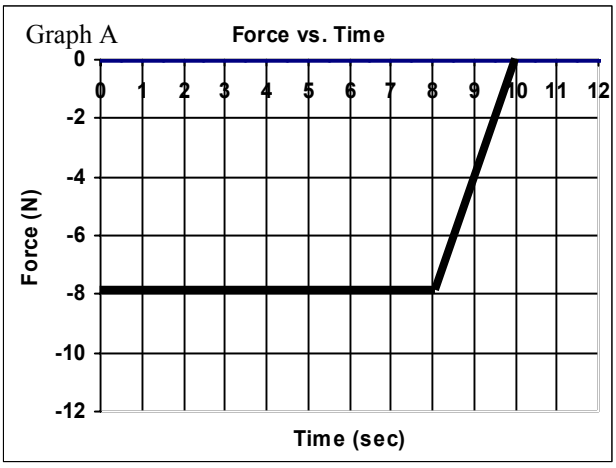
34. A more powerful motor does more or less work than a less powerful motor?

35. A larger force gives more or less acceleration than a small force?

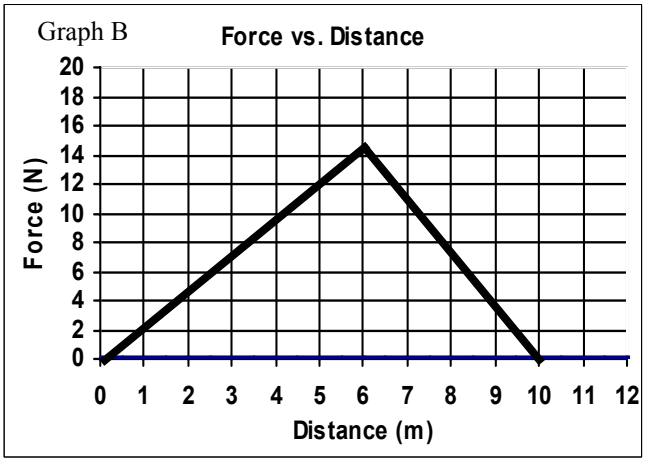
36. A 2 kg ball is dropped from 6 m, how fast is it going half way down. VEO!

37. A 3 kg object is moving at 6 m/s. In how much distance will it stop if $\mu k = 0.3$? VEO!

Graph A



Graph B



38. Use the graphs above to answer the following:
    A. Which graph shows positive forces?
    B. On which graph is the object experiencing a negative acceleration?
    C. On which graph is the object speeding up?
    D. On which graph is the object gaining momentum?
    E. What will you find with Graph A?
    F. What will you find with Graph B?
    G. If they were the same object how would they be related?
    H. Find the impulse of one of the objects.

    I. Find the work done on one of the objects.

    J. If the object on Graph B is 2 kg and starts at rest, find its final velocity

    K. What would be the 2 kg object's final kinetic energy?

    L. What would be the 2 kg object's final momentum?