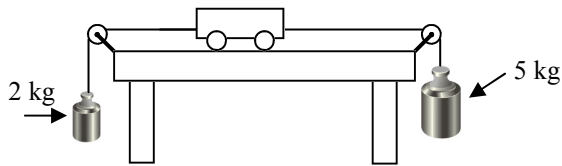
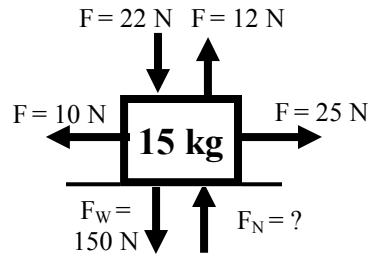


## 2008 Forces 4



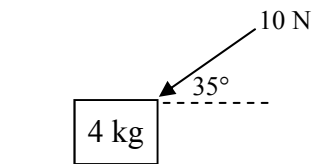
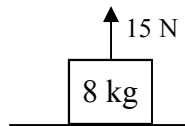
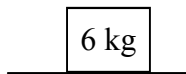
1. A cart is attached to two masses.
  - A. Label the weights of the two masses.
  - B. Will the cart have a positive or negative acceleration?
  - C. Draw the force diagram for the cart.
  - D. What is  $a_y$  for the cart?

2. Use the diagram at the right to answer the following.
  - A. Which forces are  $+y$  forces?
  - B. Which forces are  $-y$  forces?
  - C. Which forces increase the normal force?
  - D. Which forces decrease the normal force?
  - E. Which forces do not change the normal force?
  - F. Using Max, what is the acceleration in the x-direction?

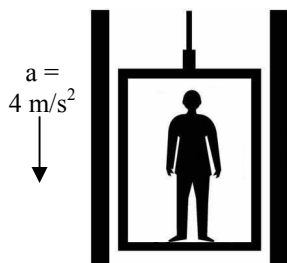
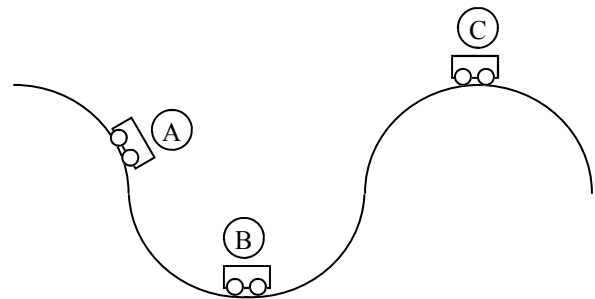


- G. Because it is not moving in the y-direction, what is  $a_y$ ?
- H. Using Max, calculate  $F_N$ .

3. All three of the masses below are at on a table. Calculate the normal force for each.

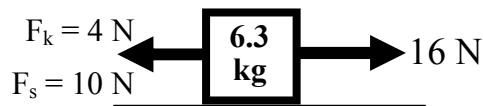


4. When we feel weightless it is because this force is missing.
5. The diagram at the right shows a cart on a roller coaster.
  - A. At which position do you feel heavier?
  - B. At which position do you feel lighter?



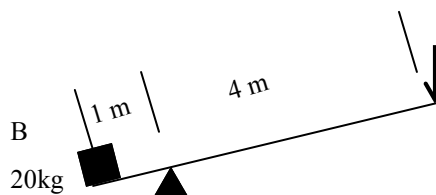
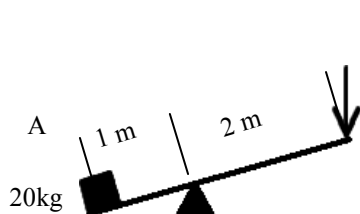
6. A 60 kg man is riding in an elevator that is accelerating downward at  $4 \text{ m/s}^2$ .
  - A. Is the acceleration  $+$  or  $-$ ?
  - B. Draw the forces on the man.
  - C. Are the forces vertical or horizontal?
  - D. Is this a Max or May question?
  - E. How heavy does the person seem?

7. If  $\mu_s = 0.65$  and  $\mu_k = 0.5$  and  $F_N = 120$  N, calculate  $F_s$  and  $F_k$ .



8. For the mass at the left
- How much force is necessary to keep this object moving?
  - How much force is necessary to start this object sliding?
  - Will this object slide?
  - Why?
  - When it is accelerating, is it sliding or at rest?
  - Which friction do you use when it is accelerating?
  - Calculate the acceleration of the object.

9. Since the above 6.3 kg object on a table...
- What is the normal force on the object?
  - Calculate the coefficient of static friction on the object.



10. Here's the way to think about simple machines. If you use twice the distance, you only need 1/2 the force to lift the object.
- With lever A, how much WEIGHT are you lifting?
  - How much force is necessary to lift object A
  - With lever B, since you use \_\_\_\_\_ times as much distance, you only need \_\_\_\_\_ the force to lift it.
  - How much force is necessary to lift object B?

- How many protons does carbon have?
- How many protons does chlorine have?
- What is the atomic number of Silicon?
- If I take away 1 proton from Oxygen, what element do I create?
- If I add 1 neutron to carbon, what element do I have?
- If two atoms have the same number of protons, but different number of neutrons, what do we call them?
- If you add electrons to an atom, it becomes a negative \_\_\_\_\_.

6 <b>C</b> 12.011 Carbon	7 <b>N</b> 14.007 Nitrogen	8 <b>O</b> 15.999 Oxygen	— <b>F</b> 18.998 Fluorine
14 <b>Si</b> 28.086 Silicon	15 <b>P</b> 30.974 Phosphorus	16 <b>S</b> 32.066 Sulfur	— <b>Cl</b> 35.453 Chlorine

18. Is this atom neutral, positive, or negative?

