2008 Forces 6
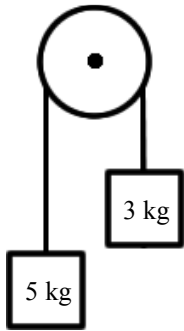
1. Use your "Connected Objects" notes to answer the following.
    A. For the right side, is positive up or down?
    B. For the left side, is negative up or down?
    C. Label the weights of both objects on the diagram.
    D. Is the weight of the 3kg object positive or negative?
    E. Is the tension on the 5 kg object positive or negative?
   F. Find the acceleration of the system (follow the notes exactly).

3 kg

5 kg

2. A. Use your notes to fill in the diagram at the right.
        NOTICE: the numbers are different than the notes.

    B. Will the object slide or not?

$F_s =$ $F_k =$ $F_N =$

$\mu_s =$
0.2

F_{Wy} 6 kg $F_X =$

$F_W =$

$F_{WX} =$

35°

3. (*Using "Gravity Notes"*) A 14 kg object is moved from the Earth to Mars.
    A. What is its weight on the Earth?
    B. What is the mass of the object on Mars?
    C. If the mass of Mars is 6.4×10^{23} kg and the radius of Mars is 3.39×10^6 m calculate the force of gravity of the 14 kg object on Mars.
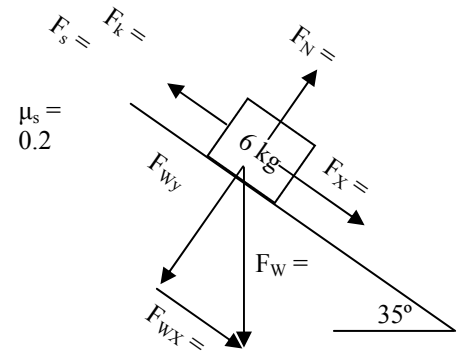
    D. If the object's mass were doubled, how would the force of gravity change?

    E. If the distance to the center of Mars was doubled, how would Fg change?

1 m   2 m   2 m
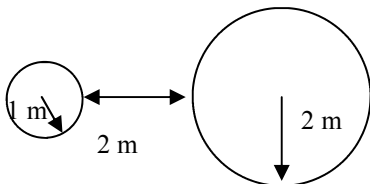
4. What does "r" mean in the gravity equation?

5. For the two objects at the left, what would be "r"?

6. A 6 kg object is in an elevator that is accelerating downward so that a = -2 m/s^2.
    A. What is the weight of the object?
    B. Using your notes, find the normal force on the object.

    C. Does the object feel heavier or lighter?

7. Name the six simple machines:

8. What two simple machines are scissors?
9. What simple machine is a flight of stairs?
10. What kind of simple machine is a screwdriver when it is used to pry open a can of paint?

11. A. Is an electric motor a simple machine?   B. Why or why not?

12. How do ALL simple machines multiply force?

150 N

12 cm
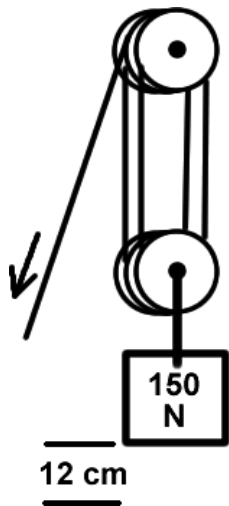
13. A. What is the input force for the pulley system?

   B. How much rope is pulled out of the pulleys?

   C. What is the MA of this system?

14. With a lever a person uses 200 N to lift a 1400N object.
   A. How much does this lever multiply your force?

   B. What is the mechanical advantage of the lever?

15. A. Find the mechanical advantage of the incline plane.

   B. How much force is necessary to pull the object up the ramp?

$F = ?$

1 m

5 m

10 kg
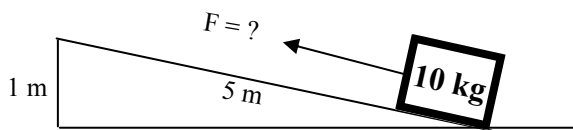
Atom A	Atom B	Atom C
15 protons	14 protons	15 protons
15 electrons	15 electrons	18 electrons
15 neutrons	15 neutrons	16 neutrons

16. Use the three atoms at the right to answer the following:
   A. ___ Which two atoms are the same element?
   B. ___ Which two are isotopes of each other?
   C. ___ Which ones are neutral atoms?
   D. ___ Which one is an ion?