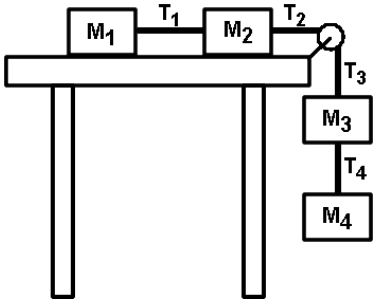
A-Day: due Wed., 11/7 (Assigned 11/5)
B-Day: due Thurs., 11/8 (Assigned 11/6)

2007 Forces 6

Variable	Units	Name	Notes
MA	none	Mech Advantage	For simple machines only

Equation:
$MA = \frac{F_{out}}{F_{in}}$ OR $MA = \frac{D_{Effort}}{D_{Resistance}}$



1. For the picture at the left draw the force diagram for M_2 if there is friction on the table.

2. Using the above force diagram.
   A. Give all positive x forces:
   B. Give all negative x forces:
   C Give all positive y forces:
   D. Give all negative y forces:

3. Write Newton's second law equations for the above object (x and y directions).

   X-direction: Y-direction

4. 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?

5. With a lever a person uses 200 N to lift a 1400N object. What is the mechanical advantage of the lever?
   Variables: Equation:

6. Name the six simple machines.

7. What two simple machines are scissors?

8. What simple machine is a flight of stairs?

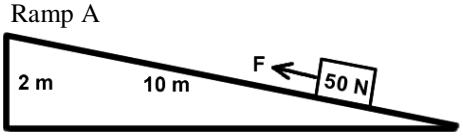
9. What kind of simple machine is a screwdriver when it is used to pry open a can of paint?

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

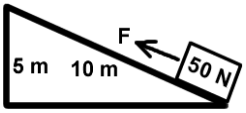
12. For the two ramps at the right:
    A. Which has the greatest MA?
    B. Find MA for ramp A.

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

Ramp A



Ramp A

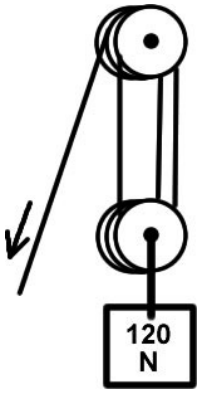


13. How do simple machines multiply force?

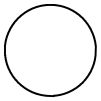
14. Which lever has the larger MA?

A 

B 



15. For the pulley at the left,
    A. What is the MA of the pulley system?
    B. How much input force is needed to lift the object?
    C. If you pull out 21 cm of rope, how high does the object lift?
    D. Draw a force diagram for the lower pulley (lower circle):

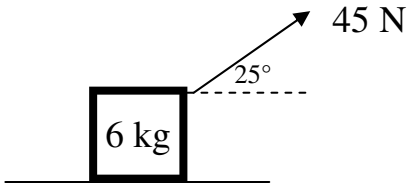


16. A 14 kg object is moved from the earth to Mars.
    A. What is its weight on the earth?
    B. If the mass of Mars is $m_2 = 6.4 \times 10^{23}$ kg and the radius of Mars is $r = 3.39 \times 10^{6}$ m calculate the force of gravity of the 14 kg object on Mars.

    C. What will the mass of the object be on Mars?

17. For the object at the right.
    A. Decide if it will slide or not (give all of the numbers on the diagram).

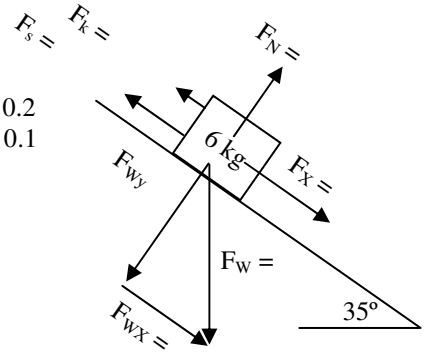
    B. Find the acceleration of the object.



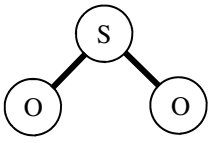
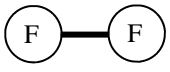
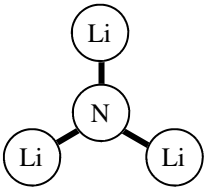
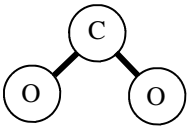
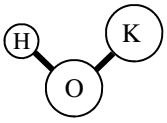
$\mu_s = 0.42$
$\mu_k = 0.21$

18. Using your notes for the object at the right.
    A. What is its weight?
    B. What is the normal force?
    C. What is the Fx?
    D. What is Fs?
    E. What is Fk?
    F. Will it slide?
    G. Find acceleration.

$\mu_s = 0.2$
$\mu_k = 0.1$



19. Fill in the following diagrams

 *Atoms:* ____ *Elements:* ____ *Molecules:* ____ *Compounds:* ____	 *Atoms:* ____ *Elements:* ____ *Molecules:* ____ *Compounds:* ____	 *Atoms:* ____ *Elements:* ____ *Molecules:* ____ *Compounds:* ____	 *Atoms:* ____ *Elements:* ____ *Molecules:* ____ *Compounds:* ___	 *Atoms:* ____ *Elements:* ____ *Molecules:* ____ *Compounds:* ___