

# Hydraulic Hot Water Bottle Worksheet

## Part 1. Water Tower and Water Pressure

1. What is the purpose of a water tower?
2. At what point during the lifting of the hot water bottle does water begin to flow out of the tube?
3. What happens when the water bottle is lowered below the bucket (or sink)?
4. When the end of the plastic tube is raised above the hot water bottle, at what level does the water in the tube stay? Does the water continue to flow? Does the water level-off and reach an equilibrium height?

## Part 2. Hot Water Bottle Scale

Measured distance between initial water height and final water height: \_\_\_\_\_

Area of the board in contact with the hot water bottle: \_\_\_\_\_

Actual weight of student: \_\_\_\_\_

1. Use Equation 6 to calculate the weight of the student. *Hint:* Watch units!
  
  
  
  
  
  
  
  
  
  
2. Compare the calculated weight to the actual weight. Describe methods that might improve the weight calculation.

### Part 3. Hot Water Bottle Hydraulic Jack

1. Compare the distance the syringe plunger moves and the height that the student is lifted.
2. Initial length of plunger to the syringe body: \_\_\_\_\_  
Final length of plunger to the syringe body: \_\_\_\_\_  
Initial height of the board above the floor: \_\_\_\_\_  
Final height of the board above the floor: \_\_\_\_\_  
Ideal Mechanical Advantage of the hydraulic jack: \_\_\_\_\_
3. Was more work done by the hydraulic lift than was performed by the person pushing the plunger?
4. What is a disadvantage of a hydraulic press?

### Part 4. Hot Water Bottle Hydraulic Jack (Alternate)

1. Describe what happens during this demonstration.
2. Develop a hypothesis that might explain the lifting power of the water.