

Name:

Class:

Date:

## Activity 7.6A: Energy Systems Lab

### Materials Needed

- 1 large balloon per student
- Several textbooks per student group
- Syringes (two per group; you can experiment with different sizes)
- About 10" of clear aquarium tubing per group (small enough to fit snugly on syringes)
- Water
- Cooking oil

### Section One: Pneumatic Power Systems

Complete the following for pneumatic power systems.

1. What is the definition of *pneumatic energy*?

Answer:

2. Lay your balloon on the edge of the desk with the open end hanging over the edge.
3. Place a textbook on the edge of the desk so it is covering the balloon but the open end is still hanging over the edge.
4. Gently blow into the balloon to inflate it and attempt to shift the book. Can you get air into the balloon?

Answer:

5. Attempt to fully blow up the balloon and completely shift the book off the edge of the desk. Were you successful?

Answer:

6. Was it difficult to begin moving the book? Was it easier once the balloon was partially inflated? Explain your answer.

Answer:

7. How does blowing up the balloon relate to pneumatic energy systems?

Answer:

## Section Two: Hydraulic Power Systems

Complete the following for hydraulic power systems.

1. What is the definition of a *hydraulic power system*?

Answer:

2. Attach a piece of tubing to the end of one of your syringes. Push the syringe plunger all the way down.
3. Fill the syringe with water. Make sure there is water in the tube as well. Carefully push the syringe plunger to expel all air from the tube. Keep the syringe about 3/4 full of water.
4. Push the plunger on the second syringe down completely. Attach the open end of the tube to the second syringe.
5. Push the plunger down on the syringe with the water in it. What happens to the plunger on the empty syringe?

Answer:

6. Unhook the tubing from one end of the system and drain the water from the tubing and syringes.
7. Repeat the activity using cooking oil in place of water. What is different about the action when cooking oil is used instead of water?

Answer: