Activity 3.2.1 Under Pressure

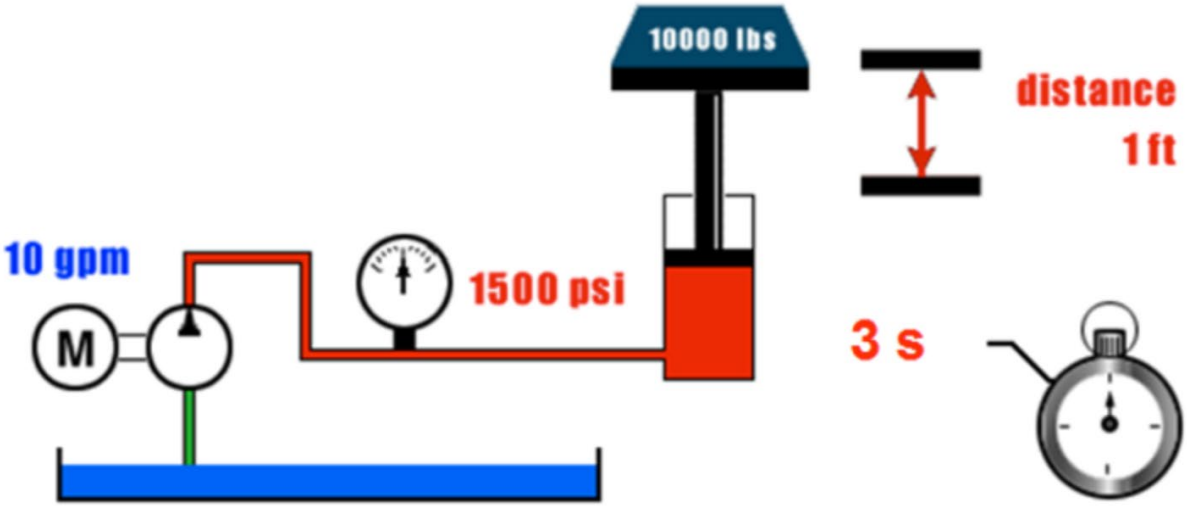
Name:

Period:

Reflection Question: An object has a base that is 4 square inches. It also exerts a pressure of 22 pounds per square inch. What is the weight of the object? Show your work.

Reflection Question: A dental hygienist uses a pump to move a patient's chair up and down. Together, the chair and patient exert a downward force of 510 pounds. The chair is attached to a large piston with an area of 189.3 $in.^2$. To move the chair, the pump applies force to a small piston with an area of 13.7 $in.^2$. What force must the dental hygienist exert on the small piston to lift the chair and the patient? Show your work.

Turn and Talk: In Unit 1 Mechanical Design, you learned about simple machines. How is a hydraulic or pneumatic actuator different?



Reflection Question: If the system lifts a 10,000-pound weight 1 foot in 3 seconds, what is the power output of the system? Show your work.

Hint: Convert seconds to minutes and ft-lb/min to horsepower.

What is its efficiency? Remember efficiency is the ratio of useful energy output to the total energy input, or the percentage of work input that is converted to work output.

Where is the energy lost?

Conclusion

1. Name one fundamental principle of fluid power. Explain your reasoning.

2. List and describe the functioning components and purpose of a fluid power device at your home or school.

3. Explain an everyday task that could be performed more efficiently if a fluid power device were used.

4. Perform research to determine how fluid power is being used to improve human life. Provide two examples along with references.