Instructions for Printing Fluid Power Task Cards

- Print slides 2-5 and then take to a copy machine to make double sided copies
- Copy slide 2 to the front and slide 3 to the back of one sheet of paper MAKING SURE BIG PICTURE ALIGNS WITH CORRECT TASK! (flip around if not)
- Repeat previous step with slides 4 and 5
- Cut into separate task cards and then have them laminated for repeated use

Materials List For Task Cards

- Egg in Jar – need one hardboiled egg, jar with mouth slightly small than egg diameter, and a heat source (boiling water, matches, etc.) – teacher supervision needed during this
- Holding Power – an object that can be held by a student for approx. 5-10 minutes before wavering, stopwatch
- Tube Resistance – assorted weights, two veterinarian syringes, two different lengths of vinyl tubing, and a ruler
- Fluid Power Detective – no materials needed

Task Card: Egg in Jar

1.) Note: Teacher must assist on this task!
2.) Teacher will give you a hardboiled egg, glass bottle, and boiling water
3.) Remove the shell off the egg and see if it fits inside the mouth of the bottle
4.) Think how you are going to use heat and air pressure to get egg inside jar
5.) With teacher assistance, pour the boiling water into the jar
6.) Immediately place egg on jar opening and watch
7.) Document what happened and your reasons for it (it's not magic!)

Pressure

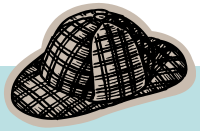
What happens to a balloon when it gets warm? When it cools? How does this relate to your task?

More: Charles Law says: Volume increases (or decreases) when temperature increases (or decreases)

EVALUATE and DOCUMENT how this relates to using pneumatic devices

Task Card: Fluid Power Detective

1.) Note: fluid power is using fluid to move power from one place to another
2.) Look for examples of how fluid power is used in your school (hint: machines!)
3.) Write down in your notebook details about each example (description, use, location in building, etc.)
4.) Repeat steps 2-3 as needed until you have plenty of examples.
6.) Calculate the *AVERAGE* number of examples *you saw* for each location in your school building.

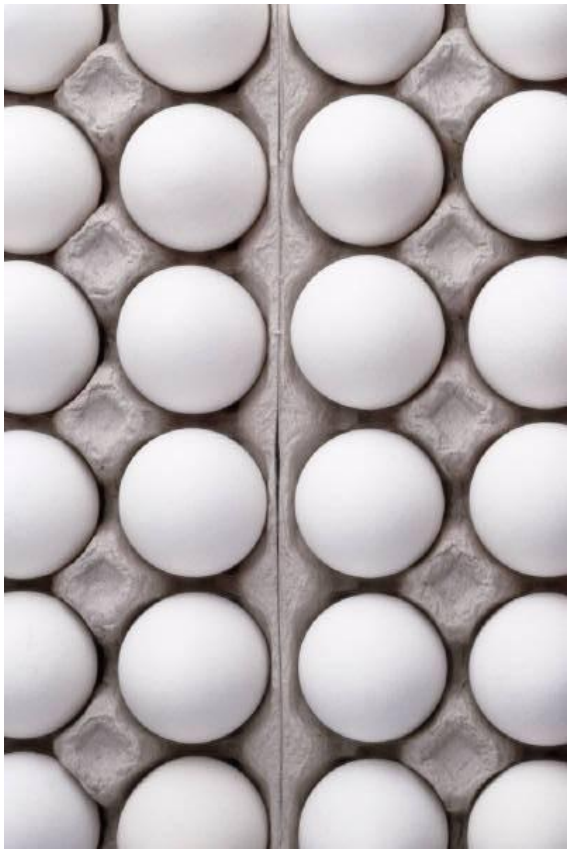


Average

Total number of examples you counted DIVIDED BY the total number of locations (# of examples/ # of locations)

More: Do you think you saw all examples of fluid power in your school?

ESTIMATE how many TOTAL examples were in your building.



Task Card: Holding Power

1.) Your teacher will hand you an object and a stopwatch
2.) Make note about how much you think the object weighs
3.) With only one hand, hold object straight out away from your body and try to hold it still (do not let it move!)
4.) Start stopwatch and see how long you can hold the object in the same place
5.) Stop stopwatch once object moves
6.) Record your time and repeat two more times (you may switch hands)
7.) Calculate the *AVERAGE* time you held the object out away from you.

Average
Total number of minutes (or seconds) you counted DIVIDED BY the total number of attempts (total time/ # of attempts)

More: How can fluid power hold things in place even when they are turned off?

ESTIMATE the size of a fluid power system (cylinder, pressure, etc.) to hold up the object you held

Task Card: Tube Resistance

1.) Your teacher will hand you a few weights, two veterinary syringes, two pieces of tubing, and a ruler.
2.) Fill up one of syringes almost completely with water
3.) Connect both syringe tips by attaching SHORT piece of tubing
4.) Record weight used on water filled plunger to move other plunger up
5.) Repeat steps using long piece of tubing
6.) *CALCULATE* how much MORE force was needed to push other plunger up

Pascal's Law Force = Pressure x Area
Force = Weight pushing on plunger
Pressure = Resistance to flow
Area = Plunger surface moving fluid

More: Resistance (bends, long run of hose) increases pressure

CALCULATE the pressure for each tube.

(Area of Circle = 3.14 x radius^2)