

Grade: 8	Block:
Date: , 2017	
Teacher:	



Lesson Title: Hydraulics	Subject: Science	Unit: Matter	Lesson Number: (7/8)
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Learning Goals:

- ❖ Students will understand that water is essentially incompressible and that we use this property to our advantage in hydraulic systems.
- ❖ They will understand that gases can be relatively easy to compress at least a small amount.
- ❖ Pressure on a gas changes the density of the gas by decreasing the volume

Preparation:

- Set up materials for 8 Cartesian divers
- Set up station for creating hydraulic systems
 - including bin full of water
- Print handouts

Materials:

- Tubing
- Syringes
- Water
- Tub
- 8 Pop bottles
- 2-liter Cartesian diver
- Frame for squeezing Cartesian diver with hydraulic syringe system

Lesson Structure:

- Introduction **(5min)**
 - Attendance
 - Give plan for lesson
- Hand out the worksheets that they will be using throughout the class
- Show demonstration of Cartesian diver **(5min)**
 - Have students describe in their own words what they think is happening to the diver
 - Have them write it down on their worksheets
 - Don't give the answer away
- Show how to make a hydraulic syringe system **(10min)**
 - Discuss how it helps to change the direction of the force
 - Say it helps you do something else as well...
 - Bring out the frame used for activating the diver remotely with the syringe system
 - Attach one end of the syringe system to the frame and hand the other end to a student in the front row
 - They will remotely compress the cartesian diver
 - Point out that these systems can be used to apply a force from a distance
 - Discuss the applications of hydraulics in everyday life
 - Car brakes
 - Heavy machinery
- Split class into groups and have them go to two different stations **(30min, 15 each station)**
 - Some will examine the cartesian diver and answer questions about it in order to guide them in the right direction towards an explanation

- Some will create their own hydraulic systems and answer questions about how they work
- Have students switch stations after 15 minutes
- While they are at their stations, they will be answering questions and drawing diagrams on their worksheets
- Understanding the syringe hydraulics helps with an explanation for the Cartesian diver.
- Rotate around between the groups and help drive the conversation while also keeping control of the class
- Have the students clean up when they are done at a station
- Bring the lesson back to a group discussion **(10min)**
 - Recap the activities in a group discussion and have students share what they learned
 - Work together as a class on a final explanation for both demonstrations
 - By the end of the lesson, students will have a full sheet of drawings and discussion about the activities, relating it to what they have learned about KMT

Homework:

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Assessment Strategies:

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Notes After First Trial:

- **Things to improve on:**
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- **Things that went well:**
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Notes After Second Trial:

- **Things to improve on:**
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- **Things that went well:**
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