

Jenny Au
Lesson 6
11/29/12

Summary of Lesson: Machines

A presentation on machines was shown to the students. I talked about simple machines and acoustic machines. A video of acoustic levitation by Argonne National Laboratory was shown. Students were interested in acoustic levitation. Polka music was played through the record player. The purpose of the presentation was to relate acoustics to the machine that the students were learning about.

GK-12 Lesson Plan

Teacher: Eileen Montbleau

Period: _____ Class: Lowell High School Freshman Physics

Date(s): 112912

SETTING THE STAGE	
<u>Essential Question</u>	How is acoustics related to the machines you are learning about?
<u>Content Objective(s)</u> (Student-friendly)	To relate acoustic machines to the simple machines the students are learning about.
<u>Connection to previous or future lessons</u>	Acoustic levitation will be revisited in the 3 rd quarter when students are learning about sound.
<u>Critical Thinking Questions</u>	What is a machine? What is a simple machine?
<u>Key Vocabulary</u>	Acoustics, input force, output force, machines
<u>Materials Needed/Safety</u>	Power Point, Record Player
ACTIVE INSTRUCTION	
<ul style="list-style-type: none"> • Launch (Engage) 	What is a machine? What is a simple machine? Examples of machines: Pliers/Scissors: Simple machine Lever of Phonograph: Mechanical energy converted to electrical signal Acoustic Tweezers: ultrasound pushing minuscule items Acoustic Levitation: sound causes solids, liquids or heavy gases to float
<ul style="list-style-type: none"> • Investigation (Explore) 	Video of acoustic levitation by Argonne National Laboratory shown. Record player was used and showed how the lever mechanically moved.
TIME FOR REFLECTION	
<ul style="list-style-type: none"> • Summarization (Explain & Extend) 	Students understand simple machine and they got to see machines related to acoustics.
<ul style="list-style-type: none"> • Assessment (Evaluate) 	Active Feedback.
<ul style="list-style-type: none"> • Homework 	None

Machines

Jenny Au

NSF GK-12 Fellow

Vibes and Waves in Action

Center for Advanced Computation and Telecommunications

University of Massachusetts Lowell

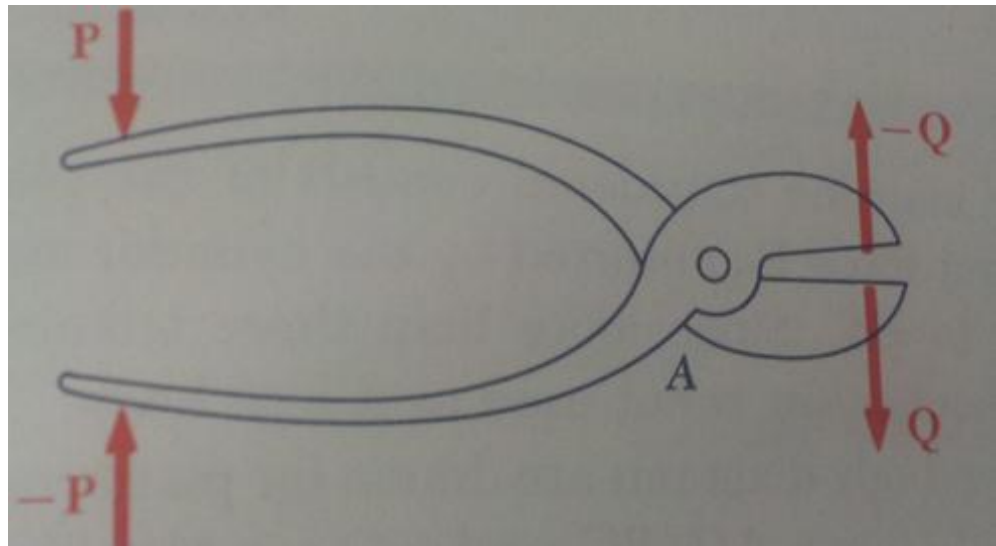
What is a machine?

Machine

- A structure designed to transmit and modify forces
- Purpose: to transform input forces into output forces

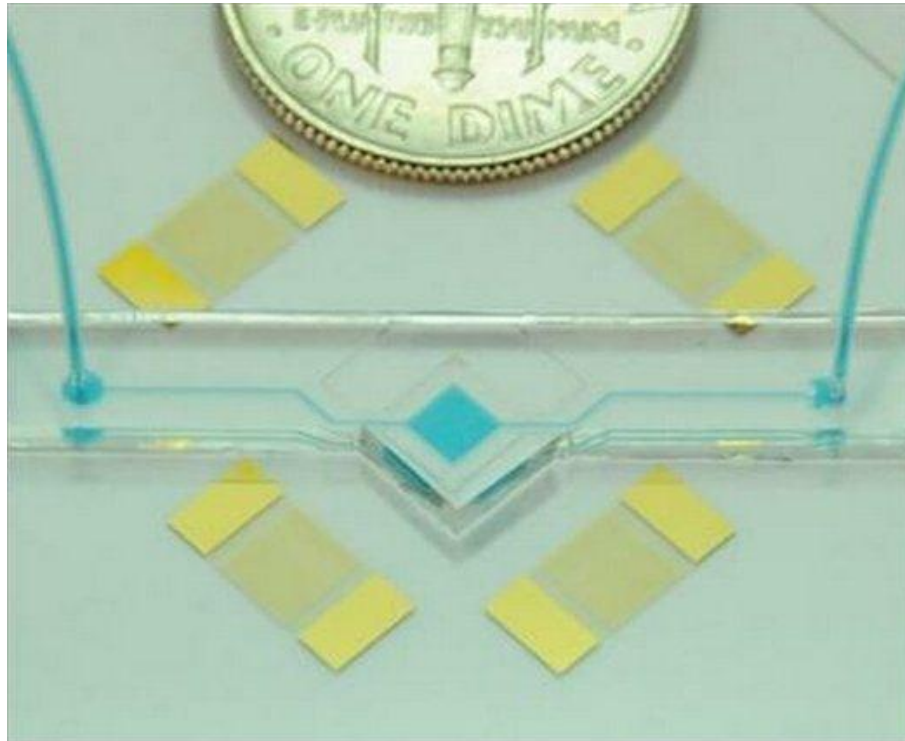
Mechanical Machines

- Scissors
- Cutters
- Levers
- Tweezers



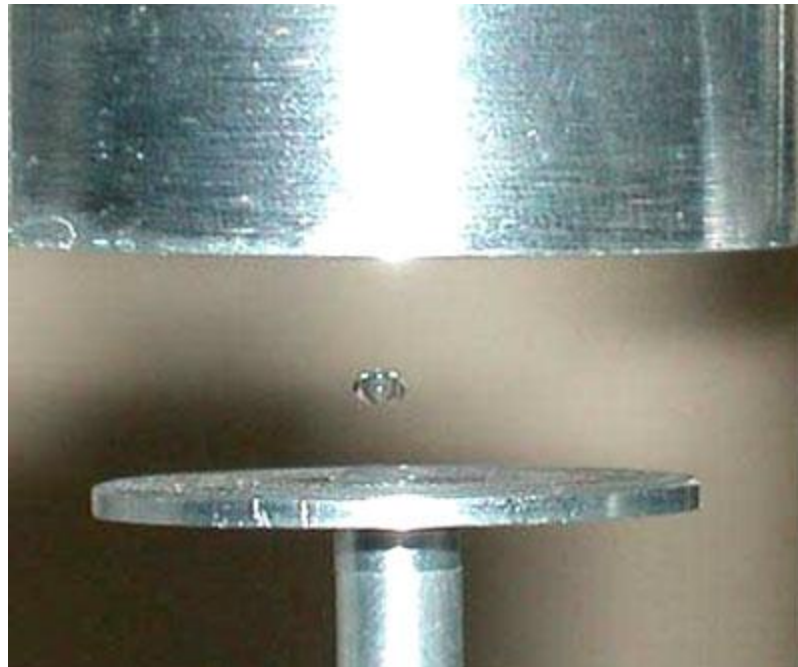
Acoustic Tweezers

- Like a tweezer
- Precisely manipulates cellular-scale objects
- Uses ultrasound to capture and control miniscule items

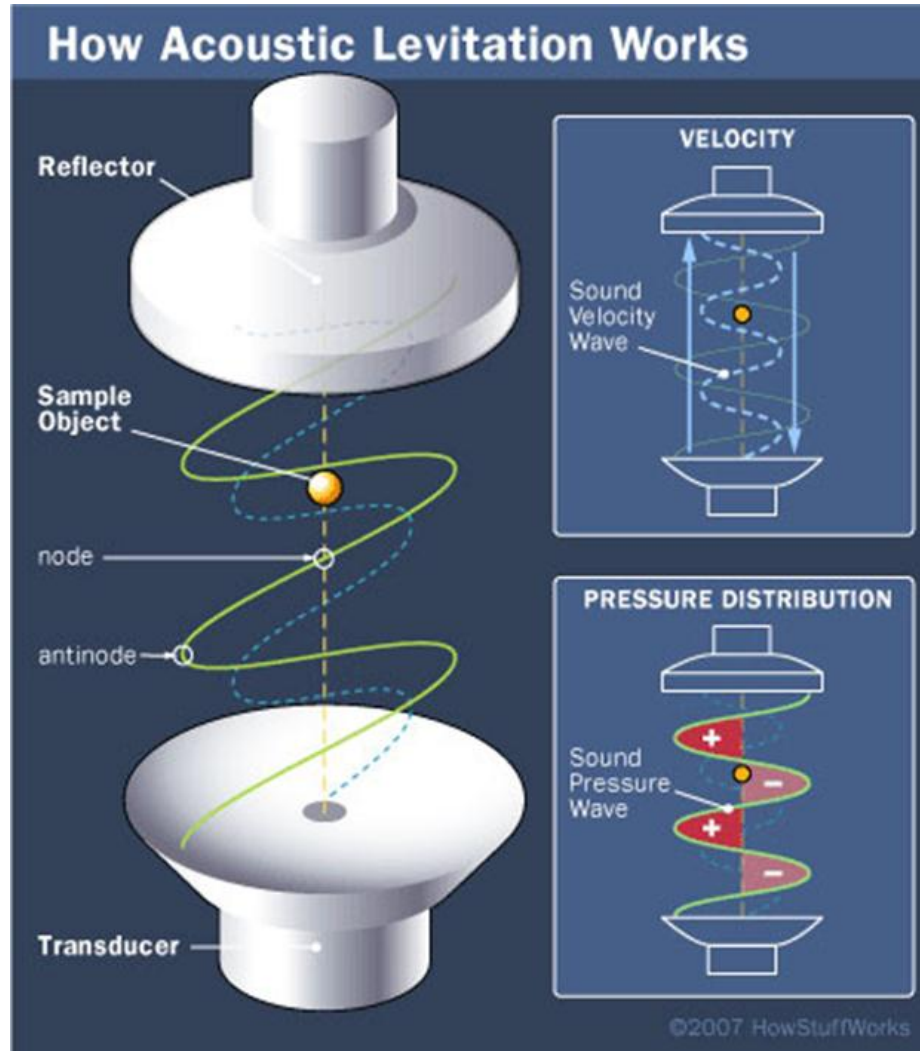


Acoustic Levitation

- Sound causes solids, liquids, or heavy gases to float.
- Acoustic levitation uses sound traveling through a fluid to balance the force of gravity



Acoustic Levitation



Lever of Phonograph

- Displacement of the lever on a record player
- Mechanical energy converted into electrical signal
- Playback through speaker

