

09 Fluid Power

Content Area: **Technology**
Course(s):
Time Period: **Full Year**
Length: **4 Week**
Status: **Published**

General Overview, Course Description or Course Philosophy

This full-year course continues to emphasize the application of integrated STEM (Science, Technology, Engineering and Mathematics) principles and the design method introduced in the 1st year technology course. This course is taught on the foundations of technology education having students invent solutions to real-world problems through robotic applications. Students will identify problems, research, design and fabricate solutions. Problem solving, critical thinking and design skills are taught through various activities. Hands-on themes include structural and robotic systems, as well as system control technology. This course provides all students with valuable skills such as: problem solving, design, creative thinking, systems thinking, teamwork, documentation, programming, and computer applications.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Simple machines and basic mechanisms make life easier.

You can't cheat work.

CONTENT AREA STANDARDS

TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
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RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
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STUDENT LEARNING TARGETS

Students will understand:

- How hydraulics and pneumatics are used to increase power in a technological system.
- why air is considered a fluid

advantages and disadvantages of hydraulics vs pneumatics

- How to calculate mechanical advantage in the system
- How to design a system to produce a specific outcome

Declarative Knowledge

- Identify and recall uses of fluid power.
- State the differences between hydraulic and pneumatic power.
- Explain when and how to utilize different types of fluid power.
- State the formula for calculating mechanical advantage in fluid power.

Procedural Knowledge

Students will be able to:

- Compare and contrast and determine when to use hydraulic vs. pneumatic fluid power.
- Demonstrate the ability to design, build and apply fluid power in a system to increase or decrease mechanical advantage in order to solve a problem.
- Calculate the mechanical advantage of fluid power systems

EVIDENCE OF LEARNING

Formative Assessments

Observation of “Do Now”

mechanical advantage problems during and after lessons.

Observation of fluid power systems designed and built by students.

Quiz on Mechanical Advantage in Fluid Power

Summative Assessments

Fluid Power Design Project - Engineering Logbook Evaluation Questions on Unit Test.

RESOURCES (Instructional, Supplemental, Intervention Materials)

Teacher notes on Engineering Logs.

Former student log examples.

Panasonic Challenge Engineering Log notes and examples.

INTERDISCIPLINARY CONNECTIONS

Educational Technology: Use of Google resources

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.