TECH: Hydraulics (Energy/Power) Class

Summary

Updated in November of 2011. Students will participate in a demonstration of hydraulics. They will understand basic hydraulic principles.

Time Frame

2 class periods of 60 minutes each

Group Size

Large Groups

Life Skills

Thinking & Reasoning

Materials

1 Hydraulic demonstration kit.

Background for Teachers

The full list of equipment to be purchased is on page 10 and 11 of the PDF file. The stand for the hydraulics demonstrator needs to be built by the teacher. It is recommended that the teacher read through the booklet to familiarize themselves with the demonstration. The images on this document come from a variety of sources. They are either public domain, royalty fee, created by the author, or used by arrangement with the copyright holders. No permission is granted for the copying or re-use of any images used in this document, copyrighted or otherwise. Hydraulics© Mike Breen - Author of document. USOE has purchased rights to the document which gives individual teachers within the state of Utah rights to print this document for use in their classes.

Student Prior Knowledge

It is suggested that students read in the booklet through the heading "Determining Cylinder Force" prior to the demonstration.

Intended Learning Outcomes

Understand the basic principles of hydraulics. Understand where hydraulics are utilized in our world. Practice problem solving skills. Explore Energy/Power technologies used in our world. Use career information to explore various occupations of personal interest.

Instructional Procedures

Day 1 : Class reads the booklet with the instructor providing guidance on who reads. The demonstration is started, students lift the 6 kilogram weight with their thumb on a dare from the instructor. Instructor completes the demonstration by incorporating the hydraulic tester, and all students lift the weight with their thumbs. Day 2: Students finish reading booklet and the problems and questions are answered with each student working on their own. Each student is able to use a booklet to look up the answers. The instructor may lead them through the math problems as a class. If there is time and a projection system available, the site howstuffworks.com and the page on hydraulics with the video information can be incorporated or these sites can be used as extensions for students if a computer lab is readily available.

Strategies for Diverse Learners

Assign the extension lesson as homework. Instead of giving the students the exact page have them go to howstuffworks.com and enter hydraulics and elevators in the search bar and let them explore the site.

Extensions

Web site showing hydraulic equipment being run. This may be incorporated into the end of the class if a computer lab is available. It may also be guided by the teacher if a projector system is used in conjunction with the lesson.

Assessment Plan

Students get two separate grades. They receive one grade for participating in the hydraulic demonstration, and another grade for the completed worksheet.

Bibliography

Basic hydraulic formulas, Retrieved December 17, 2005, from

http://www.airlinehyd.com/KnowledgeCenter/Hydraulic/Formulas/BasicH.asp Bohn, C., Fales, J., Kuetemeyer, V., MacDonald, A. (1986). Energy, power and transportation technology, Encino, California: Bennett & McKnight Bonsor, K., Introduction to how hydraulic cranes work. How hydraulic cranes work. Retrieved December 18, 2005, from http://science.howstuffworks.com/transport/ engines-equipment/hydraulic-crane.htm Brain, M., Introduction to how hydraulic machines work. How hydraulic machines work. Retrieved December 18, 2005, from

http://science.howstuffworks.com/transport/ engines-equipment/hydraulic.htm Bureau of Labor Statistics, U.S. Department of Labor, Occupational outlook handbook, 2004-05 Edition, Aircraft and Avionics Equipment Mechanics and Service Technicians, Retrieved December 18, 2005, from http://www.bls.gov/oco/ocos179.htm Bureau of Labor Statistics, U.S. Department of Labor, Occupational outlook handbook, 2004-05 Edition, Elevator Installers and Repairers, Retrieved December 18, 2005, from http://www.bls.gov/oco/ocos189.htm Bureau of Labor Statistics, U.S. Department of Labor, Occupational outlook handbook, 2010-11 Edition, Heavy Vehicle and Mobile Equipment Service Technicians and Mechanics, Retrieved November 13, 2011, from http://www.bls.gov/oco/ocos197.htm Careeronestop, U.S. department of labor, Assemblers & fabricators, all other, America's career infonet, 2010 statistics, Retrieved November 19, 2011 from http://www.careerinfonet.

org/occ_rep.asp?next=occ_rep&Level=&optstatus=010100111&jobfam=49&id=1&nodeid= 2&soccode=493042&stfips=49&x=35&y=13 Firehouse19.com, station news, L19 receives new TNT rescue tools, TNT hydraulic spreaders (Jaws of Life), [Photograph] Retrieved on January 21, 2006, from http://www.firehouse19.com/A%20shift%20extrication%20training%20(17)1.JPG Harris, T., Introduction to how elevators work. How elevators work. Retrieved December 18, 2005, from http://science.howstuffworks.com/transport/engines-equipment/elevator1.htm Otis elevator products, Retrieved January 19, 2006, from

http://www.otis.com/products/detail/0,1355,CLI1_PRD245_PRT30_PST46_RES1,00.html Thode, B., Thode, T. (2002) Technology in action. (p287.). Peoria: Glencoe/McGraw-Hill Utah Vocational Core Curriculum. (1986). Hydraulics. Salt Lake City: Utah State Office of Education Utah Vocational Core Curriculum. (1992). Hydraulics. Salt Lake City: Utah State Office of Education

Authors

MICHAEL BREEN