

ATech Educator News

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February 2016

From time to time the ATech newsletter includes articles submitted by individuals who have demonstrated expertise in certain areas of automotive diagnostics, repair, and/or instruction. This month we are privileged to welcome Phil Jelinek retired Automotive Instructor from California as our guest author.

S.T.E.M. The Basics!!

This is the third of many articles about S.T.E.M. to help students/learners understand the basic concepts of what everyone is talking about, in easy to understand terms. I have attended many S.T.E.M. symposiums, only to discover that after the students explain their projects, they are unable to separate which part of their project is either the Science part, Technology Part, Engineering part, or the Math part. You see, S.T.E.M. is an acronym that stands for Science Technology Engineering and Mathematics.

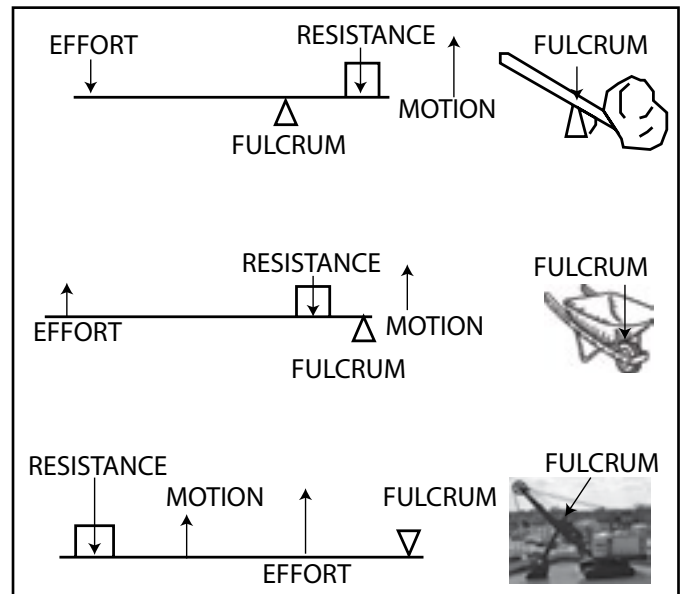
Technology!

Technology today has come to mean some sort of Electronics, which by and large means COMPUTERS. Is that really what Technology is??? We need to change this perception. At one time (16th Century) the Lead Pencil was considered the latest technology of its day. Paper clips, circa 1867, were the technology of their day.

What I presented to my students on the third day of class were the Six Simple Machines. They can be defined as “The simplest mechanisms that use mechanical advantage to multiply force”. These Six Simple Machines go back to the 3rd century B.C. They are: The Lever, Wheel and Axle, Pulley, Inclined Plane, Wedge and the Screw and *knowing them will change the way you look at your world!*

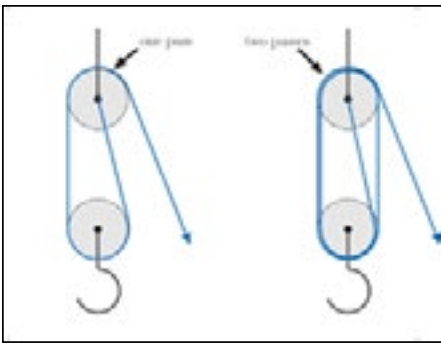
When teaching about the Automobile, these Six Simple Machines are a foundational technology and can be regarded as the elementary building blocks of which all complicated machines are composed.

Let’s take the first one, the Lever. We get the term “Leverage” and it is used throughout the automobile and



the tools we use to repair it. When you start to study the Lever, you will find there are three classes of levers. There are three types or classes of levers, according to where the load and effort are located with respect to the fulcrum. **Class 1** has the fulcrum placed between the effort and load. **Class 2** has the load between the effort and the fulcrum. **Class 3** has the effort between the load and the fulcrum. Do some research on your own to find out how many “Levers” are around you at home, in your vehicle, and at work. They are everywhere from the scissors we use (Class 1), to the diving board at a pool to the shovel used to dig up dirt (Class 3), to the Wheelbarrow (Class 2) into which we put the dirt. (See Picture)

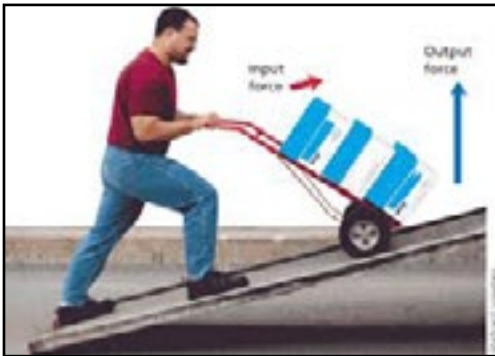
The Wheel and Axle: You don’t have to go far for this one, all you have to do is turn a door knob. In the automobile we have a steering wheel, with the axle being the shaft to the steering mechanism. Then we have the Drive axle turning the Wheels of the vehicle. (See Pictures)



Pulleys: While we are familiar with sailing ships using blocks and tackles to support masts and to raise and lower sails, we use a Belt and Pulley system on our engines to turn our Water Pumps, Power Steering Pumps, Cooling Fans and Alternators that are mounted at the front of our engines. (See Pictures)



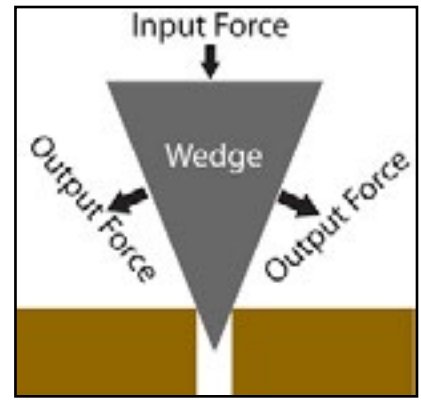
Inclined Plane: also known as a ramp, is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load. We have many examples of inclined planes from on/off ramps, roads up mountains/hills, to driveways, loading ramps and skate parks. The concept is that it is easier to push/pull something up a ramp than to pick it straight up. (See Pictures)



Wedge: is a triangular shaped tool, and is a portable inclined plane. It functions by converting a force applied to its blunt end into forces perpendicular



to its inclined surfaces. We use Wedges to split logs, raise the corners of machines, and to keep the head on hammers and such. (See Pictures)



Screw: is a mechanism that converts rotational motion to linear motion. It is an inclined plane wrapped around a rod. The



longer the inclined plane, the closer the threads are together. Coarse screws go in faster but don't have the clamping strength. Fine thread takes longer to go in but have greater clamping strength. This knowledge along with a couple of models (See pictures) will go a long way in helping students understand the differences



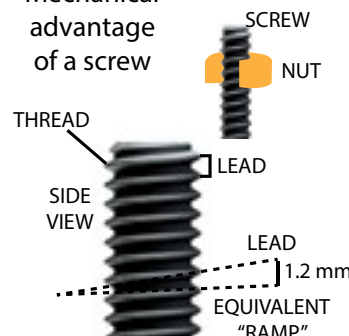
between coarse and fine thread bolts and screws.

So what is a simple one sentence explanation of Technology: **Technology is the "What" - tools, machines, techniques, etc. that are used to solve problems and/or perform functions.**

by Phillip Jelinek

6.3 Gears, ramps and screws

Mechanical advantage of a screw



- A **screw** is a simple machine that turns rotating motion into linear motion.
- A screw works just like a ramp that curves as it gets higher.

Phil Jelinek, who is now retired, was an award winning automotive instructor for over 25 years. He developed and implemented the first UC approved Automotive Physics (d-Lab Science) class and Automotive Engineering (g-Elective) class in California, there-by helping to save HS auto programs from extinction in that state. Three different years, he had teams attend the National New Car Competition in New York City, has been selected Teacher of the Year by three different organizations, and is currently the Past-President of the California Automotive Teachers Association.

You may contact Phil at pjelinek@calautoteachers.com



VISION Hi-Tech Training & Expo

A promotional graphic for the VISION Hi-Tech Training & Expo. It features several yellow gears of different sizes arranged in a cluster. The gears contain the following text: "Management Training", "Educator Think Tank", "Expo", "Networking", and "Technical Training". To the left of the gears is the "ASA Midwest" logo, which includes the text "presented by" above the "ASA" logo and "Midwest" below it. Below the ASA logo is the "GEARED FOR GROWTH" logo, which consists of a red gear and a blue gear with a blue arrow pointing from the red gear to the blue gear, followed by the text "GEARED FOR GROWTH". To the right of the gears is a lightbulb icon with radiating lines above it. Below the lightbulb is the "VISION Hi-Tech Training & Expo" logo, which includes the text "VISION" in a large, bold, red font, "Hi-Tech Training & Expo" in a smaller blue font, and the dates "March 4-5, 2016" and "Conference: March 3-6 Expo: March 4-5 Hi-Tech Tool Expo: March 3" below it.

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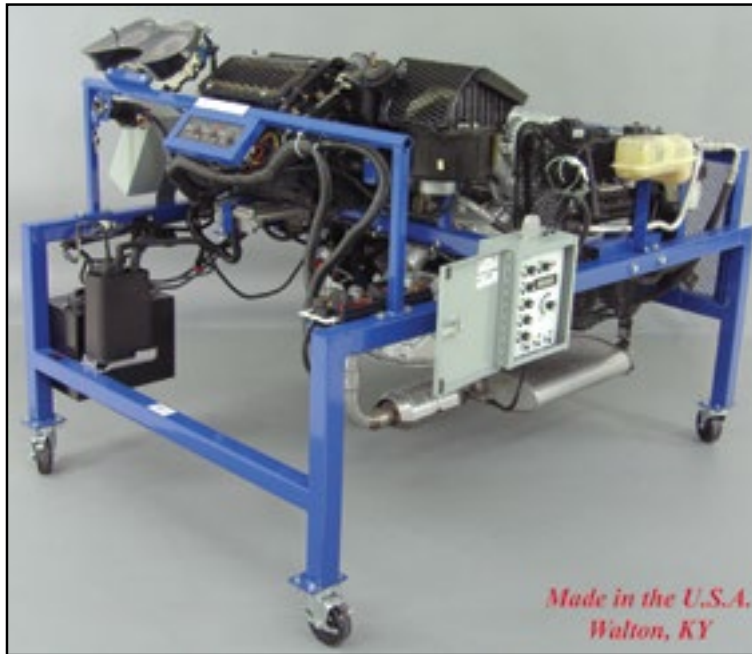
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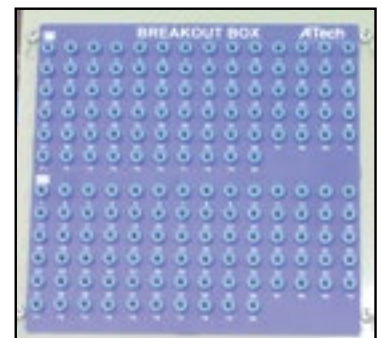
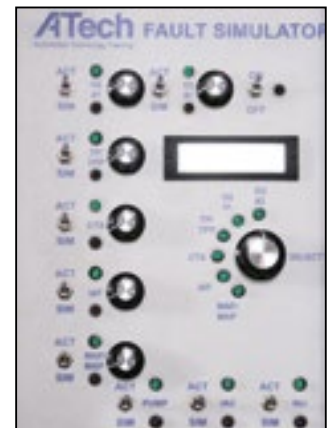
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