

Physics Fun Program - All Terrain Vehicle

Description

Interested in bringing science to your library patrons? Come explore gravity, building, and mechanics in simple, fun, hands-on experiments. With a borrowed WLS physics kit, ideal for ages 8+, teams build all terrain vehicles and race them against each other or the clock. Fun and educational.

Audience

Ages 8+

Budget/Costs

Free with borrowed WLS kit

Number of participants

Up to 20, depending on ages

Program Time

1.5 hours plus .5 hours staff setup time

Collection and Dewey Connections

Physics - 620.0078, 530.078, 531.107

All terrain vehicles - 629.22

STEAM Tie-ins

Science: physics, work, machines

Technology: batteries, electronics

Engineering: balance, steering

Art (optional): colors and cutting

Math (optional): calculating time and distance



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Preparation

At least 2 weeks ahead of the program, set up kit request.

<https://it.westchesterlibraries.org/services-2/westchester-library-system-leader-lab/wls-leader-lab-kits/>

Prepare area: 15 minutes

1. Copy handouts as needed.
2. Arrange kits.
3. Set up race track(s) and optional “pit” areas
 - a. On different surfaces
 - b. With timer
4. (optional) Set up projector and laptop to display vehicle photograph, pg 13
http://www.thamesandkosmos.com/images/support/PhysicsWorkshop_ManualImages.pdf

Introduction: 5 minutes

Provide overview and tips for building

- Use the picture on page 13 of the book as a guide
- Choose all parts first and arrange them so they’re ready to go together
- To build the chassis, make sure the rods are oriented so that the evenly spaced holes are on the **SIDES** of the bars
- Match the polarity on the battery to the polarity on the motor box
- Add or remove tread links to see the effect on the speed and direction of the vehicle

Build the vehicle: 20 - 40 minutes, depending on age and number of participants

Provide guidance and troubleshooting help.

- Encourage testing, troubleshooting and teamwork
- Participants will finish at different times. Those who finish sooner may decorate vehicles with decals, or make racing “start” and “finish” flags.

Race vehicles: 20 - 30 minutes depending on age and number of participants

Options (possibly have two racing stations so two activities can occur at the same time)

- Run in “heats,” narrowing the field over successive heats until there is a final two
 - Allow time between heats for adjustments to vehicles
- Run timed races

Take candid, group photos and a closeup photo of all vehicles

Cleanup and close: 5 minutes

1. (optional) Discuss what made vehicles work well
2. Disassemble vehicles. Remove decals. Remove batteries and replace all parts in kits
3. Distribute prizes.

Physics Fun! Simple Machines and More

What's work?

- force acting on an object in the direction of motion
- work has no direction

What's a machine?

- A mechanical device that changes the direction or magnitude of a force.
- A machine makes work easier.
- An ideal simple machine is one in which the power in equals the power out.
- Three simple machines originated with the Greek philosopher Archimedes around the 3rd century BC: the lever, pulley, and screw.

FORCE
any interaction that,
when unopposed,
will change the
motion of an object

LET'S GET DOWN TO WORK!

Which of these simple machines are part of your ATV?

Lever

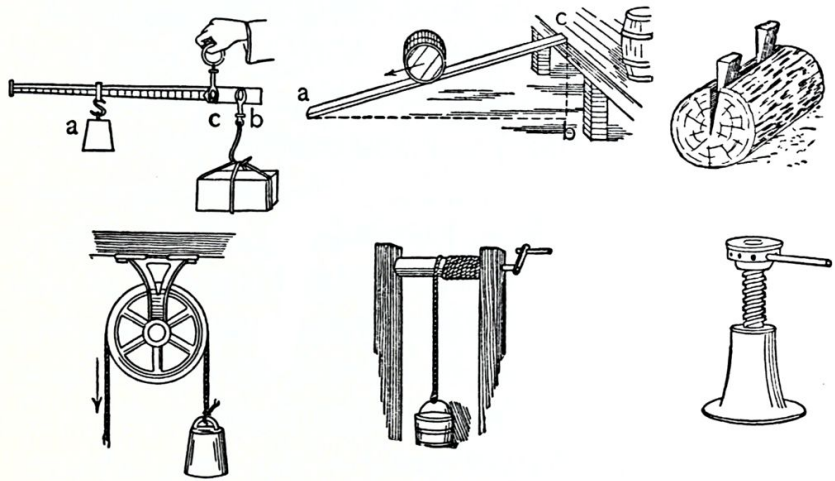
Inclined Plane

Wedge

Pulley

Wheel and Axle

Screw



Related Links

[Museum of Science and Industry - Simple Machines Game](#)

[6 Kinds of Simple Machines](#)

[Live Science - 6 Simple Machines](#)

[Simple Machines on Wikipedia](#)

[Thames & Kosmos Physics Workshop Kit](#)