Join us for Hack the Classroom on October 27th!

# Hacking STEM Lessons & Hands-On Activities

Build affordable inquiry and project-based activities to visualize data across science, technology, engineering, and math (STEM) curriculum. Middle school standards-based lesson plans written by teachers for teachers.

## Lesson Plans, They're Free!

Translate this site to get the lessons in your preferred language

**NEW THIS MONTH!**

### How fast do humans run?

Students compare the running speeds of animals, conduct data analysis to compare the race times of peers ages 11-18, and use trend data to compare how their own speed will change with age. This data science lesson integrates physical education and math.

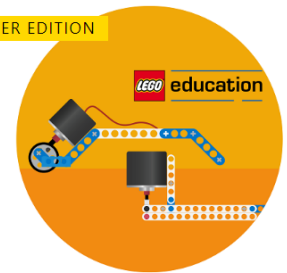**COMPARE YOUR SPEED ›**

**PARTNER EDITION**

### Bring Oceans Exploration to Your Classroom

Students discover how ocean currents work, how sharks swim, how to measure ocean depths and how reefs form using Microsoft's ecosystem of tools including Excel, MakeCode, Minecraft: Education, Office 365, Paint 3D and Windows 10 MR + Photos.

**EXPLORE OUR OCEANS ›**

**PARTNER EDITION**

### Using Pythagorean theorem to Measure Topography

Students build measuring tools from cardboard or LEGO® bricks to create an initial transportation plan for an island national park in Excel. Next, they use the Pythagorean theorem to design their road and bring their national park to life by adding topographic elements in Paint 3D.

**MAKE THE MEASURING TOOLS ›**

**TEACHER GENERATED**
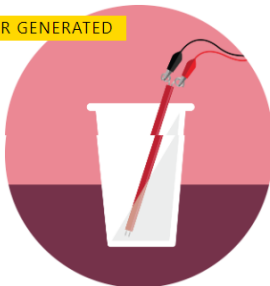
### Measuring Water Quality to Understand Human Impact

This activity has students acting as stream hydrologists. They construct an Electrical Conductivity (EC) Sensor using inexpensive materials such as drinking straws and wire. In addition, they explore proportional relationships using Excel graphs to calibrate the EC Sensor for accuracy. They then use the calibrated sensor to compare and contrast the quality of different water samples visualized in a custom Excel Workbook.
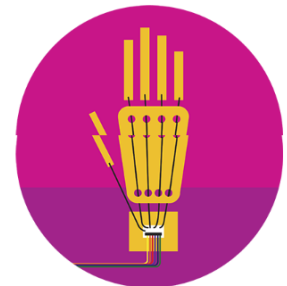
**MAKE A CONDUCTIVITY SENSOR ›**

### Harnessing Electricity to Communicate

Students build a telegraph out of everyday objects to understand electrical energy and its role in communications. Then, they use a customized workbook to send and receive information in Morse code using their telegraph.

**MAKE A TELEGRAPH ›**

### Building Machines that Emulate Humans

Students build robotic models from cardboard and straws to understand the anatomy and biomechanics of the human hand. Then, they conduct trials visualizing data in Excel to generate new ideas for improving its performance.

**MAKE A ROBOTIC HAND ›**

Want more lessons? Explore the Library!

**NEW THIS MONTH!**

## How fast do humans run?

Did you know that between the ages of 11-18, human running speed continues to increase? In this lesson, students compare the running speeds of humans and animals, conduct data analysis to compare the race times of peers ages 11-18, and use trend data to compare how their own speed will change with age. This data science lesson integrates physical education and math.

COMPARE YOUR SPEED >

How fast do humans run?
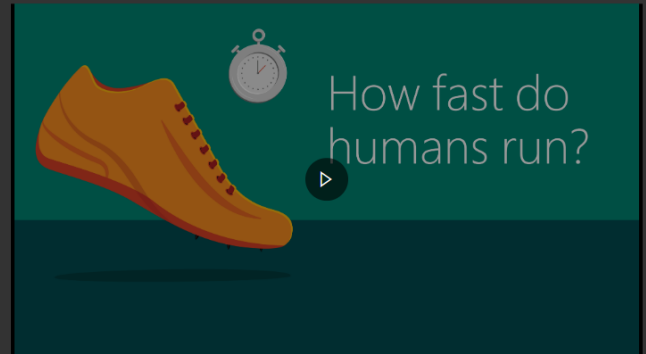
## Hacking STEM is made possible by a partnership between the Education Workshop, Hack for Good and the Microsoft Garage

### What is the Education Workshop?

A small incubation team inside of Microsoft that focuses on developing next generation hardware, software, and services for K-12 education. Our goal is to support teachers building inquiry and project-based activities that embed computational and design thinking into existing middle school curriculum. We want to democratize STEM for learners and demonstrate how all schools can provide affordable opportunities to bring 'making' and 21st century technical skills to the classroom. Hacking STEM was originally prototyped by the Education Workshop as a Hack For Good during Microsoft's 2016 //Oneweek Hackathon. Our 'hacked' version of Excel brings to life the fundamentals of science, opens the emerging world of IOT to the classroom and helps educators meet the NGSS and ISTE standards for data science.

## Need Help? Have Questions?

VISIT THE SUPPORT PAGE >          EMAIL HACKING STEM >          JOIN THE CONVERSATION >          SUBMIT YOUR IDEA >

## Also brought to you by

## Hack for Good

Hack for Good is the community of employees who want to use their technical and business hacking skills to help solve the world's greatest societal problems. The goal is to foster a community that will collaborate, create and build solutions that will empower every person and every organization on the planet to achieve more.

MICROSOFT PHILANTHROPIES >



## The Microsoft Garage

The Microsoft Garage "Ship Channel" is Microsoft's official outlet for experimental projects from small teams across the company to test a hypothesis, receive early customer feedback, and determine product market fit. The Garage provides expert guidance and a lightweight release process to help teams get their experiments out quickly.

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