TI-Innovator™ Hub Projects

10 Minutes of Code for TI-Innovator™ technology

Introduce students to the basics of coding to help build critical-thinking and problem-solving skills. Programming with TI-Innovator™ technology introduces physical computing and helps spark interest in engineering, robotics and more.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB/2L1
10	TI-RGB Array (for Unit 7)	STEMRGB/ENV

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	TI-RGB Array

Project location: https://education.ti.com/en/activities/ti-codes

Moody Hues

The **Digital Mood Ring** activity is “square one” for using Texas Instruments graphing calculators to code the TI-Innovator™ Hub on other STEM Projects. Students program input and output feedback controls to make the built-in lights on the Hub mimic the colors of a mood ring.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB/2L1
2	Temperature Module Pack of 5	STEMTEMP/ENV/9L1
30	Chenille Wires/pipe-cleaners	

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	Temperature Module
2-3	Chenille Wires

Project location: TISTEMprojects.com

A one, and a two …

Making Music With Code is a fun way to engage students in math, science, design and coding by programming the Hub to play a tune on its built-in speaker.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
10	Optional: Laminated 88 key piano keyboard with note frequencies in Hz	

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	Laminated 88 key piano keyboard with note frequencies in Hz

Project location: TISTEMprojects.com

Dog Days

Pet Car Alarm engages students in the math and science of the greenhouse effect by designing and building a pet-smart alarm system that sounds an alert when the interior temperature of a model car approaches the danger zone.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
4	White LED Module Pack of 5	STEMWLED/ENV
2	Servo Motor Module Pack of 5	STEMSM/ENV
4	Temperature Module Pack of 5	STEMTEMP/ENV
2	Hall Sensor Module Pack of 5	STEMHS/ENV
10	External Battery Kit	STEMBT/AC
10	Small magnets (ceramic, ferrite or ceramic-ferrite)	
10	Small toy pet	
10	Small piece of clear plastic to model car window	
10	Fashion Doll Car, shoebox, or another object to model a car	
	Cellophane tape to attach magnet to pet and window to motor	

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
2	White LED Module
1	Servo Motor Module
2	Temperature Module
1	Hall Sensor Module
1	External Battery Kit
1	Small magnet
1	Small toy pet
1	Small piece of clear plastic
1	Fashion Doll Car, shoebox, etc.
	Cellophane tape

Project location: TISTEMprojects.com

I ❤ STEM

The **Four-Chambered Heart** inspires a passion for biomechanical engineering as students design the electrical system that makes an artificial heart go thump-thump, thump-thump.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
1	LED and Leads Pack	STEMLEDS/ENV
2	Temperature Module Pack of 5	STEMTEMP/ENV
40	Toothpicks	
40	2 x 3/4 inch adhesive labels	
30 oz.	Conductive Modeling Clay (such as Play-Doh) (red) (note: do not use plasticine or non-conductive modeling clay)	
10	Optional: Build Sheet PDF	
10	Optional: 3D Printed Heart	

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
	LEDs and Leads
1	Temperature Module
4	Toothpicks
4	2 x 3/4 inch labels
3oz	Conductive Modeling Clay (red)
1	Build Sheet PDF
1	3D Printed Heart

Project location: TISTEMprojects.com

Smart Irrigation

Smart Irrigation System challenges students to find a solution to a critical real-world problem — how to use water most efficiently — by designing, building and coding a working model system that waters real crops without wasting a drop.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEMLS/ENV
2	Light Sensor Module Pack of 5	STEMLS/ENV
2	Temperature and Humidity (DHT) Module Pack of 5	STEMDHT/ENV
2	Moisture Module Pack of 5	STEMMM/ENV
2	Water Pump Pack of 5	STEMWP/PWB

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	Light Sensor Module
1	Temperature and Humidity (DHT) Module
1	Moisture Module
1	Water Pump

2	MOSFET with Battery Holder Pack of 5	STEMMO/PWB		1	MOSFET with Battery Holder
40	AA Batteries			4	AA Batteries
10	Container for the plants, such as a 1-gallon milk jug			1	Container for the plants
	Soil, perlite or some other growth medium				Soil, perlite or some other growth medium
	Drinking straws				Drinking straws
	Duct Tape				Duct Tape

Project location: TISTEMprojects.com

Feel the heat

In **Some Like It Tepid**, students collect temperature data of their favorite beverage, define thresholds and program the Hub's built-in LED to indicate the beverage's temperature.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
10	TI-SensorLink adapter	STEMSL/ENV
10	Vernier BTA SS Temperature Probe	Vernier Part # TMP-BTA
10	Cup (for hot liquid)	

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	TI-SensorLink adapter
1	Vernier BTA SS Temperature Probe
1	Cup (for hot liquid)

Project location: TISTEMprojects.com

Running the bases (with TI-RGB Array)

The TI-RGB Array provides another level of engagement as students experiment with controlling each of the 16 individual RGB LEDs. Math, science and design all come together when using the TI-RGB Array.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
10	TI-RGB Array	STEMRGB/ENV

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	TI-RGB Array

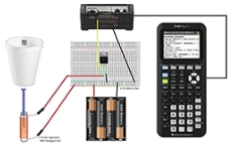
Project location: TISTEMprojects.com

Science Olympiad Detector Building Event

The **Detector Building event** combines coding, engineering, math and science into a working sensor that is calibrated and coded to collect data. The program students write will cause various LEDs to turn on or off based on the temperature readings.

Equipment Recommendation: 1 per Science Olympiad Team		**TI Part #**
1	TI-Innovator Hubs	STEM/PWB
1	Breadboard Pack	STEMEE/PWB

Project location: TIdetectorBuilding.com



Path to STEM Projects

Guide students toward building their own STEM projects with activities that motivate them to learn the science concepts that support the development of engineering skills.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
10	Breadboard Pack	STEMEE/PWB

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	Breadboard Pack

Project location: https://education.ti.com/en/activities/stem/path-to-stem

Exploring the Depths with Uniform Motion

Exploring the Depths with Uniform Motion is a project-based STEM activity that explores uniform motion and will engage your students in the engineering design process while using TI-Nspire™ technology and the TI-Innovator™ Hub.

Equipment Recommendation: 30 Students		**TI Part #**		**Equipment for Single Set-up:** 3 students per set-up	
10	TI-Innovator Hubs	STEM/PWB		1	TI-Innovator Hub
2	Servo Motor Module Pack of 5	STEMSM/ENV		1	Servo Motor Module
10	External Battery Kit	STEMBT/AC		1	External Battery Kit

*External battery is optional, can use Wall Adapter to plug TI-Innovator Hub directly into a power outlet.

Project location: https://education.ti.com/en/tisciencenspired/us/stem

One Small Bite for Man

One Small Bite for Man is a project-based STEM activity that explores cellular respiration and will engage your students in the engineering design process while using TI-Nspire™ CX with the TI-Innovator™ Hub.

Equipment Recommendation: 30 Students		**TI Part #**		**Equipment for Single Set-up:** 3 students per set-up	
10	TI-Innovator Hubs	STEM/PWB		1	TI-Innovator Hub
2	White LED Module Pack of 5	STEMWLED/ENV		1	White LED Module
2	Servo Motor Module Pack of 5	STEMSM/ENV		1	Servo Motor Module
2	Vibration Motor Module - 5 Pack	STEMVM/ENV		1	Vibration Motor Module
10	External Battery Kit	STEMBT/AC		1	External Battery Kit

*External battery is optional, can use Wall Adapter to plug TI-Innovator Hub directly into a power outlet.

Project location: https://education.ti.com/en/tisciencenspired/us/stem

One Giant Leaf for Mankind

One Giant Leaf for Mankind is a project-based STEM activity that explores photosynthesis and will engage your students in the engineering design process while using TI-Nspire™ technology and the TI-Innovator™ Hub.

Equipment Recommendation: 30 Students		**TI Part #**
10	TI-Innovator Hubs	STEM/PWB
2	Light Sensor Module Pack of 5	STEMLS/ENV

Equipment for Single Set-up: 3 students per set-up	
1	TI-Innovator Hub
1	Light Sensor Module

Project location: https://education.ti.com/en/tisciencenspired/us/stem