



# STONEOAK MEDIA

StoneOakMedia.com



STEM-focused  
project based learning  
aligned to curriculum standards  
supercharged with cutting-edge  
Augmented Reality & 3D Printing  
technology

# Introduction



StoneOak Media was established in 2014 with a singular focus on delivering educational solutions that make learning immersive, engaging, and fun. StoneOak Media's initial products were the first to bring project-based augmented reality enhanced STEM content into the classroom. StoneOak Media is also the first company to bring 3D Printing focused STEM lessons, centered on the Engineering Design Process, into classrooms and libraries.

StoneOak Media's products have been used by tens of thousands of students in several thousand schools across North/Central/South America, Europe, Africa, Asia, and Australia. Learn more at [www.StoneOakMedia.com](http://www.StoneOakMedia.com).

## Product & Program Overview



### Augmented Reality Enhanced Products & Programs

#### Augmented Reality STEM Adventures!

Students use their personal mobile phone/tablet to experience the immersive Augmented Reality enhanced content in these low-cost workbooks. Lessons include:

**Solar System Expedition:** Students explore each planet in the Solar System, take measurements of conditions there, and design a base capable of surviving and thriving on their planet of choice.

**Water Cycle Engineer:** Students travel to a Moon base, to learn about the water cycle in the context of its sealed ecosystems. They complete the mission by setting up a water cycle at a new underground base.

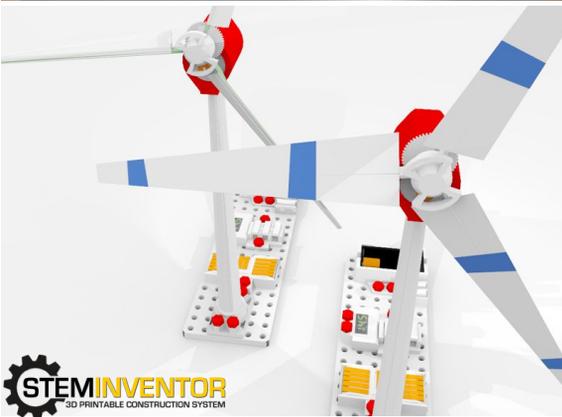
### STEMInventor 3D Printable Products & Programs

#### Supercharging Learning with 3D Printed STEM Resources

Unlock a world of creativity with STEMInventor 3D printable STEM kits and construction system components.

Effortlessly download and 3D print as many parts as you need for these STEM-enhanced lessons, and witness the magic as students' imagination and creativity flourish.

Our catalog features over 100 easy-to-3D print construction components, STEM kits, and competitive design challenges, and educational lessons; providing everything you need to inspire and engage young innovators.



## Make-Your-Own 3D Printed STEM Makerspace Resources & Programs

### Hundreds of 3D Printable Construction System Parts

STEMInventor.com provides easy access to hundreds of 3D printable construction system parts. From structural beams, to axles, to screws, wheels, cams, tools, and more, STEMInventor.com provides the resources needed to supercharge your makerspace. Empower students and educators to make their own STEM inventions as they explore science and engineering!



# Price Summary: Products

Level	Lesson Title	Target Grade	Material Price*
Level 0 (Easiest)	<b>Solar System Expedition</b> Augmented Reality Enhanced Lesson	4 - 8	<b>1 Book:</b> \$19.95 <b>25 Books:</b> \$448.87 <b>30 Books:</b> \$538.65
Level 0	<b>Water Cycle Engineer</b> Augmented Reality Enhanced Lesson	4 - 8	<b>1 Book:</b> \$19.95 <b>25 Books:</b> \$448.87 <b>30 Books:</b> \$538.65
Level 1	<b>Catapult Challenge</b>	5 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware Kit:</b> None Needed
Level 1	<b>Simple Machines: Pulleys</b>	5 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 1	<b>Bridge Design Challenge</b>	5 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 1	<b>Crane Design Challenge</b>	5 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 2	<b>Pump Jack</b>	6 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$20 (For 2 Pump Jack Kits)
Level 2	<b>Solar Power Station</b>	6 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$36 (For 1 Solar Power Station Kit)
Level 3	<b>Line Shaft Power</b>	6 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$25 (For 2 Line Shaft Power Kits)
Level 3	<b>Solar House &amp; AC</b>	6 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$32 (For 1 Solar House Kit)
Level 3	<b>Wind Turbine Challenge</b>	6 - 12	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$25 (For 1 Wind Turbine Kit)

= Augmented Reality Enhanced Workbooks

= Lesson Related 3D Printable Digital (.STL) File Access.

= Parts Kits Containing Non-3D-Printable Items (e.g. Wires, Motors, etc)

\* Each Lesson's Books, Parts Kits, and 3D files can be reused.

# Price Summary: Products & Hosted Training

Level	Lesson Title	Target Grade	Time (Hrs)	Hosting Class	Material Price*
Level 0 (Easiest)	<b>Solar System Expedition</b> Augmented Reality Enhanced Lesson	4 - 8	1	\$150 Us \$0 DIY	<b>1 Book:</b> \$19.95 ☐ <b>25 Books:</b> \$448.87 ☐ <b>30 Books:</b> \$538.65 ☐
Level 0	<b>Water Cycle Engineer</b> Augmented Reality Enhanced Lesson	4 - 8	1	\$150 Us \$0 DIY	<b>1 Book:</b> \$19.95 ☐ <b>25 Books:</b> \$448.87 ☐ <b>30 Books:</b> \$538.65 ☐
Level 0	<b>Intro To 3D Printing</b>	Recorded Training	1	N/A	<b>Online Curriculum Access:</b> \$25/person
Level 0	<b>Intro To 3D Printing</b>	Live Training	1	\$150 /class	<b>Online Curriculum Access:</b> \$0 (Included in Hosting Fee)
Level 1	<b>Catapult Challenge</b>	5 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware Kit:</b> None Needed
Level 1	<b>Simple Machines: Pulleys</b>	5 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 1	<b>Bridge Design Challenge</b>	5 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 1	<b>Crane Design Challenge</b>	5 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> See Parts Shop Amazon Links
Level 2	<b>Pump Jack</b>	6 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$20 (For 2 Pump Jack Kits)
Level 2	<b>Solar Power Station</b>	6 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$36 (For 1 Solar Power Station)
Level 3	<b>Line Shaft Power</b>	6 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$25 (For 2 Line Shaft Power Kits)
Level 3	<b>Solar House &amp; AC</b>	6 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$32 (For 1 Solar House Kit)
Level 3	<b>Wind Turbine Challenge</b>	6 - 12	1.5	\$200 Us \$0 DIY	<b>This Kit:</b> \$50, <b>All Kits:</b> \$239 <b>Hardware:</b> \$25 (For 1 Wind Turbine Kit)

☐ = Augmented Reality Enhanced Workbooks

= Lesson Related 3D Printable Digital (.STL) File Access.

= Parts Kits Containing Non-3D-Printable Items (e.g. Wires, Motors, etc)

\* Each Lesson's Books, Parts Kits, and 3D files can be reused.

# Augmented Reality Enhanced Lessons

# Title: Solar System Expedition

# Grades: 4-8



**Title:** Solar System Expedition

**Type:** Augmented Reality (AR) Enhanced Workbook-Based Virtual Instruction

**Description:** Take STEM education to the next level with this augmented reality enhanced tour of the Solar System. Participants join a Top Secret mission to establish an outpost on a planet in our Solar System. This fun-filled educational tour of the Solar System teaches students basic facts about each of the planets, and engages them to take measurements of the conditions there. The lesson wraps up by challenging students to design a base for the planet of their choice.

**Duration:** 1 Hour

**Format:** 25 or 30 Printed Workbooks

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up books from Educator prior to virtual class, and use books at home on in their class during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Scientific Investigation & Reasoning, Matter & Energy, Earth & Space, Organisms & Environment, Engineering Design.

Training	Reusable Training Materials	Total
<b>\$150</b> We Host <b>\$0</b> DIY	<b>\$448.87:</b> Includes 25 AR-enhanced Solar System Expedition Workbooks <b>\$538.65:</b> Includes 30 AR-enhanced Solar System Expedition Workbooks	<b>\$598.87</b> or <b>\$688.65:</b> Us <b>\$448.87</b> or <b>\$538.65:</b> DIY

## THE ROCKWELL ADVENTURES SOLAR SYSTEM EXPEDITION



Try *Solar System Expedition* for yourself!

Grades: 4-8

1 Launch the Zappar App



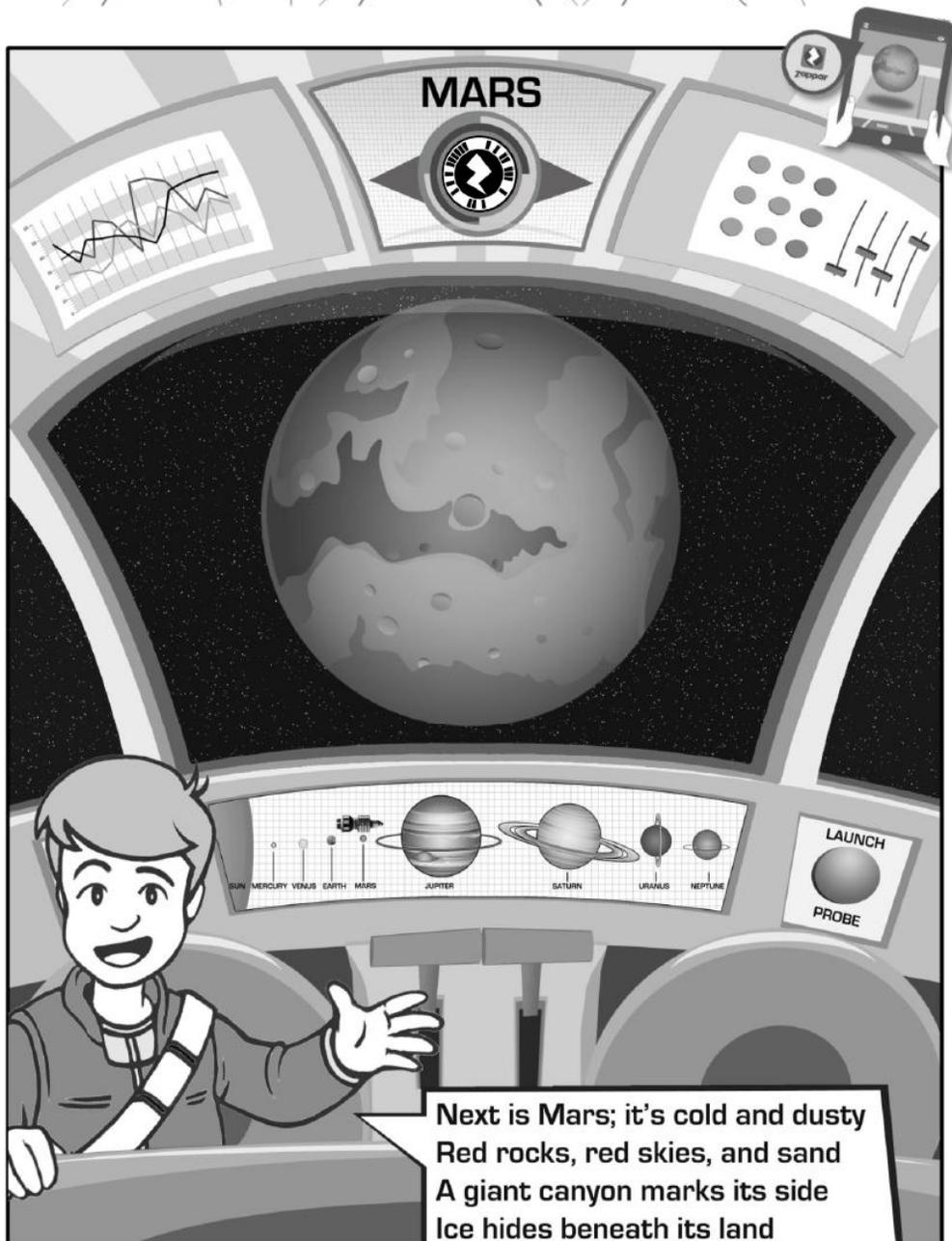
2 Scan Planet Image



3 Explore the Planet



Works on  
any iOS or  
Android  
Device



# Title: Water Cycle Engineer

Grades: 4-8

**THE ROCKWELL ADVENTURES™**  
**WATER CYCLE ENGINEER**

Immersive 3D Water Cycle  
FREE Augmented Reality App!  
Zappor

**2018-2019 SCHOOL YEAR**

- Explore the Water Cycle At Two Moon Bases
- Immersive 3D Virtual Environments
- Correlated to State & National Standards
- Pre & Post Exploration Tests
- Water Cycle Design Challenge

Visit StoneDakMedia.com For Even More!

**Title:** Water Cycle Engineer

**Type:** Augmented Reality (AR) Enhanced Workbook-Based Virtual Instruction

**Description:** Take STEM education to the next level with this augmented reality enhanced tour of the Water Cycle. Participants then virtually travel to colonies on the Moon to learn about the water cycle. This fun-filled educational adventure teaches students facts about each step of the water cycle and challenges them to setup a water cycle at a new Moon base under construction.

**Duration:** 1 Hour

**Format:** 25 or 30 Printed Workbooks

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up books from educator prior to virtual class, and use books at home on in their class during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Scientific Investigation & Reasoning, Matter & Energy, the Water Cycle, Engineering Design.

Training	Reusable Training Materials	Total
<b>\$150</b> We Host <b>\$0</b> DIY	<b>\$448.87:</b> Includes 25 AR-enhanced Water Cycle Engineer Workbooks <b>\$538.65:</b> Includes 30 AR-enhanced Water Cycle Engineer Workbooks	<b>\$598.87</b> or <b>\$688.65:</b> Us <b>\$448.87</b> or <b>\$538.65:</b> DIY

**THE ROCKWELL ADVENTURES**  
**WATER CYCLE ENGINEER**

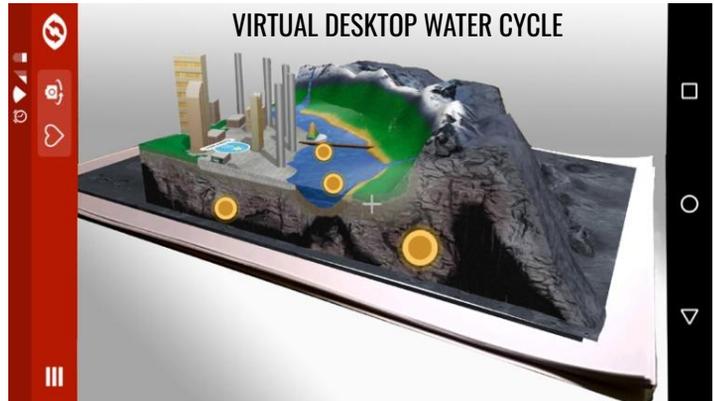
**THE MOON**

STEP #2: NEW MOON BASE CONSTRUCTION

STEP #1: INITIAL FROM STATION (2018-2019)

Hi, I'm Chip from the Rockwell Family. We're exploring the next front through space. And we need your help on a project. You will help us complete a Moon Base.

Yes, our mission takes place on Earth's Moon. We'll begin here, at the base of the Earth. We'll then travel by train to a new base. That's where we're being built out.



Try Water Cycle Engineer for yourself!

Grades: 4-8

1 Launch the Zappar app

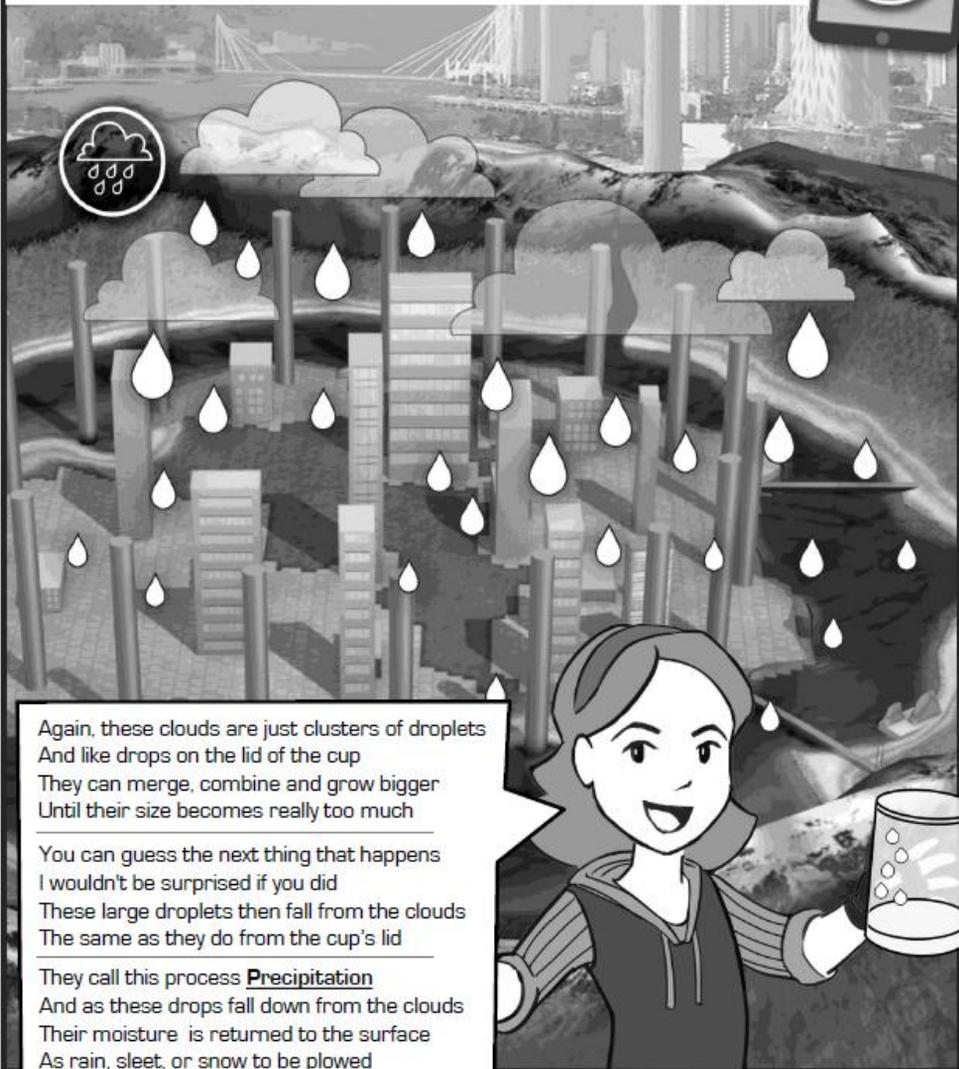
2 Scan Zapcode

3 Explore 3D Content

Works on  
any iOS or  
Android  
Device

# PRECIPITATION

SCAN THIS PAGE AND TAKE NOTES



# How Augmented Reality Enhanced Lessons Work

## Step 1: Augmented Reality Workbook Acquisition & Distribution



- Library Purchases Augmented Reality Enhanced Workbooks
- These Workbooks Become Library Loan Items
- Students Sign Up For Virtual Training
- Students Stop By Library and Check Out Workbooks Ahead of Virtual Training Date

## Step 2: Students Load Augmented Reality App



- Workbook Brought Home
- Student Download Zappar Augmented Reality App To Their Mobile Phone or Tablet (iOS/Android)
- Student Awaits Online Training Date

## Step 3: Students Assemble & Test STEM Kit During Virtual Training



- Student Logs Into Webinar At Designated Time
- Student Explores Immersive Webinar
- Student Keeps Workbook Several Days, Optimizing Their Designs
- Student Returns Workbook To Library

# 3D Printing Enhanced Lessons

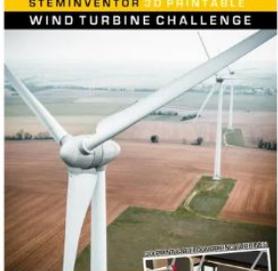
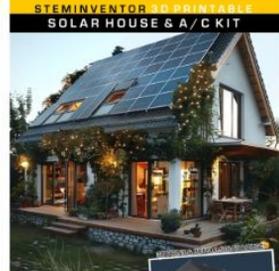
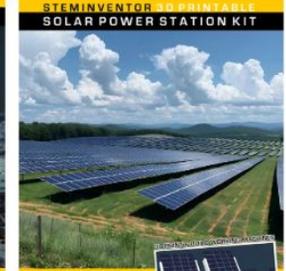
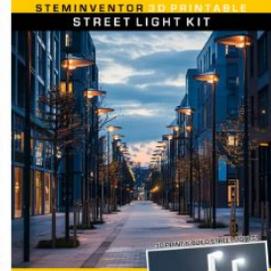
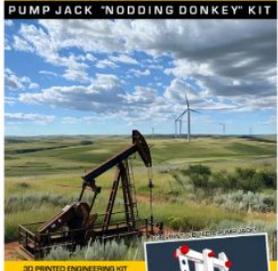
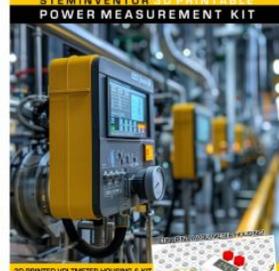
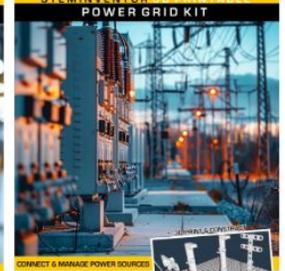
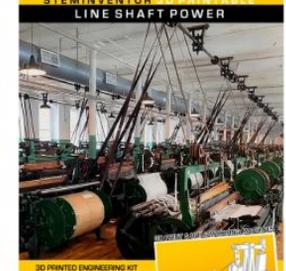
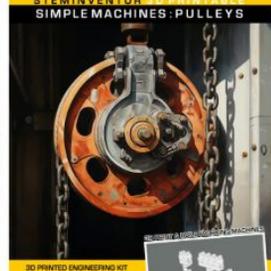
# Overview: STEMInventor 3D Printed Lessons



## STEMInventor Platform

Discover the STEM Inventor suite, offering easy-to-replicate 3D printable construction components and pre-designed kits for engineering challenges. With hundreds of 3D printable parts and over a dozen STEM-focused kits, the possibilities are limitless! Perfect for classrooms, libraries and makerspaces; enabling the creation of unlimited inexpensive 3D printable Erector Set like construction system parts and STEM-focused educational kits. Print components for hundreds of students/patrons for pennies a piece. Replace broken or missing parts by simply printing more. Give away parts to students/patrons that build creations at your facility, then print more as needed. Unlimited replication for a single location. Ideal for budget-friendly, hands-on STEM learning!

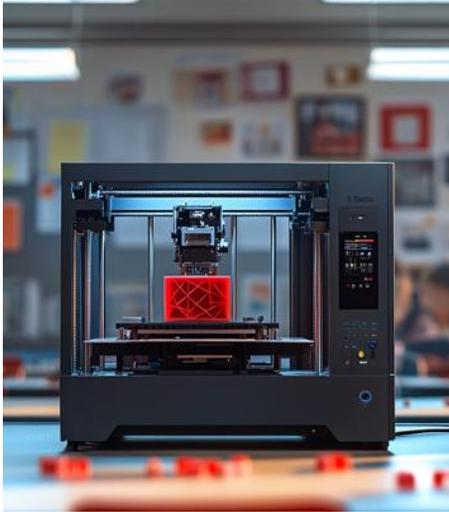
## Many Lessons To Choose From

<p><b>STEMINVENTOR 3D PRINTABLE WIND TURBINE CHALLENGE</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Students Research, Build, Test, and Complete With Custom Blade Designs</li> <li>- Learn the Engineering Design Process</li> <li>- 3D Print an Unlimited Number of Turbines</li> <li>- Compatible for State &amp; National Standards</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE SOLAR HOUSE &amp; A/C KIT</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printed and Other Components</li> <li>- Explore and Learn About Heat Transfer and Solar Power Production!</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE DOMEHAB: TERRARIUM KIT</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printable &amp; Other Components</li> <li>- Integrates With Other STEM Kits</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE SOLAR POWER STATION KIT</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printed and Other Components</li> <li>- Explore and Learn About Electricity!</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE STREET LIGHT KIT</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printed and Other Components</li> <li>- Light Your 3D Printed Creation!</li> </ul>
<p><b>STEMINVENTOR 3D PRINTABLE PUMP JACK "NODDING DONKEY" KIT</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printed and Other Components</li> <li>- Convert Electrical Energy to Rotational Mechanical Movements</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE POWER MEASUREMENT KIT</b></p>  <p><b>3D PRINTED VOLTMETER HOUSING &amp; KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printed and Other Components</li> <li>- Measure the Voltage You Produce!</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE POWER GRID KIT</b></p>  <p><b>CONNECT &amp; MANAGE POWER SOURCES</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Printable &amp; Other Components</li> <li>- Connects to Power Production Kits</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE LINE SHAFT POWER</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Print and Other Components</li> <li>- Explore and Learn About Simple Machines!</li> </ul>	<p><b>STEMINVENTOR 3D PRINTABLE SIMPLE MACHINES: PULLEYS</b></p>  <p><b>3D PRINTED ENGINEERING KIT</b></p> <ul style="list-style-type: none"> <li>- Easy to Construct</li> <li>- 3D Print and Assemble All Materials</li> <li>- Explore and Learn About Simple Machines!</li> </ul>

# Title: Intro To 3D Printing

# Grades: 9-12, Adults, Educators

**STEMINVENTOR 3D PRINTABLE**  
**INTRO TO 3D PRINTING**



**Title:** Intro to 3D Printing

**Type:** Virtual Instruction

**Duration:** 1 Hour

**Format:** Live Zoom-based Virtual Meeting

**Description:** This live virtual training session, designed for educators, library staff and patrons, covers the basics of what it takes to get started in 3D printing. Topics covered include: Intro to 3D Models, how 3D printing works, moving from design to print, 3D modeling software, 3D model repositories, model slicing, 3D printing.

**STEM Topics Covered:** 3D Design, 3D Model Repositories, 3D Printing

**Pricing:**

<b>Virtual Training</b>	<b>Reusable Training Materials</b>
<b>Live Zoom:</b> <b>\$150/Class</b>	<b>\$0:</b> None needed
<b>Pre-Recorded</b> <b>\$25/Person</b>	<b>\$0:</b> None needed

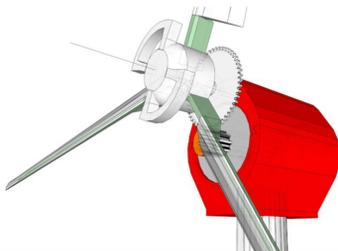
**Setup:** No setup is needed.

**Lesson:** Live Zoom participants log into class at the designated time. Questions will be taken and answered throughout the presentation. Pre-Recorded Class participants individually log into StoneOak Media's Learning Management System.

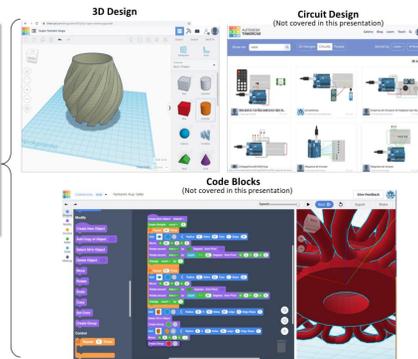
**What is a 3D Model?**

**Definition**

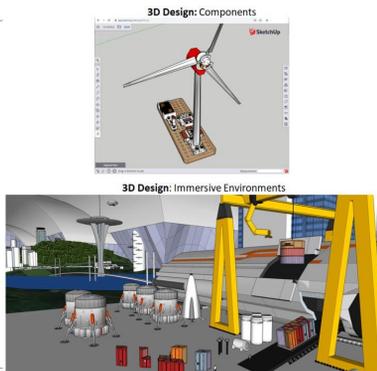
- "In 3D computer graphics, 3D modeling is the process of developing a mathematical representation of any surface of an object (either inanimate or living) in three dimensions via specialized software - Wikipedia



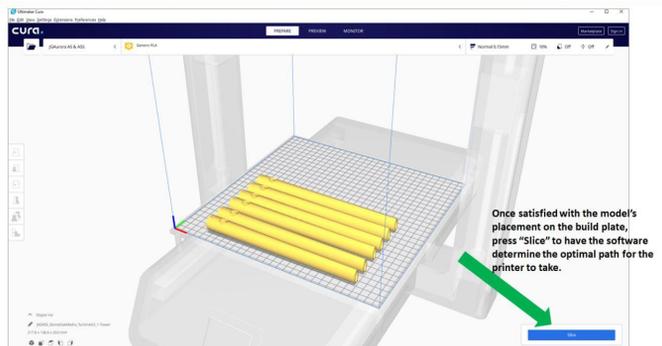
**Creating 3D Designs: TinkerCAD**



**Creating 3D Designs: SketchUp**



**3D Printer Slicing Software: Moving From Design to Print**



Once satisfied with the model's placement on the build plate, press "Slice" to have the software determine the optimal path for the printer to take.

# Title: Machines @ Work: Catapult Design Challenge

# Grades: 5-12

## STEM INVENTOR 3D PRINTABLE CATAPULT DESIGN CHALLENGE



**Title:** Catapult Design Challenge

**Type:** 3D Printed Lesson

**Description:** Designed for upper elementary, middle, and high school students, this 3D printable lesson teaches students about the engineering design process and the basics of projectile motion as they assemble this 3D printed catapult.

**Duration:** 1.5 Hour

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

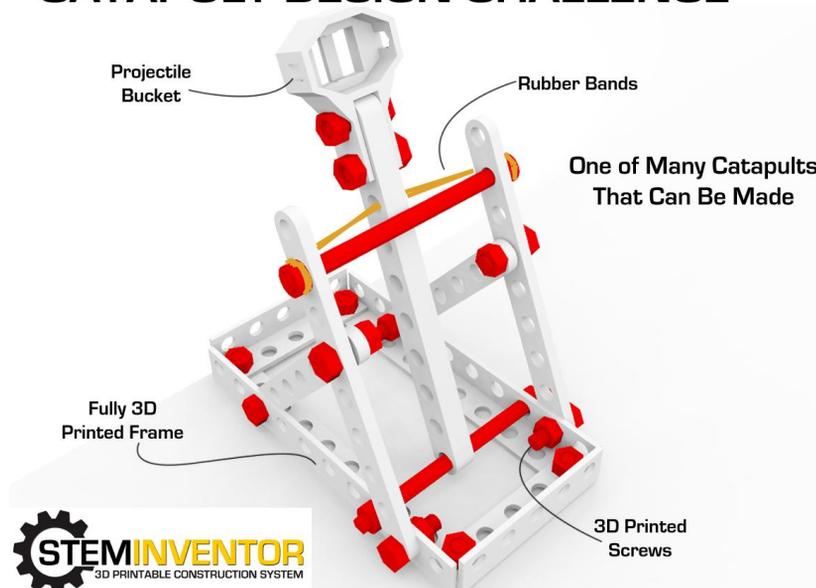
**STEM Topics Covered:** Physics, Scientific Investigation & Reasoning

**Lesson Setup:** Educators will be provided with access to the online repository of digital (.STL) files needed to 3D print the components featured in this lesson. Ahead of the date of the class, educators 3D print all of these components.

**Lesson:** During the lesson, attendees learn about the history and types of catapults. Basic physics behind projectile motion are also covered. An introduction is then given to the catapult they will be assembling during the class. Attendees then work to assemble the 3D printed catapults during the lesson. During and after the lesson, students can creatively explore variations on the implementation. Afterwards, they return the kit to the educator.

Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	None needed. Bring your own rubber bands

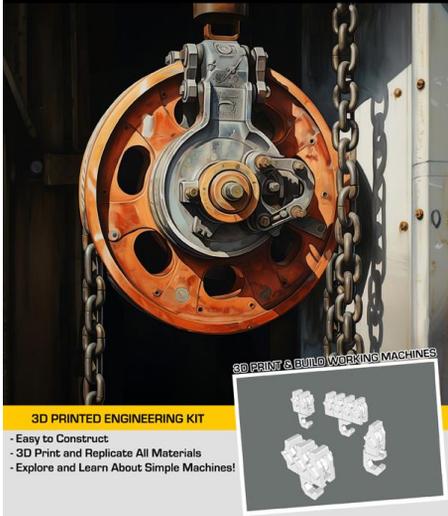
## CATAPULT DESIGN CHALLENGE



# Title: Machines @ Work: Simple Machines - Pulleys

# Grades: 5-12

## STEMINVENTOR 3D PRINTABLE SIMPLE MACHINES: PULLEYS



**Title:** Simple Machines - Pulleys

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about different types of Pulleys, a type of simple machine. Students learn about mechanical advantage pulleys deliver as they assemble, single, double, triple, and quadruple wheel compound pulleys, and use these simple machines to accomplish work.

**Duration:** 1.5 Hour

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

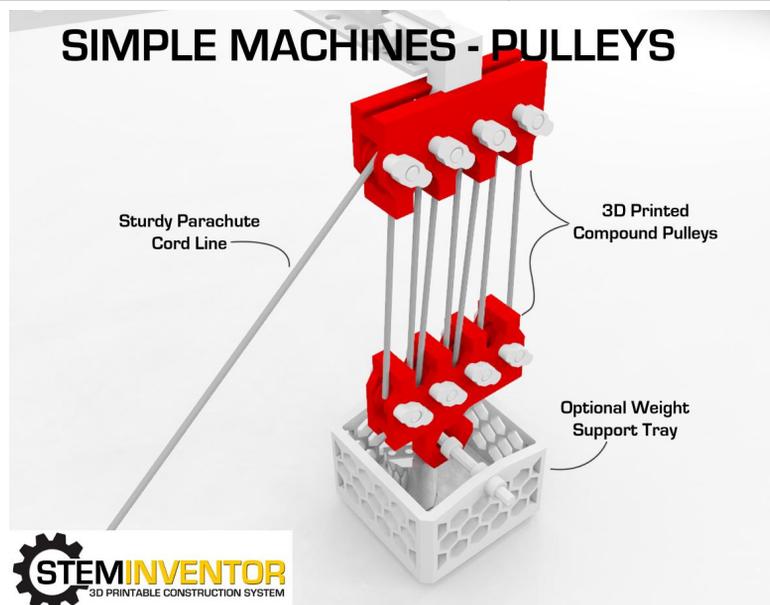
**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Simple Machines, Scientific Investigation & Reasoning

**Lesson Setup:** Educators will be provided with 10 "Simple Machine - Pulleys" parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Pulley. Ahead of the date of the class, educators will 3D print all structural components.

**Lesson:** During the lesson, attendees learn about the various kinds of pulleys, and measure Mechanical Advantage, Work, and Efficiency. An overview of each kind of pulley is covered as attendees work to assemble the 3D printed pulleys during the lesson. During and after the lesson, students can creatively explore variations on the implementation. Afterwards, they return the kit.

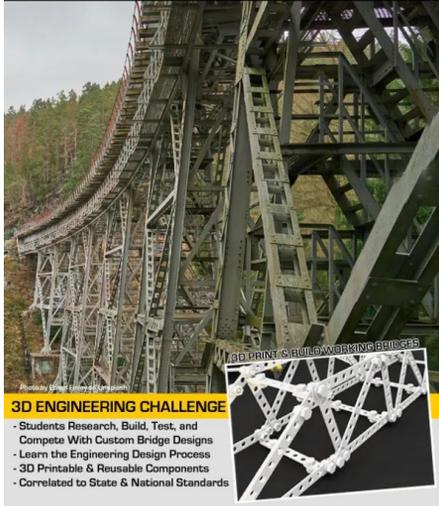
Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	See Parts Shop Amazon links



# Title: Bridge Design Challenge

# Grades: 5-12

## STEM INVENTOR 3D PRINTABLE BRIDGE DESIGN CHALLENGE



**3D ENGINEERING CHALLENGE**

- Students Research, Build, Test, and Complete With Custom Bridge Designs
- Learn the Engineering Design Process
- 3D Printable & Reusable Components
- Correlated to State & National Standards

**Title:** Bridge Design Challenge

**Type:** 3D Printed Lesson

**Description:** Designed for upper elementary, middle and high school students, this 3D printable lesson teaches students about the basics of bridge design and the common types of truss bridges, as they assemble a 3D printed Warren truss bridge.

**Duration:** 1.5 Hour

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

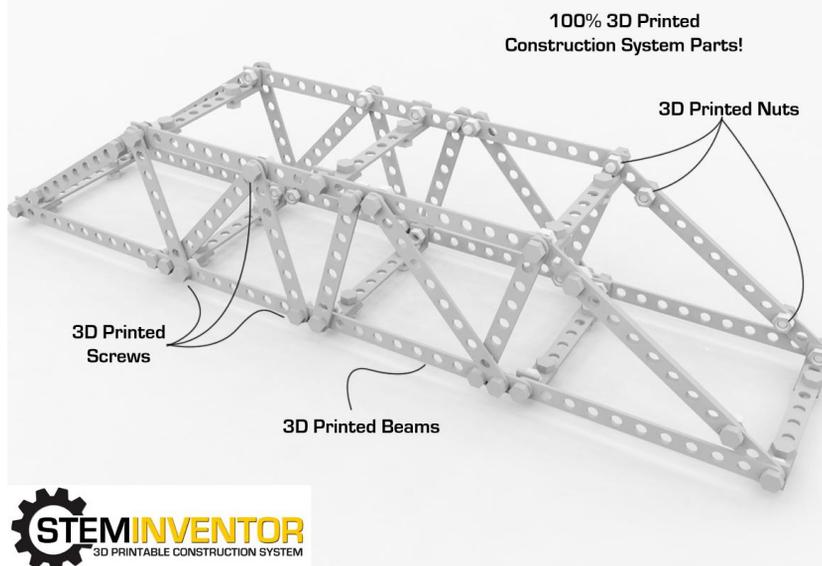
**STEM Topics Covered:** Scientific Investigation & Reasoning, Engineering Design

**Lesson Setup:** Educators will be provided with 10 Bridge Design parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the Bridge structural components. Prior to class, educators 3D print all structural components

**Lesson:** During the lesson, attendees learn about the history and types of bridges that have been developed. An overview of various kinds of truss bridges, and the pros and cons of each is covered as they work to assemble the 3D printed bridge. During and after the lesson, students can creatively explore variations on the implementation. Afterwards, they return the kit.

<b>Training</b>	 <b>Lesson 3D Printable Digital Files</b>	 <b>Lesson Hardware Parts</b>
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	See Parts Shop Amazon links

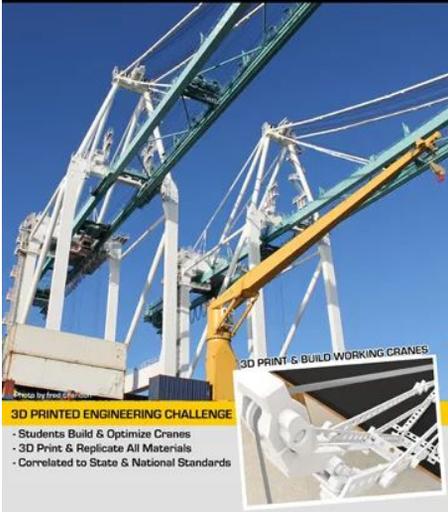
## BRIDGE DESIGN CHALLENGE



# Title: Crane Design Challenge

# Grades: 5-12

## STEMINVENTOR 3D PRINTABLE CRANE LIFT CHALLENGE



**Title:** Crane Design Challenge

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about the history of cranes, and design considerations engineers use when designing cranes. They then work to assemble a sample crane, and use it to pick up a weight.

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Duration:** 1.5 Hour

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

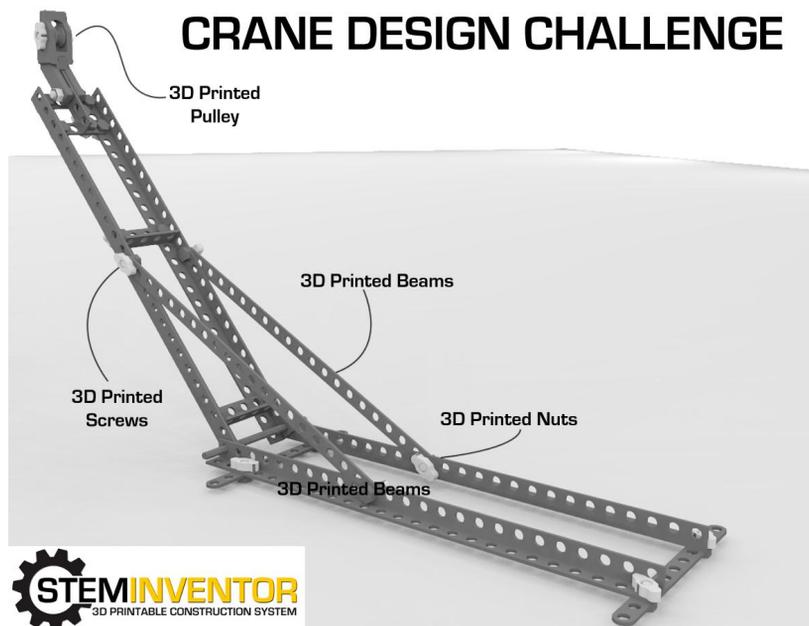
**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Scientific Investigation & Reasoning, Engineering Design

**Setup:** Educators will be provided with 10 Crane parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print Crane structural components. Ahead of the date of the class, educators 3D print all structural components

**Lesson:** During the lesson, attendees learn about the history and types of cranes that have been developed. The physics behind crane design are also discussed. Attendees then work to assemble the lesson's crane using educator supplied 3D printed parts. During and after the lesson, attendees creatively explore variations on the crane's implementation. Afterwards, they return the kit.

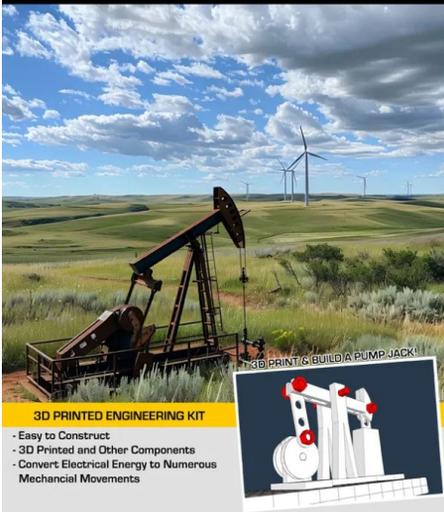
Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	See Parts Shop Amazon links



# Title: Machines @ Work: Pump Jack

# Grades: 6-12

## STEMINVENTOR 3D PRINTABLE PUMP JACK "NODDING DONKEY" KIT



**Title:** Pump Jack "Nodding Donkey" STEM Kit

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about a wide variety of energy conversions: electricity to a variety of mechanical motions (rotational, to linear, to reciprocal, to levers) as they assemble this 3D printed Pump Jack.

**Duration:** 1.5 Hour

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

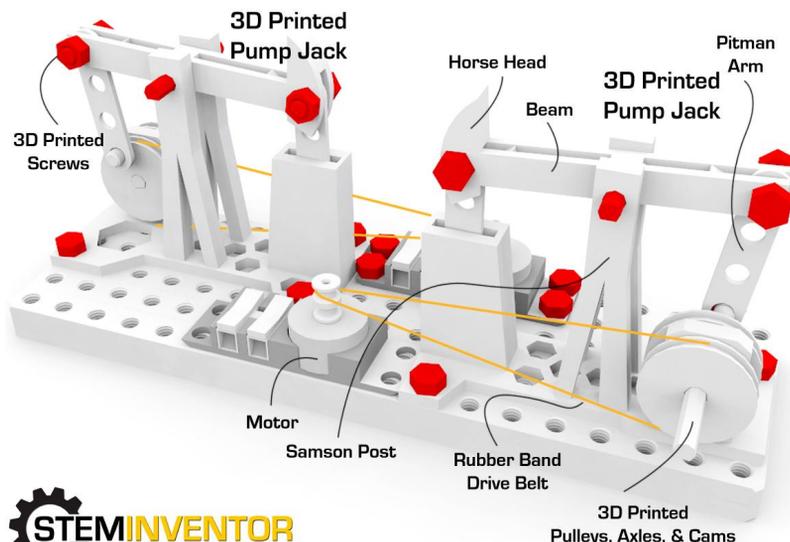
**STEM Topics Covered:** Electricity, Matter & Energy / Energy Conversion, Simple Machines, Scientific Investigation & Reasoning

**Setup:** Educators will be provided with 10 Pump Jack parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Pump Jack. Ahead of the date of the class, educators will 3D print all structural components.

**Lesson:** During the lesson, attendees learn about how electricity works and various forms of energy conversion. An overview of various kinds of mechanical motion is also covered as they work to assemble the 3D printed pump jack during the lesson. During and after the lesson, students can creatively explore variations on the implementation. Afterwards, they return the kit.

Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	<b>Two Pump Jack Parts Kits:</b> \$20

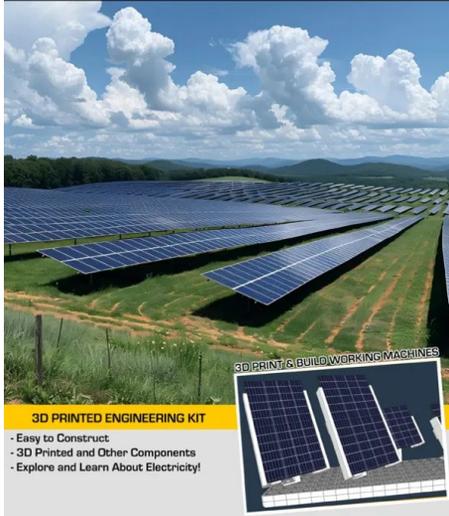
## PUMP JACK "NODDING DONKEY"



# Title: Solar Power Station

# Grades: 6-12

## STEMINVENTOR 3D PRINTABLE SOLAR POWER STATION KIT



### 3D PRINTED ENGINEERING KIT

- Easy to Construct
- 3D Printed and Other Components
- Explore and Learn About Electricity!

**Title:** Solar Power Station STEM Kit

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about a wide variety of STEM topics as they assemble a 3D printed solar power station. Participants assemble and link solar panels, and power projects under different lighting conditions.

**Duration:** 1.5 Hour

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

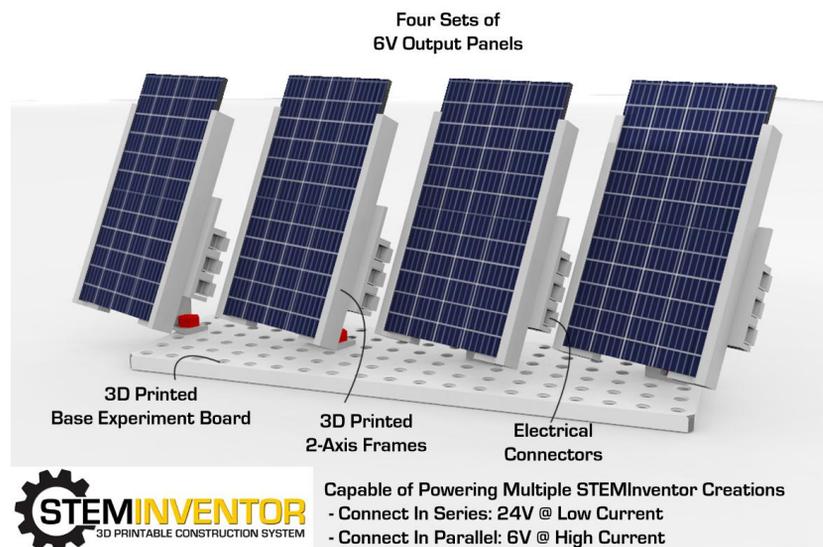
**STEM Topics Covered:** Environmental Sustainability, Renewable Energy, Electricity, Scientific Investigation & Reasoning

**Setup:** Educators will be provided with 10 Solar Power Station parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Solar Power Station. Ahead of the date of the class, educators 3D print all structural components. These become loan-able items, and are then lent out to each class attendee.

**Lesson:** During the lesson, attendees learn about real-life solar power stations, renewable energy, environmental sustainability, and how electricity works, as they work to assemble the 3D printed power station during the lesson. During and after the lesson, students use the engineering design process to improve their production of electricity. Afterwards, they return the kit.

<b>Training</b>	 <b>Lesson 3D Printable Digital Files</b>	 <b>Lesson Hardware Parts</b>
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	<b>One Power Station Parts Kits:</b> \$36

## SOLAR POWER STATION



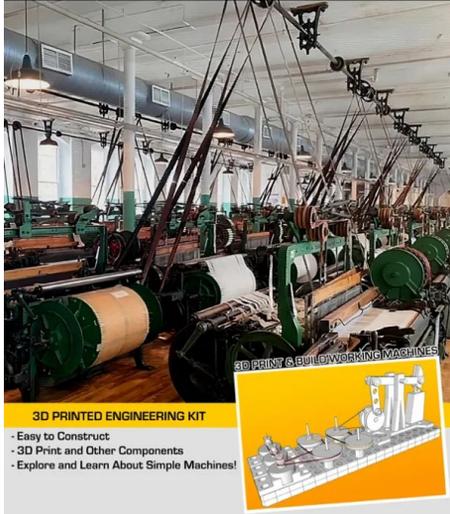
Capable of Powering Multiple STEMInventor Creations

- Connect In Series: 24V @ Low Current
- Connect In Parallel: 6V @ High Current

# Title: Machines @ Work: Line Shaft Power

# Grades: 6-12

## STEMINVENTOR 3D PRINTABLE LINE SHAFT POWER



**Title:** Line Shaft Power

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about a wide variety of energy conversions: electricity to a variety of mechanical motions (rotational, to linear, to reciprocal, to levers) as they assemble this engaging 3D printed lesson.

**Duration:** 1.5 Hours

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

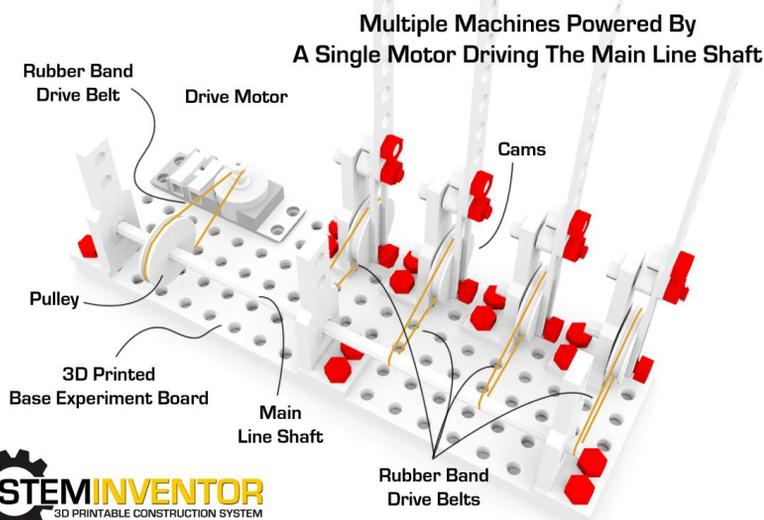
**STEM Topics Covered:** Electricity, Simple Machines, Scientific Investigation & Reasoning, Engineering Design

**Setup:** Educators will be provided with 10 Line Shaft Power parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Line Shaft Power kit. Ahead of the date of the class, educators 3D print all structural components. These become loan-able items, and are then lent out to each class attendee.

**Lesson:** During the lesson, attendees learn about how electricity works and various forms of energy. An overview of various kinds of mechanical motion is also covered as they work to assemble the 3D printed line shaft power kit during the lesson. During and after the lesson, students can creatively explore variations on the implementation. Afterwards, they return the kit.

<b>Training</b>	 <b>Lesson 3D Printable Digital Files</b>	 <b>Lesson Hardware Parts</b>
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	<b>Two Line Shaft Power Parts Kits:</b> \$25

## LINE SHAFT POWER



# Title: Solar House & Air Conditioning

# Grades: 6-12

## STEMINVENTOR 3D PRINTABLE SOLAR HOUSE & A/C KIT



**Title:** Solar House & AC STEM Kit

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson teaches students about a wide variety of STEM topics as they assemble this solar powered 3D printed house, with an attached evaporation cooling system capable of reducing its interior temperature by  $> 10^{\circ}\text{F}$ .

**Duration:** 1.5 Hours

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Environmental Sustainability, Renewable Energy, Electricity, Heat Transfer, Additive Mfg, Scientific Investigation & Reasoning

**Setup:** Educators will be provided with 10 Solar Home & AC parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Solar Home. Ahead of the date of the class, educators will 3D print all structural components. These become loan-able items, and are then lent out to each subsequent class attendee.

**Lesson:** During the lesson, attendees learn about real-life 3D printed homes, renewable energy, environmental sustainability, the different types of heat transfer (conduction, convection, radiation), electricity, and how evaporative coolers work, as they work to assemble the 3D printed house during the lesson. During and after the lesson, students use the engineering design process to improve their home setup to produce the biggest temp. difference. Afterwards, they return the kit.

Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	<b>One Solar House Parts Kits:</b> \$32

## SOLAR HOME & AC



### Off-Grid Sustainable Energy

Four Solar Panels Provide  
All The Power This  
Off-Grid Home Needs  
And More

### Active Cooling ( $> 10^{\circ}\text{F}$ )

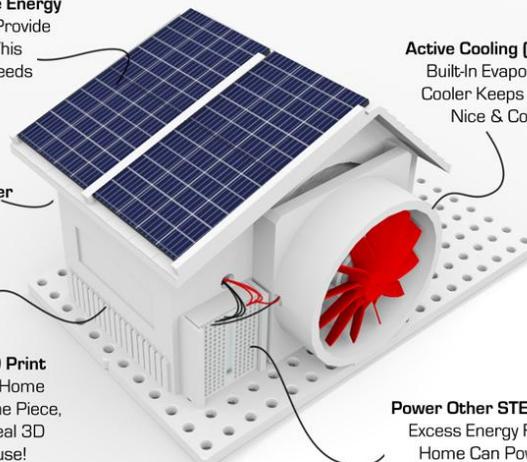
Built-In Evaporative  
Cooler Keeps Home  
Nice & Cool!

### Study Heat Transfer

-Conduction  
-Convection  
-Radiation

**One Piece 3D Print**  
Main Body of Home  
3D Prints As One Piece,  
Just Like A Real 3D  
Printed House!

**Power Other STEM Kits**  
Excess Energy From  
Home Can Power  
Other STEMInventor Kits



# Title: Wind Turbine Challenge

# Grades: 6-12

## STEMINVENTOR 3D PRINTABLE WIND TURBINE CHALLENGE



### 3D ENGINEERING CHALLENGE

- Students Research, Build, Test, and Compete With Custom Blade Designs
- Learn the Engineering Design Process
- 3D Print an Unlimited Number of Turbines
- Correlated to State & National Standards

**Title:** Wind Turbine Challenge

**Type:** 3D Printed Lesson

**Description:** Designed for middle and high school students, this 3D printable lesson empowers students to use the Engineering Design Process as they learn about forces, motion, energy, and electricity; and experiment to produce the most power from their turbines.

**Duration:** 1.5 Hours

**Format:** 3D Printed Parts, Background Videos, Student Consumables

**Execution:**

**Option 1:** "We Host" Training includes virtual instruction by one of our trainers. Participants pick up parts from educator prior to virtual class, and use during the program. All training materials are loanable/reusable by the educator thereafter.

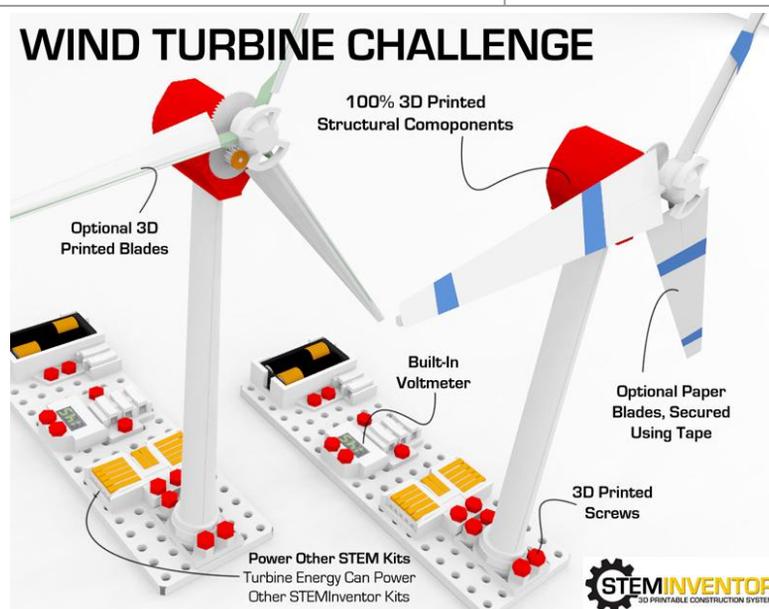
**Option 2:** DIY. You host the lesson yourself at no incremental cost.

**STEM Topics Covered:** Scientific Investigation & Reasoning, Matter & Energy, Engineering Design. Electricity, Renewable Energy, Power Systems

**Setup:** Educators will be provided with 10 Wind Turbine Challenge parts kits, and 1-year access to the online repository of digital (.STL) files needed to 3D print the structural components of each Wind Turbine. Ahead of the date of the class, educators 3D print all structural components. These become loan-able items.

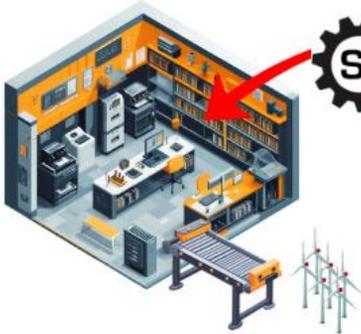
**Lesson:** During the lesson, attendees learn about renewable energy, the inner workings of wind turbines, how turbines integrate with city power grids, turbine blade design considerations, electricity, the engineering design process and more, as they work to assemble the 3D printed turbine during the lesson. During and after the lesson, students use the engineering design process to improve their blade designs. Afterwards, they return the kit.

Training	 Lesson 3D Printable Digital Files	 Lesson Hardware Parts
<b>We Host:</b> \$200 <b>\$0: DIY</b>	<b>This Kit:</b> \$50 <b>All Kits:</b> \$239	<b>One Wind Turbine Parts Kits:</b> \$25



# How STEMinventor 3D Printed Lessons Work

## Step 1: STEMinventor Access & 3D Printing



- Library Accesses STEMinventor STEM Kit Digital Library
- Library 3D Prints Unlimited\* Replicate STEM Kits
- These STEM Kits Become Library Loan Items

## Step 2: Students Check Out 3D Printed STEM Kits



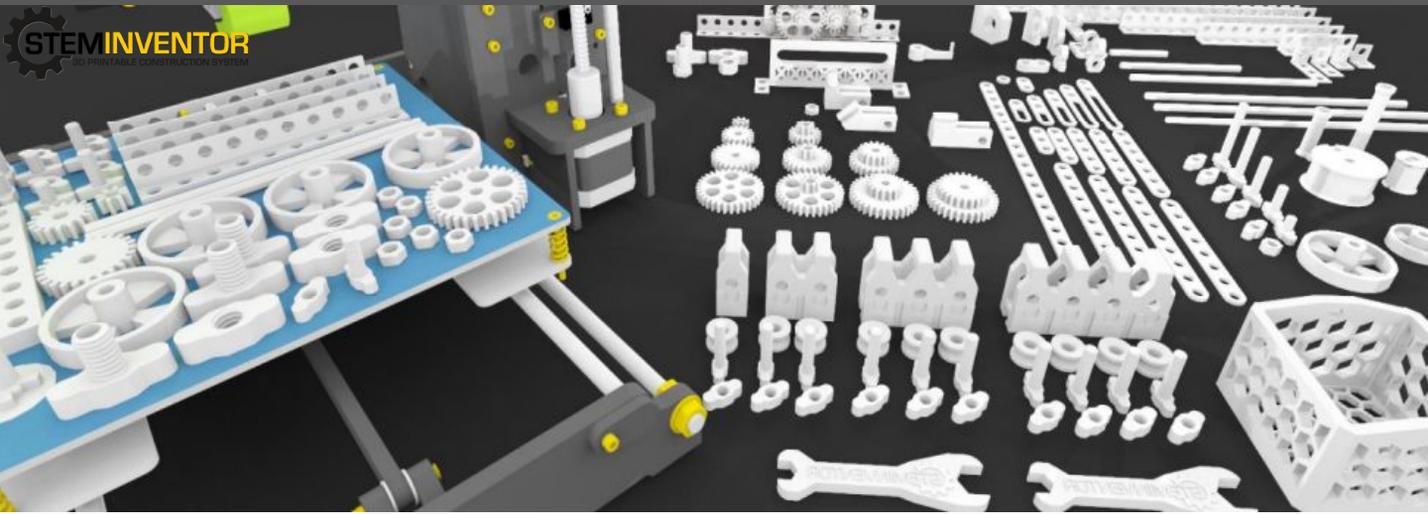
- Unassembled STEM Kit Brought Home
- Broken/Missing Parts? Not a Problem. Library Simply Prints More
- Student Awaits Online Training Date

## Step 3: Students Assemble & Test STEM Kit During Virtual Training



- Student Logs Into Webinar At Designated Time
- Students Assemble and Test STEM Kit During Webinar
- Student Keeps Kit for Next Several Days, Optimizing Design Challenge
- Student Returns Kit To Library
- Broken/Missing Parts? Not a Problem. Library Simply Prints More

# Make-Your-Own 3D Printed STEM Programs & Makerspace Resources



## Turn Your Makerspace Into a Low-Cost High-Impact STEM Education Hub!

**Title:** STEMinventor Single Site Access

**Type:** 3D Printed Makerspace Resources

**Description:** The **STEMInventor Platform** suite offers a wide variety of easy-to-replicate 3D printable construction components; from wheels, to axles, to gears, pulleys, cams, structural beams, cranks, screws, and more. With hundreds of 3D printed parts to choose from, the possibilities are limitless! Print components for hundreds of patrons/students effortlessly. Replace broken or missing parts by simply printing more. Give away parts to patrons/students that build creations at your facility, then print more for mere pennies. Educators can also use these components to construct their own programs on a variety of STEM-focused topics. Ideal for budget-friendly, hands-on STEM learning

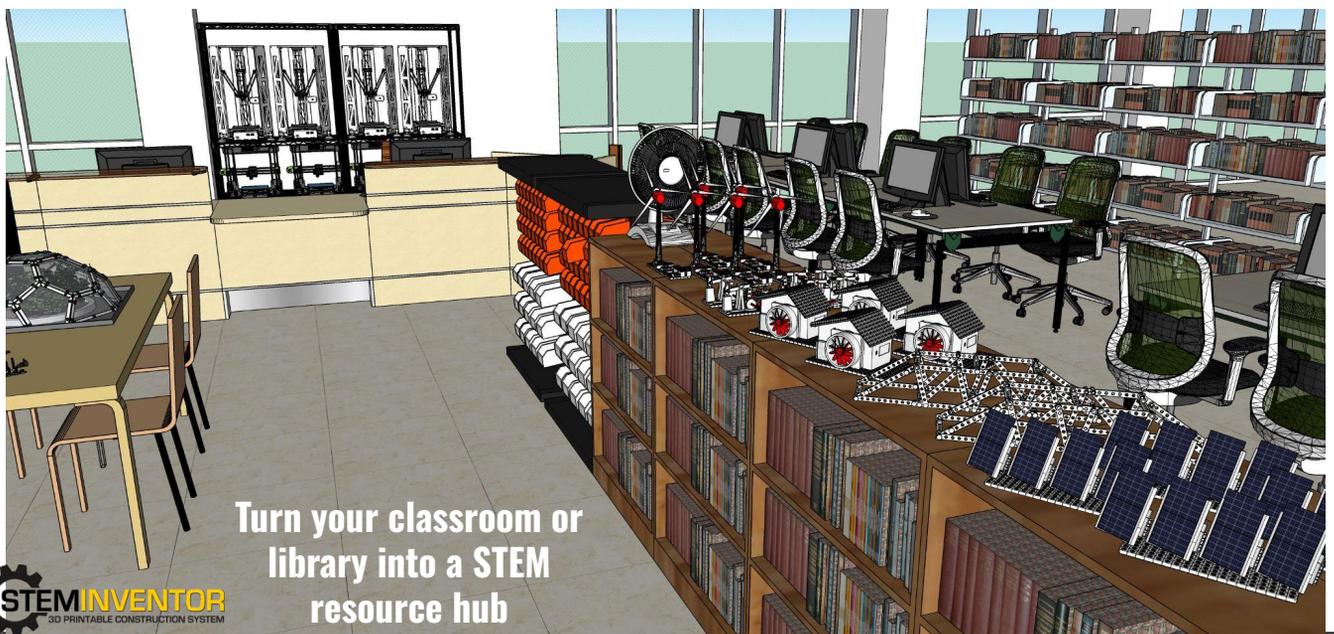
**Duration:** Self Paced

**Format:** Students, Educators, & Library Staff build their own STEM inventions, at their convenience

**Price:**

**STEMInventor.com Single Site Access:** \$239/yr. for access to all digital 3D printable (.STL) files

**Parts Kits:** Prices Vary. See "Material Price" column on Pages 3 and 4 for more details



Turn your classroom or  
library into a STEM  
resource hub



# STONEOAK MEDIA



**Augmented Reality & 3D Printing Focused Products and Programs**

 **STONEOAK MEDIA**

StoneOakMedia.com | STEMInventor.com

210-441-7222

5900 Balcones Drive #16093

Austin, TX 78731