

Engaging STEM Lesson Ideas



 [@STEMseeds](https://twitter.com/STEMseeds)

by Amy Loeffelholz

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Michaela Freeland



last updated 6 Oct 2015

“Engaging STEM
Lesson Ideas”



or just
Google
“STEM
seeds”

Slides & referenced videos: bit.ly/STEMIdeas

2014 preso: tinyurl.com/STEMIdeas

PLAYDATE

People Learning and Asking Y: Digital Age Teacher Exploration ©

[Home](#) [Schedule](#) [What to Bring & Know](#) [Resource Guides](#) [Organizers](#) [Backstory](#)

PLAYDATE OKC

No presenters. No agendas. Just playing.

Explore the things you've never had time to explore!

Twitter Hashtags: #PLAYDATE15 #OklaEd

Cost: FREE - EVENTBRITE Registration Coming!

Theme: **3D Printing & Digital Design**

When: Saturday, November 7, 2015 (9:00 am - 1:00 pm)

Where: Crabtree Library, Casady School, Oklahoma City, OK

Register On [Eventbrite](#)

**Saturday,
November 7th
9 am - 1 pm**

playdate.edcampokc.org

Where are we now?

Amy Loeffelholz [@AmyLoeffelholz](#)

Grade 4-5 STEM

Lakeview Elementary

Yukon Public Schools



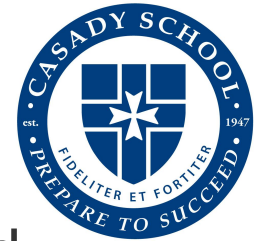
[@STEMseeds](#)

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Director of Technology

Grade 2-4 STEM Club

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STEM.casady.org



Michaela Freeland

Library Media Specialist

Casady School

Engaging STEM Lesson Ideas

1. Engineering Design Challenges - Wes
2. Mint Mobiles- Amy
3. 3D Printing - Michaela
4. Hot Wheels Speedometry -Amy
5. MinecraftEDU- Wes
6. CSI - Amy

STEM Class Essentials

1. Collaboration
2. Engineering Design
3. Measurement
4. Making
5. Learning Through Failure



1. Engineering Design Challenges

Challenge #1 - Paper Table

Summary: With your team in 20 minutes, construct a table using provided materials that will support a heavy dictionary at least 8 inches off the table for at least 60 seconds.

Materials:

1. 20 pieces of newspaper
2. 3 feet of masking tape
3. 1 piece of cardboard
4. 1 dictionary

Restrictions:

1. Materials CANNOT be directly taped to the table



[Check out our Flickr photo set of student paper tables!](#)

Inspirational / Related Sites:

1. [PBS Kids Design Squad Nation: Paper Table \(PDF handout\)](#)
2. [Design a Sturdy Paper Table by eGF!](#)



<http://stem.wesfryer.com/home/engineering-design-challenges>

1. Engineering Design Challenges

Challenge #2 - Straw Structures

Summary: With your team in 20 minutes, build a straw structure that can support a tennis ball above the table for 15 seconds or more. Measure the height.

Materials:

1. 25 straws
2. 3 feet of masking tape
3. 1 tennis ball
4. Ruler



[Check out our Flickr photo set of student straw towers!](#)

Inspirational / Related Sites:

1. [Based on a lesson by Bethany Ligon](#)
2. ["Time to Kill" on Jonathan Claydon's site, Infinite Sums](#)



<http://stem.wesfryer.com/home/engineering-design-challenges>

1. Engineering Design Challenges

Challenge #3 - Pipe Cleaner Structures

Summary: With your team in 20 minutes, build a structure with pipe cleaners that will support a cup with 50 pennies at least 3 inches off the table

Materials:

1. 10 pipe cleaners
2. Small plastic cup
3. 50 pennies
4. Ruler

Inspirational / Related Sites:

1. [Based on a lesson by Bethany Ligon](#)



[Check out our Flickr photo set of student pipe cleaner structures!](#)



<http://stem.wesfryer.com/home/engineering-design-challenges>

1. Engineering Design Challenges

Challenge #4 - Tennis Ball Lego Tower

Summary: With your team in 20 minutes, build the tallest tower you can with Legos that will support a tennis ball above a table. Measure the height in inches from the tabletop to the top of the tennis ball.

Materials:

1. Tub of assorted Lego bricks
2. 1 tennis ball
3. Ruler

Inspirational / Related Sites:

1. Based on a lesson from [5 Construction Challenges for Kids With BIG Ideas by Childhood 101](#)



[Check out our Flickr photo set of student Lego towers!](#)



<http://stem.wesfryer.com/home/engineering-design-challenges>

1. Engineering Design Challenges

GOAL:
make as
long a span
as possible
out from
the edge of
the table



SUPPLIES:

29 metal washers
As many paint sticks
as needed

GUIDELINES:

Measure & **submit electronically** at least
3 measurements in
inches from the table's
edge

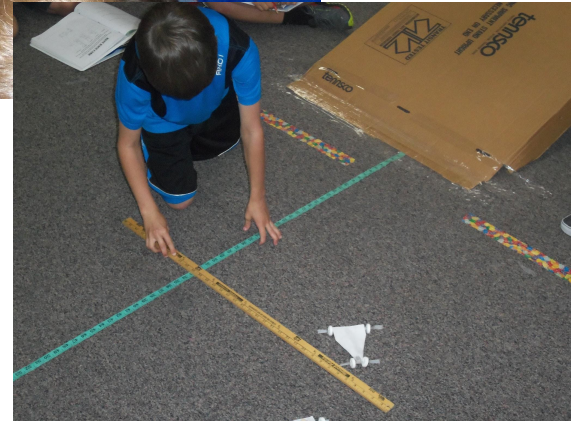
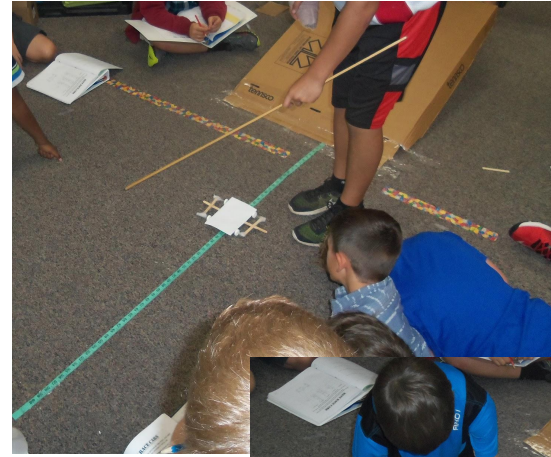
<http://stem.wesfryer.com/home/cantilever-spans>

2. Mint Mobiles

The activity starts with a build kit and basic instructions: Build a car that will roll down a ramp and travel past the end.

The kit contains 4 mints, 2 straws, 4 popsicle sticks, 2 index cards and a tape dispenser.

2. Mint Mobiles



2. Mint Mobiles

We record the data, average it, then graph it. The top groups go on to the STEM Wall of Fame!



3. 3D Printing



Casady STEM
@CasadySTEM

A STEM camp student had a broken flip flop & designed a "flip flop clip" to fix it. She 3D printed the part! #OklaEd

<https://twitter.com/CasadySTEM/status/624217806314172416>



RETWEETS
10

FAVORITES
25



9:01 AM - 23 Jul 2015

3. 3D Printing

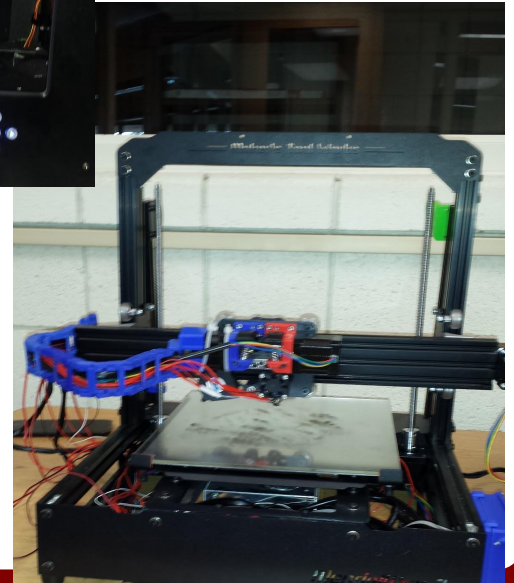
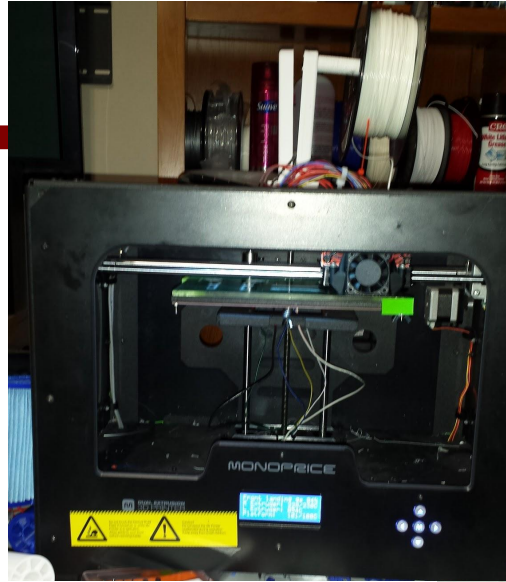
Makerbot clone
from Monoprice
Makerstoolworks

prototekokc.com

PROTOTEK

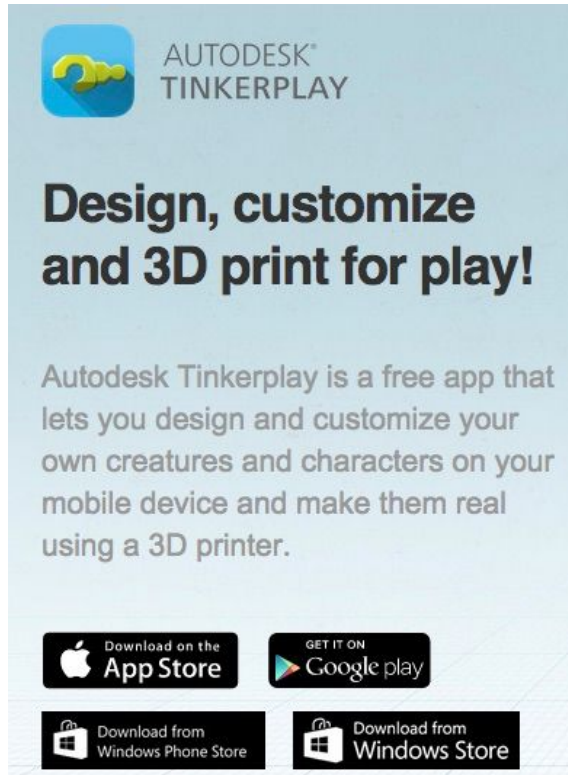



Create Anything



3D Printing



www.123dapp.com/tinkerplay





 AUTODESK
TINKERPLAY

Design, customize and 3D print for play!

Autodesk Tinkerplay is a free app that lets you design and customize your own creatures and characters on your mobile device and make them real using a 3D printer.



Arc de Triomphe model designed by rising 6th grader in summer 3D printing camp.

3D Printing

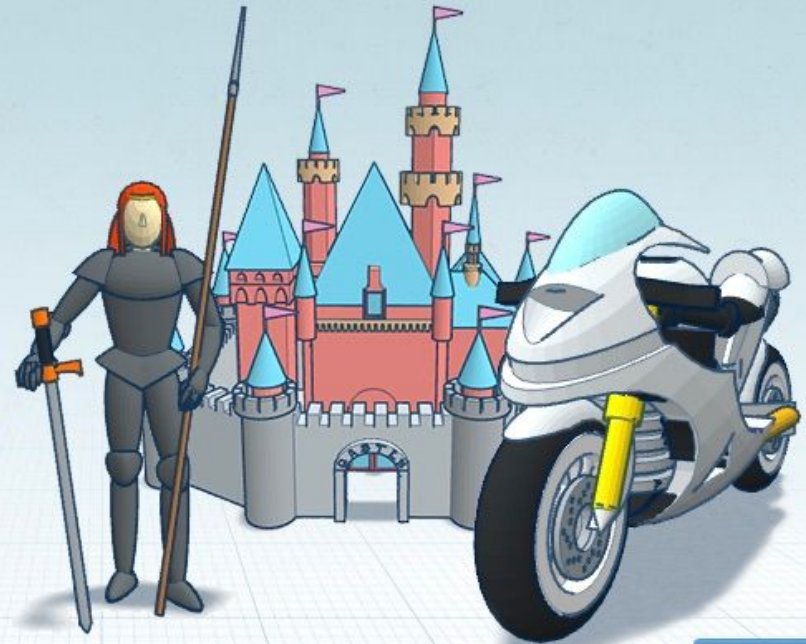


[Tinkercad.com](https://www.tinkercad.com)

The easiest, **fiercest** 3D design tool around.

Tinkercad is a free, easy-to-learn online app anyone can use to create and print 3D models.

Start Tinkering now



Share Image



Home About Sign up for free

The first CAD tool for 3D printers

Tinkercad is a powerful yet easy-to-use web application that lets you turn ideas into a 3D printable design in minutes.

[Start the tutorial](#)

Learn to use Tinkercad in three easy steps

4. Hot Wheels Speedometry

Hotwheels has developed a curriculum and for a while gave away class sets of track and cars. This curriculum is designed to show examples of potential and kinetic energy, as well as variables such as height of starting ramps, and the weight of the car.

[Hot Wheels Speedometry](#)

4. Hot Wheels Speedometry

In my class, I allowed the students to build, test and explore.





Hot Wheels Lesson in STEM Class - @STEMseeds

5. MinecraftEDU



MINECRAFTEDU




MINECRAFTEDU

Bring Minecraft to the Classroom



Brought to you by
TeacherGaming

Officially supported by
 MOJANG



[by wfryer](#)



MinecraftEDU Recipe Reference Sheet #1

Planks



Pick Axe



Furnace



Sticks



Sword



Torch



Crafting Table



Hoe



Iron Ingot





MinecraftEDU

Treehouse Challenge



MINECRAFTEDU

March/April 2015 - @iesSTEM @wfryer

Teachers: Get more info & download this world [here](#)

5. MinecraftEDU

Your Objectives in 2 Days:

1. Build the coolest **roofed** treehouse you can including **ladders**, **windows**, **doors**, & **torches**
2. Include at least 1 **square room** with an **area of 25 (5 x 5)**
3. Build a **fenced corral** with a perimeter of 24 (2 x 10, 3 x 9, 4 x 8, 5 x 7, or 6 x 6) & **a gate**

Applied Problem Solving



stem.wesfryer.com/home/minecraft



[MinecraftEDU](#)
[Redstone](#)
[Engineering](#)
[Challenge](#)



stem.wesfryer.com/home/minecraft/redstone

Level 1: Redstone Powered House

Build a house in your area and add ALL of the following redstone-powered items:

1. Iron doors which open with pressure plates or switches/buttons
2. [Automatic Lights](#) (turn on with switch/button or pressure plate or light sensor)
3. Egg / Snowball / Arrow Dispenser ([tutorial video](#))
4. [Shower](#) ([use dispenser and water bucket](#) - or [use a sticky piston like Sam!](#))
5. [Refrigerator](#) - Materials: 1 Dispenser, 1 Iron Block, 1 Iron Door, 1 Button/Lever. Place a dispenser and on top, put an iron block. Then place an iron door in front of it, and put A button or lever on the iron block. Then just fill the dispenser. ([tutorial videos by Josh & Shelby](#))
6. Door Bell (simple: Use Note block and button, or a [more complex version tutorial](#))
7. Sliding Glass Doors / Jeb Door ([tutorial video](#))



MINECRAFTEDU

stem.wesfryer.com/home/minecraft

[Full 1:32 video on YouTube](#)

6. Crime Scene Investigation

1. One Hour Mysteries- Work in groups to solve a crime based on evidence given.
2. CSI Labs- Fingerprinting, Handwriting Analysis, Textile Identification, Liquid Chromatography, and Dental Impressions.

6. Crime Scene Investigation

CSI Labs:





VIRTUALLY
UNSTOPPABLE



FREE
ONLINE
CONFERENCE

CONFERENCE DATES:
October 19 - 30, 2015

**PRE-CONFERENCE
KEYNOTE:**
October 12, 2015

<http://k12onlineconference.org>

Get Involved in Oklahoma EdCamps!



Saturday, March 5, 2016

www.edcampOKC.org

www.edcampOK.org



STEM seeds

@STEMseeds

a community of STEM teachers sharing lesson ideas facilitated by @wfryer & @AmyLoeffelholz

📍 Oklahoma

🌐 STEMseeds.org

📷 6 Photos and videos



TWEETS
85

PHOTOS/VIDEOS
6

FOLLOWING
109

FOLLOWERS
206

More ▾

+ Follow

Tweets Tweets & replies

STEM seeds @STEMseeds · 6h
Join @AmyLoeffelholz & @wfryer "Practical Lessons 4 Elementary STEM Integration" tinyurl.com/STEMIdeas tomorrow afternoon at 2:45 #OTAEM14

STEM seeds @STEMseeds · 6h
gr8 final playground design projects by #stem students taught by @AmyLoeffelholz @lesYukon #oklaed @yukondistrict



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July 2016
PD Camp!

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