



STIIX™

Lesson Plan

Flashlight Project



Topics: Circuits, Electrical Energy

Career Exploration: Electrical Engineer.

Length: 1-2 Hours

Teams: 1-2 students

Hey there!
My name is Alex Reader and I am the founder here at STIIX.



I am a former engineer & teacher- and I have a huge passion for helping shape students minds through STEAM.

If this is your first STIIX lesson, we just want to say thank you! We hope both you & your students enjoy the hands-on activities, and please know we are here for any support along the way.

All of our projects follow the infamous 'Engineering Design Process', shown below. This process is so meaningful to me because not only is it applicable here for this activity, but also in life...Design constraints are representative of the real world, failure is okay, and constantly making improvements is what life is all about!

The purpose of this lesson plan is just to point you in the right direction to all the helpful resources we provide to help make this activity a smooth, memorable, and impactful one!

If any question pop up at all after scanning through, please do not hesitate to call or email!



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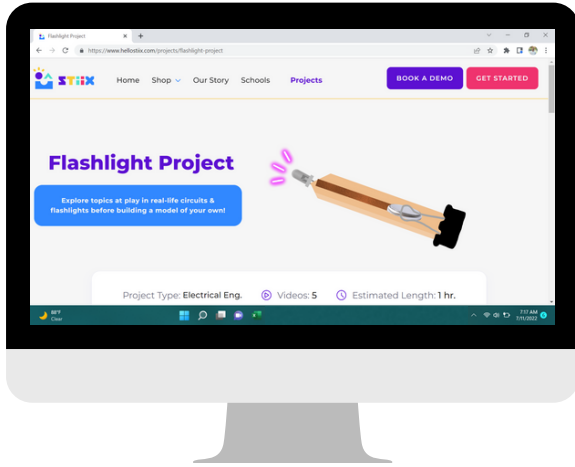
The Engineering Design Process



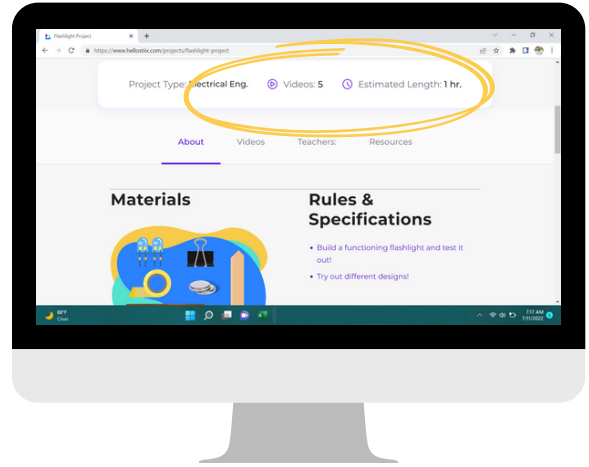
So where do I start?

In case you have not found it already, you will want to navigate to the Flashlight project page.

To locate it, click on the "Projects" tab on our website and click the  icon, or feel free to scan this QR code:



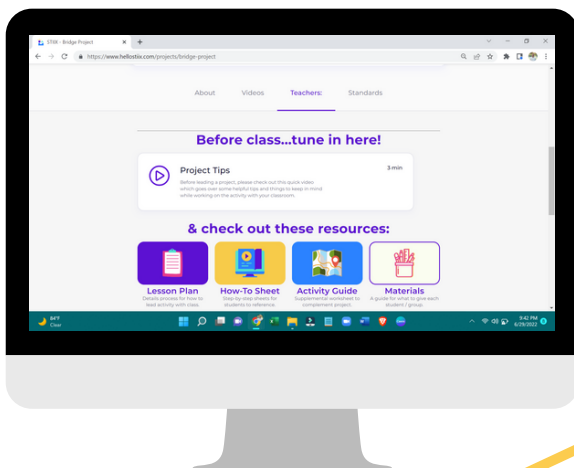
If you see this, you are in the right place



Scroll down and you will see where the project videos are housed, along with the rest of our resources for you!

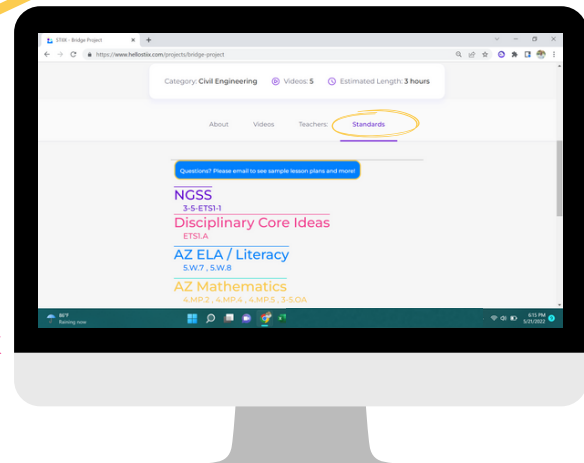
Beforehand:

Don't worry, preparation is super minimal! We want to make this as easy as possible for you!



Be sure to check out our TEACHER TIPS VIDEO that we make for each project. In them, we detail helpful insight for how to best lead the project at hand!

1.



2.

Our projects align with some of the latest national standards. Click through the 'Standards' tab to see how the content meshes with your grade band & initiatives..

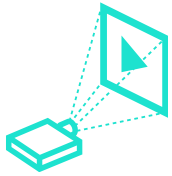
Flashlight Project Objective:

Students are to design and build a functioning LED flashlight that relies on a basic circuit model to operate. They are immersed into a story in STIIX-ville, where the power has just gone out and they are tasked to build a device to help households without backup generators be able to see at night!

Key Vocabulary

Please keep an eye & ear out for the following vocab words:
Current, Circuit, Battery, Positive/Negative, LED, Wire, Electrical Energy

The Process:



1. Project & Play Videos (10-15 mins.)

STIIX has a series of 5 videos we play for the students to introduce the project and how to go about building it.

Optional: Allow well-behaved and respectful students to be the ones who play the videos for the class

Optional: Pause when prompted to discuss the inquiry-based learning questions!

- V1 = Introduction
- V2 = Academics
- V3 = 'How- To'
- V4 = Testing & Eval.
- V5 = Industry Spotlight



2. Group up & Brainstorm (<5 mins.) (if applicable)

- *This project is not an open-ended design challenge like most of our others. which makes the brainstorm portion not quite as crucial since we have a relatively straightforward process we are following.
- Break up into teams of 1-2
- Prompt them to recollect our task
- Think of it as thinking time... talk to partners, ask questions, THINK BIG!

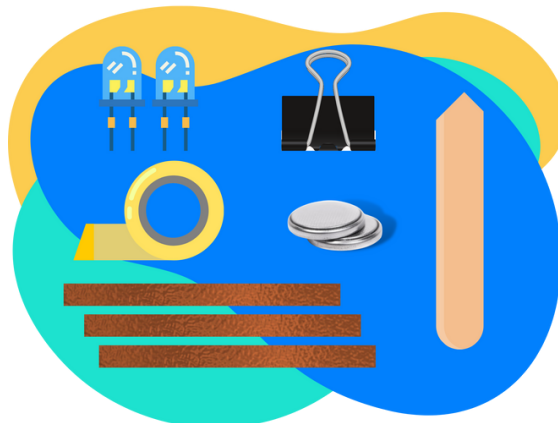


3. Pass out Materials (<5 mins.)

Take time to set out materials in an organized fashion for students before class, while videos are playing, or while they are brainstorming.

Individual Mats.

- LED lights (as needed)
 - Start with 1 or 2
- x1 Wood Stick
- x1 Binder Clip
- x1 Battery
- x2 Strips Copper Tape
- More provided if needed

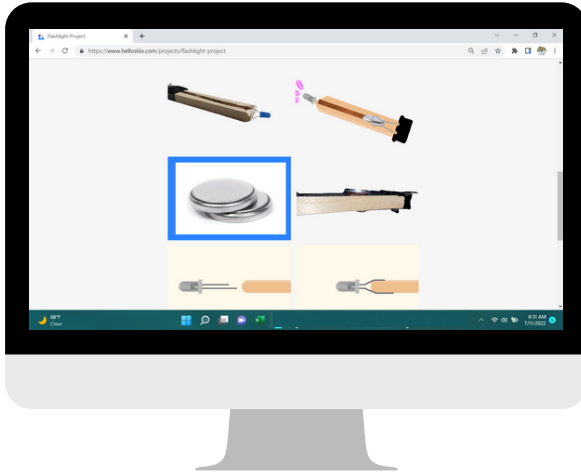


Shared / Group Mats.

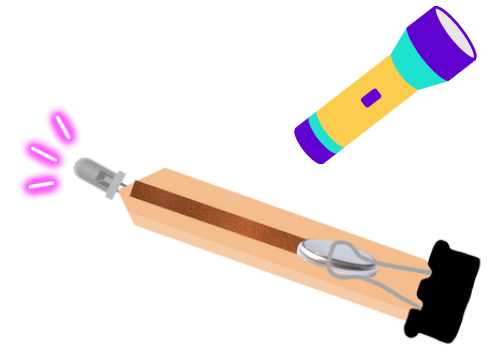
- How-To Sheets
- Tape

4. Get to Building (45 mins. - 1 hr.)

- Pass out "Step-by-Step" sheets
 - If students ask you questions, ask them if they have referenced the sheet before you answer/help them
- Optional: Leave the "Gallery" section of the project page up while students are building

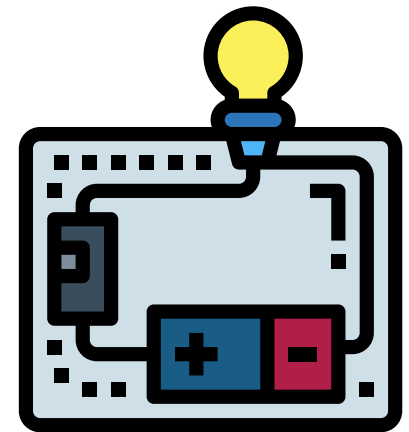
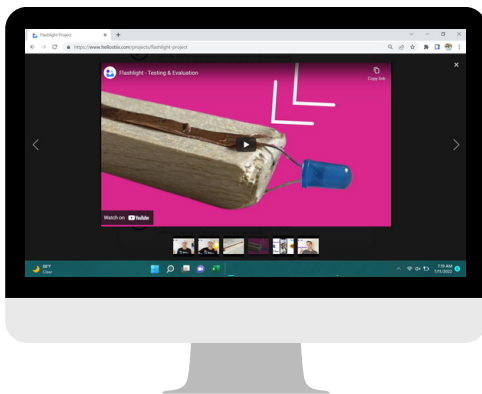


- If project will carry over into another day, have students write name on project or sheet of paper all their supplies are on.



5. Testing / Cleanup (N/A)

- Follow testing instructions per the 4th video
- Optional: Have students calculate the value of their home!
- Can also play V5 (Industry Spotlight) at the end of the project once project is wrapping up



- While other groups are finishing testing, finished groups to clean up workspace
- 'Testing' in this project, is essentially built into the build portion.
- Award the engineer of the week sticker(s)



Extension Activities:

Check out the following options to lengthen or compress this lesson.



- Work to improve project
- Try out 2 light bulbs in there
- Decorate project
- Take a close look at LED and see if you can notice the energy transfer in there
- Watch additional videos related to Circuits / Electrical Engineering



- Help students with copper tape portion.
 - Can sometimes be frustrating.

Optional Supplements:

Check out our activity guides, quizzes, and more on the project page to see if implementing those makes sense for your classroom!

Social-Emotional



Reading / Writing

Bridge Quiz/Follow Up

1. What caused all of the bridges in America to be destroyed in the 1700s?
2. What were the three materials bridges have been made of over the years?
3. What is the strongest shape in the world?
4. The purpose of a truss is
5. What is structural efficiency?
6. Write a 3-5 sentence paragraph detailing something new you learned about bridges. Also include the structural efficiency of your bridge as part of your answer:

Bridge - Activity Guide

Structural Efficiency Calculator

Weight My bridge held: _____

Weight of my bridge: _____

Structural Efficiency: _____

Task students with some reflection questions from our provided 'Follow Up Quiz', or reinforce some topics through our activity guide handouts.

Both are found in the 'Resources' tab on the project page.

RELATIONSHIP SKILLS

STIIX activities ideal for working in teams of 2-3 solving practical problems together.

SOCIAL AWARENESS

For open-ended challenges, different people have different ideas. How can we decide on the best one, or better yet, combine thoughts?

RESPONSIBLE DECISIONS

Our materials are age appropriate, but also need to be used safely and responsibly. Students' teams are counting on them to bear that responsibility and contribute.

SELF MANAGEMENT

The Engineering Design Process creates ups and downs throughout the project. How do the students handle the inevitable obstacles and victories?

SELF AWARENESS

Our projects introduce students to some of the hottest STEM career fields. Our hope is they resonate with a project and spark a passion for a future career field!

