Build a Better Pencil - K-2 Grades

Session 1

In this engineering design lesson, students will take an ordinary pencil, identify the problems with it, and go through the engineering design process to create a pencil that is new and improved!

Session 2 (Optional)

In session 2 of Build a Better Pencil, students will practice their presentation skills by presenting their pencils to the class and Ms. Lisa. Students will show their newly designed pencils and identify what problems they fixed and how they fixed those problems.

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Engineering Design

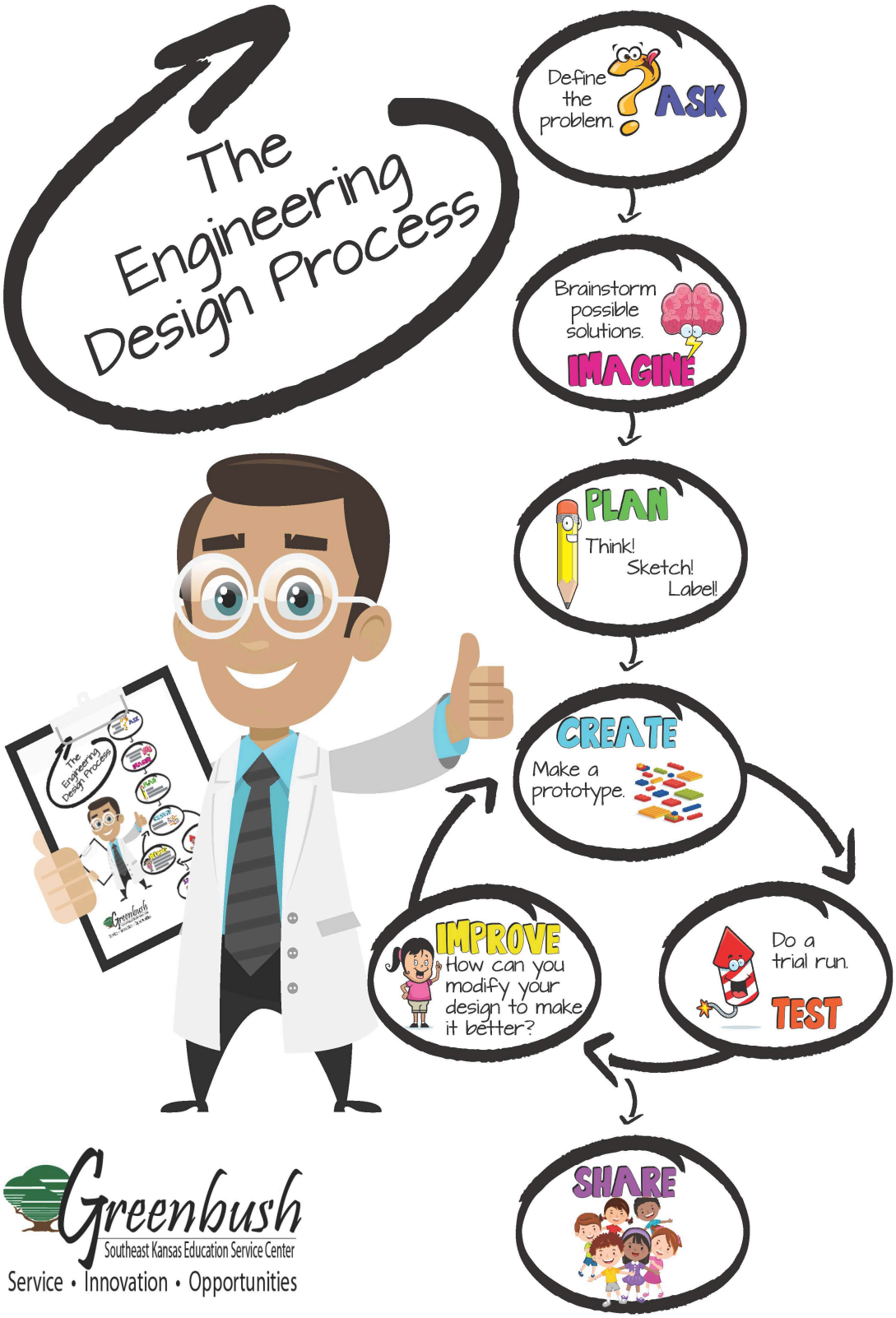
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

You will need to provide the following supplies for this lesson:

- New pencil - 1 per student
- Miscellaneous supplies that students could use to improve their pencils. Please don't go out and purchase anything. Students are creative and will find uses for about anything that you provide them. Here are some examples of things we have used for this lesson: pipe cleaners, cotton balls, balloons, Kleenex or paper towels, paper clip, rubber bands, pieces of foil, yarn, magnets, or anything else that you have in your "junk" cabinet.
- Students will need access to glue or tape
- 1 piece of plain white paper/student

Teacher preparation prior to the lesson:

- Create an area in your classroom where students can come to pickup supplies to improve their pencils. If that isn't an option because of social distancing in your classroom, alternatively you can create zip-loc bags for each student containing a variety of supplies. Whatever works best for you, works for me!
- Make copies of student sheets included in this packet - Engineering Design Process and Test Your Pencil - 1 copy per student (front and back is fine to save paper)


The Engineering Design Process
Define the problem.
ASK
Brainstorm possible solutions.
IMAGINE
PLAN
Think!
Sketch!
Label!
CREATE
Make a prototype.
Do a trial run.
TEST
IMPROVE
How can you modify your design to make it better?
SHARE
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Test Your Pencil!

Use your regular pencil to write your name on the line:

Use your newly improved pencil to write your name on the line:

Write a sentence using your regular pencil.

Write a sentence using your newly improved pencil.

Draw a small picture with each pencil in the space provided.

Which pencil do your prefer? Why?

Program Connection Information

Please use an external microphone (conference style) rather than the integrated one in the computer for the audio for your class and locate it centrally in the room. It can be difficult for the Greenbush teacher to hear the students using the computer microphone and therefore it reduces the interactive nature of the lesson. It is fine to use the computer webcam for your video source.

All classes will take place using Zoom desktop video. If your building is already set up to use a desktop video application with a computer, simply open a browser and enter https://greenbush.zoom.us/j/2326746414 in the URL space. You may need to download Zoom launcher software (free download) if you don't already have it. This needs to be done in advance of the lesson.

If using a Polycom video conferencing unit (or any legacy type video conferencing unit) to connect to a ZOOM conference, make sure the unit is in "encrypted mode" then dial the following IP on the internet: 162.255.37.11 or 162.255.36.11 and once connected, they will ask for a MEETING ID: enter 232 674 6414 (for Lisa at Science Center).

It's always a good idea to touch base with your district technology facilitator prior to your program to make sure all systems/equipment are in place and operational and that there aren't any firewalls in place that might prevent you from connecting to Zoom.

Once you connect, you will enter a Zoom waiting room. Your Greenbush teacher will admit you into the final meeting room.

If you have any questions, please contact Lisa Little at lisa.little@greenbush.org