



SCAMPER

Lesson Overview

In this lesson, students will look at a variety of objects (both familiar and unfamiliar) in different ways. They will repurpose the objects by adding materials, subtracting from the designs, and thinking of different uses for the objects. This lesson is important in introducing your students to brainstorming, thinking outside of the box, and using household items in different ways, skills which may help them in the creation of their invention. In addition, students can draw a model of their repurposed item, build this item, and create a business plan to advertise their new item.

Lesson Objectives

Students will be able to:

- Describe and apply the brainstorming process.
- Analyze an object and repurpose it, add to it, and subtract from it.
- Draw models for the new items they create.
- Build a prototype of an idea they generate from SCAMPER.
- Create a marketing plan for their repurposed item, thinking about cost, target market, and how to advertise.

Materials

- PowerPoint
- Chalkboard/wall or online space to record brainstorming
- Worksheets
- SCAMPER items
- Building supplies (recycled materials, cardboard, paper, tape, glue, etc.)

Learning Plan

Classroom Lesson:

Warm Up (10 minutes)

Begin by choosing an item to SCAMPER that is familiar to your students (rubber bands, pencils, erasers, something simple and handheld). Make sure you have enough of this item for the students to hold and explore while SCAMPERing.

Do not hand out the SCAMPER worksheet yet. Show students an item they use every day (paper clip, pencil, backpack, notebook,

Virtual considerations:

Items

Teacher can show one object to the entire class in an online meeting.

Teacher can circulate students through breakout rooms with different objects.

etc.). Have them work individually to brainstorm ways they could change this item or different ways they could use the item. The objective here is that they will not have many ideas working by themselves and without guidance (prompts) on how to think outside of the box. SCAMPERing provides more guidance, and SCAMPERing in groups helps individuals obtain more ideas. Explain this to your students when your individual brainstorming session is over (after 4-5 minutes).

Once your students are familiar with SCAMPER, use objects they do not know. You can use models and pictures, instead of items. Have students SCAMPER individually or in groups. You can continue this process of finding new objects and new uses for these objects on a regular basis.

Invention Involves Brainstorming and Thinking Outside of the Box (15 minutes)

Explain to your inventors that the process of invention involves looking at things differently and frequent brainstorming. Explain that brainstorming helps us identify problems, find solutions, think about materials for our invention, come up with different ways to test our invention, and more. It helps with everything!

Discuss how invention also involves thinking outside of the box, looking at things differently. This helps us figure out how to solve a problem, use everyday items in different ways, and use materials differently when building our invention.

SCAMPER (30 minutes)

Using the same item you used in the Warm-Up, go over SCAMPER with your students. Review what SCAMPER stands for. Teach the vocabulary in a separate lesson or go over the vocabulary while doing SCAMPER. Do a class brainstorm of one of the letters, and then have students work together to complete the rest of the SCAMPER worksheet. Encourage crazy ideas, make sure everyone's ideas are valued, and remind students that we are not laughing at or making fun of any ideas. You can have your students choose an item on their own to SCAMPER or move onto the next activity.

Engineer Your New Item (45 minutes)

If there is time, have students choose their favorite new item and draw a model of what their new item would look like, labeling possible materials, parts, and functions. Students can build a prototype of their new SCAMPERed item, if time allows.

Students can iterate on their design. They can have others use it and offer feedback or perform tests on their new product. Have students rebuild or make modifications as necessary.

Marketing Plan (30 minutes+, with presentations)

Whether the students draw or build their new idea, they should create a marketing plan for their "product", thinking about cost, target market, and how they would advertise. They should draw a one-page advertisement for their product. If time allows, groups could present their new products to the class.

Students can choose objects from their house to either work on by themselves or to present to the class for them to brainstorm problems.

Worksheet

Write on SCAMPER worksheet/write online.

Write on PPT with SCAMPER embedded.

Student creates on PPT with each letter and their ideas, images.

Use Google Keep, where students can find an image of item, write SCAMPER ideas, and draw their solution.

Use a virtual post-it notes virtual board, such as Nearpod, Google Jamboard, Miro, Lucidchart, or Stormboard.

Students can draw their solution online using Autodraw, Nearpod, Google Drawings, or Sketchpad.

Students can draw their model on paper and take a picture to share with the teacher or peers.

Discussions

Host whole class discussions on an online meeting.

Share ideas through chat on video meeting platform.

Students present their PPTs of ideas. Students gallery walk through their peers PPTs.

If you are looking for an example of a product's pitch, show this short clip from Shark Tank with two young inventors.

<https://www.youtube.com/watch?v=y5nmwuu6RX0>

Closure/Exit (10 minutes)

Hold a class discussion about how your students came up with more ideas using SCAMPER over free brainstorming. Ask how might this activity lead to invention. Question how students could use this technique in real life.

Assessments

- Class and group discussions
- SCAMPER Worksheet
- SCAMPER Marketing Plan
- SCAMPER Self-Assessment
- Lesson rubric

Content Standards

Next Generation Science Standards:

NGSS.3-5-ETS1-1

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

NGSS.3-5-ETS1-2.

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

NGSS.MS-ETS1-1

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

NGSS.MS-ETS1-2.

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

NGSS.MS-ETS1-4.

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Science and Engineering Practice 1

Asking questions and defining problems.

Science and Engineering Practice 2:

Developing and using models

Science and Engineering Practice 3:

Planning and carrying out investigations

Science and Engineering Practice 4:

Analyzing and interpreting data

Science and Engineering Practice 6:

Constructing explanations (for science) and designing solutions (for engineering)

Science and Engineering Practice 8

Obtaining, evaluating, and communicating information.

Common Core ELA Standards:

CCSS.ELA-Literacy.SL.3.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.SL.3.4

Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

CCSS.ELA-Literacy.SL.4.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.SL.4.4

Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

CCSS.ELA-Literacy.SL.5.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.SL.5.4

Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

CCSS.ELA-Literacy.SL.6.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.SL.7.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.SL.8.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-Literacy.L.3.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.L.4.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.L.5.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.L.6.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.L.7.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.L.8.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-Literacy.W.3.2

Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-Literacy.W.3.10

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-Literacy.W.4.2

Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-Literacy.W.4.10

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-Literacy.W.5.2

Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-Literacy.W.5.10

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-Literacy.WHST.6-8.10

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Common Core Math Standards:

CCSS.MATH.PRACTICE.MP1:

Make sense of problems and persevere in solving them.

CCSS.MATH.PRACTICE.MP2:

Reason abstractly and quantitatively.

CCSS.MATH.PRACTICE.MP5:

Use appropriate tools strategically.