



AFTER SCHOOL ACTIVITY PLAN

SESSION 2: Problem Solving

LESSON OVERVIEW

In this lesson, students will understand how inventions solve problems and use this information to identify their own problems. They will apply creative approaches, critical thinking and analysis to develop solutions to solve these problems.

OBJECTIVE

Students will be able to combine techniques of creative and critical thinking to approach problems and consider possible solutions.

MATERIALS

- YIP Inventor's Journals
- Videos: History Channel's Time Out: *The Origin of Ice Cream Cone*.
<https://www.youtube.com/watch?v=7OcfzMIZsxA>, (2:56 minutes)
- Ice Cream Cones (one per student) or you may use a kitchen utensil or household object (one or two for the class is enough)
- SCAMPER Worksheet
- Craft supplies (glue, scissors, tape, cardboard, construction paper, modeling clay, etc.)
- What's the Problem Worksheet (included in YIP Inventor's Journal)
- Pens/pencils
- Notebook or other paper for writing and drawing

Teacher/Leader Preparation:

- Print SCAMPER Worksheets for students
- Set up AV/media device for video
- Gather all craft supplies and set up for students to access

TEACHER/LEADER TIPS

Remind students to continue to use their YIP Inventor's Journals during every session. You may choose to let students take home their journals or not. If you choose to keep them and students do work on their inventions at home, they may record their notes and activities on separate pages and insert them into the journal later.

Note: *Logbooks of some kind are required for submission to the Northern New England Invention Convention and the Invention Convention US Nationals.*

For the SCAMPER activity, if you prefer not to use a food item (ice cream cone), you may choose to use a common household object, such as a spatula or a whisk, as the object to SCAMPER. If using objects, you may bring in several to share with students or just use one as an example for the entire class.

Finally, if you allow students to complete invention projects in pairs or teams, select the teams today. YIP encourages collaboration and welcomes teams to invent. Students may work in pairs or groups and students do not have to be in the same grade (they will compete in the grade level of the highest grade). All team members must participate in the development of the invention and should keep their own YIP Inventors Journal or invention logbook.

**Note: Only teams of two (2) students are allowed to present the Northern New England Invention Convention and the Invention Convention US Nationals. If a team is larger, two students may be selected to represent the teams at these competitions.*

INSTRUCTION & ACTIVITIES

Teacher may lead the following lesson plan with flexibility to adapt as needed to fit technology and class format:

Teacher Instruction:

Last week we talked about inventions, what they are and how they come to be things we use every day. But how do inventors come up with their ideas? It's not always easy, but really, they just look carefully at the world around them and figure out what really bothers them and then they begin to brainstorm how they might solve that problem. Or sometimes, invention ideas come out of necessity. The inventor needs to do something efficiently or better and so they create a solution.

Let's watch how one invention that I am sure you all know was born...out of complete necessity.

Share video: History Channel's Time Out: *The Origin of Ice Cream Cone*.

Link: <https://www.youtube.com/watch?v=7OcfzMIzSxA>, 2:56 minutes

What did you think?

Allow students to share comments for 1-2 minutes.

Inventing out of necessity can be easy, but how are you going to come up with your invention idea? Well, one way to brainstorm is to use a method called SCAMPER. It helps you focus your thinking on specific areas to help you narrow things down.

Activity: SCAMPER Brainstorm

Let's try SCAMPERing with an ice cream cone (alternatively, you may use a kitchen utensil or other object from home).

Optional: Distribute ice cream cones to each student. Ask them to hold the cone and examine it as you go through the steps of SCAMPER. Prompt with questions as they brainstorm. You may also choose to put students in groups of 3-4 to do this. Give them some paper to write things down and draw ideas in addition to using the SCAMPER worksheet.

1. In SCAMPER brainstorming, each letter in the word SCAMPER helps you think of an approach to looking at what you are trying to solve. With the ice cream cone, how can we make an invention

based on the ice cream cone? Can we improve the cone? Or could we look at a totally different use for the cone- so it can be used for something other than eating ice cream?

2. Distribute the SCAMPER worksheet to students. On it you will see each letter for SCAMPER and how it asks you to think about your ice cream cone.
3. Independently (or in your groups), write down your ideas. You do not have to write something down for each letter, maybe just 2-3 letters.
4. **Optional for more hands-on creative work:** Provide students with supplies such as construction paper, paper clips, pipe cleaners, popsicle sticks, markers, string, scissors, tape, glue, etc. Allow students some time to modify their ice cream cone into their new idea.
5. After 5-6 minutes, bring students back together to share. You may allow students to eat their cones! (If they made a model of their idea, you may give students a fresh cone to eat.)

You have just completed a brainstorm. This method can be used as you approach your own invention project.

Teacher Instruction:

Next, we are going to continue identifying problems to get more practice and maybe to even find the problem you are going to solve for your project (*Students may already have ideas for a project which is fine, but for those looking for help, this activity will support them.*)

Activity: Identify and Define a Problem

Now it's your turn to identify and define a problem. You may already have a problem in mind. But if not, now is a time when you can work together to identify some problems. Talk to each other about some of your ideas.

1. Use the What's the Problem worksheet in your YIP Inventor's Journal to list your thoughts. (Students may have already interviewed family and friends as a take home activity in Session 1. If this is the case, move on.)
2. Once you have a few ideas, you can start to think about some ways you may solve these problems. Use the What's the Problem worksheet in your journal to brainstorm. Write down and/or draw all the possible ideas of inventions you could make. Consider your audience (who will use it, who will it benefit), and then explain what problem this invention will help solve or how it will improve life in some way. If you need to use SCAMPER, remember that it is a good problem solving tool.
3. Allow students time to think and brainstorm and then have a sharing session. Remind students to take notes about any feedback or suggestions they hear from their classmates and new ideas they develop on their own.

Note: If you have time, you may continue. If not, this next section is included at the beginning of Session 3: Planning Your Invention.

Narrow your invention project idea selection to 3 choices and circle them on your worksheet. Next, think about how realistic your ideas are. Can you build a model (the model does not have to work, but should be a visual representation of your idea)? Is your idea doable? Use the check lists on the What's the Problem worksheet to help you. Finally, consider which idea you think will make the best invention project for you to do. Circle it and write it down on the worksheet. This will become the idea for your own invention project that we will be working on for the next several weeks in our class.

If you are having trouble thinking of something to invent, or if you just want a challenge, you can also take the YIP Challenge. This year's YIP Challenge is Weather or Not? Create an invention that will help solve a problem related to our weather. Tools to help us manage or predict weather, keep us more comfortable in different weather, or to help with climate and weather-related challenges. The sky's the limit in this weather focused challenge.

In our next session we will finalize our ideas and invention plans.

Teacher Instruction:

I hope this gave you some ideas. Now it's time to think of your own invention project that we will work on for the next several weeks in the Young Inventors' Program. If you would like to work in pairs/groups, you may. But you should decide that today.

When we meet again for YIP, you will need to have an idea for an invention.