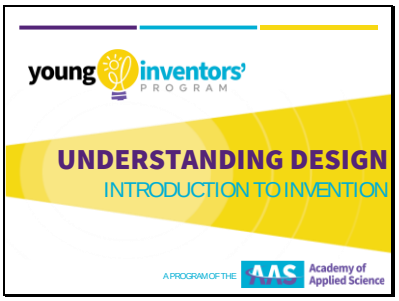
LESSON 1:
Understanding Design

Lesson Script

THIS SCRIPT IS TO BE USED AS A GUIDE TO ACCOMPANY THE SLIDE DECK FOR THIS YIP LESSON FOR PRESENTATION IN PERSON OR VIRTUAL (SYNCHRONOUS OR ASYNCHRONOUS-PRE-RECORDED).

TEACHER MAY ADD SPECIFIC GREETINGS AND COMMENTS AS NEEDED AND MAKE CHANGES TO MEET CLASS NEEDS USING THE LESSON PLAN IN THE YIP CIRRICULUM.



[TEACHER MAY MODIFY INTRODUCTION TO LESSON AS NEEDED.]

Welcome to the Young Inventors' Program! Our class is about to embark on an invention journey that will allow you to explore, create and design your very own unique invention. Our school has been doing YIP for many years along with schools and programs around NH, MA, VT and the rest of the US. Each year, we conclude our program with a showcase, an Invention Fair, where you can show off your inventions to your families and the school. And, several inventions will be selected to move on to the Northern New England Invention Convention, and from there, some may be invited to the Invention Convention US Nationals.

Today is our first activity to introduce us to YIP and the world of invention. For the next few weeks, we'll continue to learn and build our own inventions.

So let's begin.

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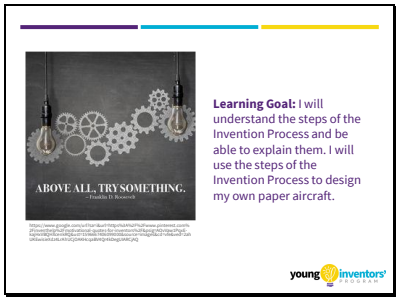
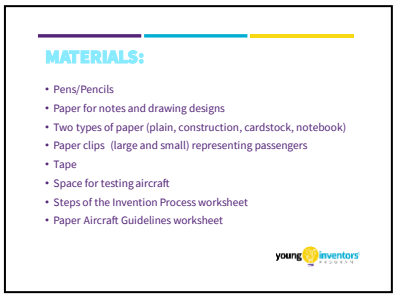


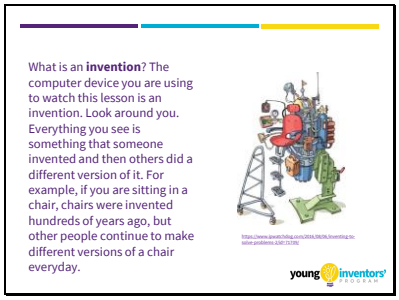
Today we are going to cover YIP Lesson One: Understanding Design. By the end of this lesson, you will understand the steps of the Invention Process and will be able to explain them to someone at home. You will also have a chance to practice the steps as you build your own paper aircraft.



Before we start, you will need the following materials.

- Pens/pencils
- Paper for notes and drawing designs
- Two types of paper (printer, notebook or construction) for aircraft
- Paper clips (large and small) representing passengers
- Tape (if using small objects listed above)
- Space for testing aircraft
- Steps of the Invention Process worksheet
- Paper Aircraft Activity Guide worksheet (*Note: Differentiated worksheets for Grades K-3 and Grades 4-8.*)

IF PRE-RECORDING YOU MAY SAY:
If you want to pause the video while you collect your things, go ahead and press Pause. Then hit Play when you are ready.



So what exactly is an invention and how do inventions come to life? Look around you. Everything you see is something that someone invented and then others did a different version of it. For example, if you are sitting in a chair, chairs were invented hundreds of years ago, but other people continue to make different versions of a chair every day.

An invention is a new thing that someone has made.

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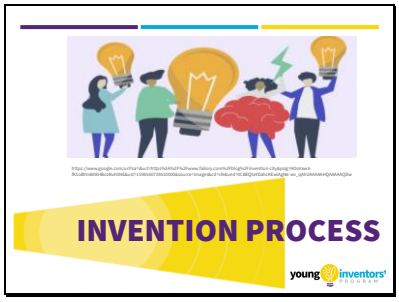
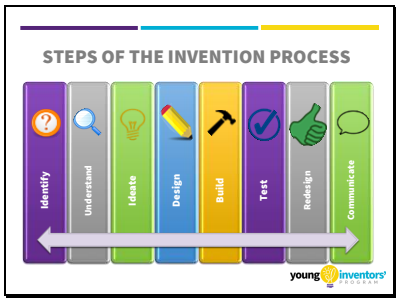


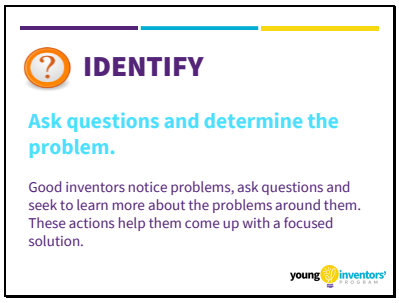
All new things, all ideas have an originator, an inventor, of sorts. And, all of these inventors follow the same basic process to turn their ideas into something real- a product. This is called the Invention Process. Most inventions are the result of the stretch from *what is* to *what might be*. If it doesn't feel easy to invent, that is OK!



Like most activities we do, invention has steps or a process that most inventors follow in some way as they develop their original ideas and turn them into something real.

You can see that there are 8 steps. And in invention, sometimes we will find that we go back a step or two and repeat one or several of them before moving forward again.

Let's go over the steps together.



Step 1: IDENTIFY – Ask questions and determine what the problem is

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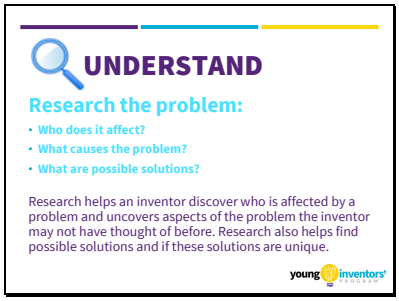
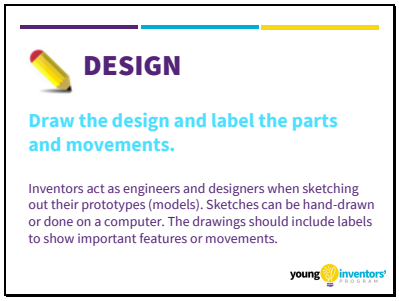


Step 2: UNDERSTAND- Research the problem fully. Who does it affect? What may cause the problem? What might be possible solutions?

Step 3: IDEATE- Use creative problem-solving to turn an idea into a solution.



Step 4: DESIGN- Sketch a drawing of the solution and its design. Label the parts.

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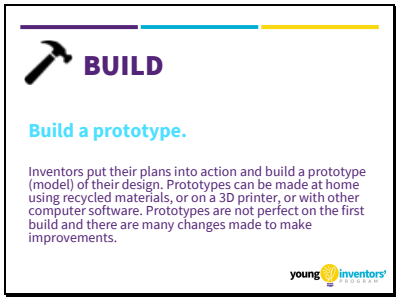
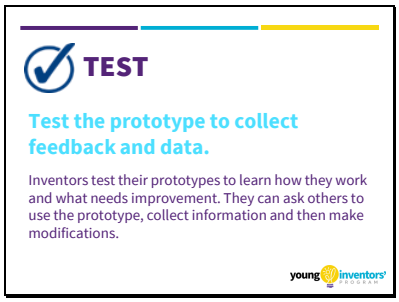
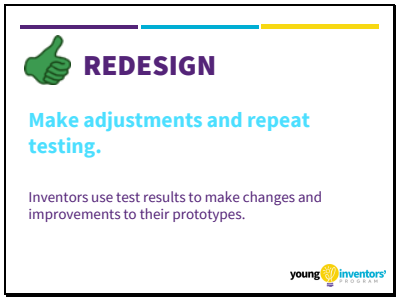


Step 5: BUILD- Put your plans in action and build a model (also called a prototype).



Step 6: TEST- Test the model to collect data and receive feedback.



Step 7: REDESIGN- Make adjustments and improvements to the prototype. The Test and Re-Design steps may repeat several (or many) times until you are satisfied with the results.

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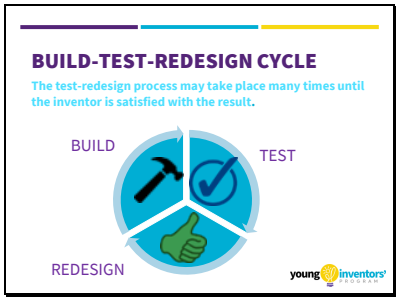
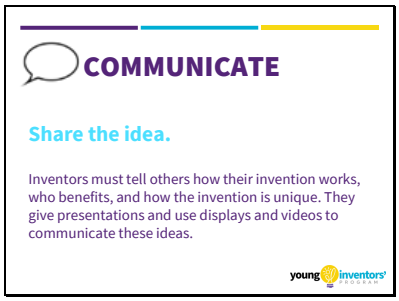


A key part of invention is this cycle of building-testing-and-redesigning your invention. Testing allows inventors to see what is working and what can be improved. Inventors sometimes go through many, many build-test-redesign cycles in their invention process. Often times, the more tests and re-designs you do, the better your final invention will be.



Step 8: COMMUNICATE- Present your idea and your solution.

Jessica O. Matthews had a unique idea: turn a soccer ball into a battery that powers lights for people in the developing world. Her story shows how an ordinary object can be transformed to address a need and improve people's quality of life.
Let's watch a video from The Henry Ford's *Innovation Nation*: Soccer Ball That Generates Energy

[PLAY VIDEO] (3:50 minutes).
Link: https://www.youtube.com/watch?v=0gifXci-FUk

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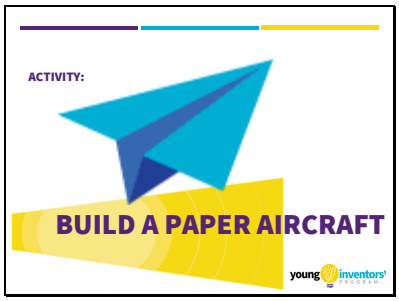
Wow! What an inspiration Jessica is to all of us. What steps of the invention process were highlighted in the video? How did Jessica approach them?

STUDENT PROVING BEHAVIOR ACTIVITY:
NOW IS A GOOD TIME TO INSERT ONE OF THE RECOMMENDED STUDENT PROVING BEHAVIOR ACTIVITIES FROM LESSON 1 PLAN INTO THE LESSON. STOP SLIDES AND/OR SCREEN SHARE TO LEAD ACTIVITY. BEGIN SLIDES WHEN READY TO RESUME.

NOTE:
IF IN-PERSON OR SYNCHRONOUS RECORDING, STOP SLIDES TO LEAD STUDENT PROVING BEHAVIOR ACTIVITY. BEGIN SLIDES WHEN READY TO RESUME.

IF PRE-RECORDING, TEACHER MAY WISH TO ASK STUDENTS TO PAUSE THE VIDEO WHILE THEY COMPLETE A STUDENT PROVING BEHAVIOR ACTIVITY. WHEN READY, THEY MAY RESUME VIDEO.



Now that you know the steps of inventing, it's time to put your new knowledge to use. Today, we're going to practice these steps as we design and build our own prototype.

Use the Paper Aircraft Activity Guide worksheet as we complete this together.

You will need a pen/pencil and paper to take notes and draw your designs, two types of paper for your aircraft models, paper clips (large and small) or other items that can attach to your paper aircraft to represent the passengers, tape, and space to fly your aircraft.

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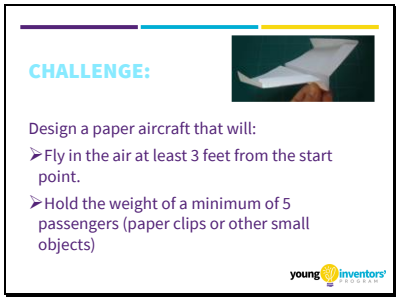
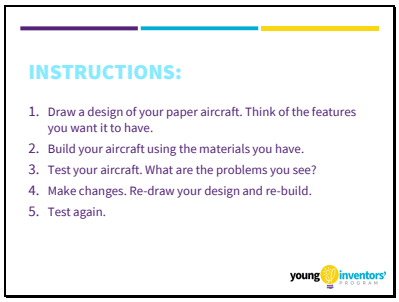


Our challenge today is to design and build a paper aircraft that will

- Fly in the air at least 3 feet from the start point
- Hold the weight of a minimum of 5 passengers (paper clips or other small objects)

NOTE:
FOR STUDENTS IN GRADES K-3, TEACHER MAY WANT TO CONCENTRATE ON BUILDING A PAPER AIRCRAFT THAT CAN FLY AT LEAST 3 FEET. FOR OLDER STUDENTS, TEACHER MAY WANT TO ADD MORE CHALLENGE AND ASK STUDENTS TO BUILD AN AIRCRAFT CAN HOLD AT LEAST 5 PASSENGERS (PAPERCLIPS). TEACHER MAY INCREASE THE MINIMUM DISTANCE TO FLY FOR ADDITIONAL CHALLENGE AS WELL.



To complete the challenge, you will first draw a picture of what you want your aircraft to look like. Think about special features you want it to have to meet the challenge. Then, you will build your aircraft using the materials you have. The next step will be to test the aircraft. Find some open space and let it fly. What works? What problems do you see? You may need to fly it several times to try to figure out what may be keeping your plan from doing what you want it to do. Then, make changes. Can you fix something or redesign the aircraft to be more successful? Rebuild your new design. Finally, test it again. You can go through this process several times until you are satisfied with your results.

NOTE:
TEACHER MAY WISH TO PAUSE THE SLIDES TO ALLOW STUDENTS TO WORK INDEPDENDENTLY OR IN GROUPS. TEACHER MAY ALSO CHOOSE TO SHOW AN AIRCRAFT THEY HAVE ALREADY MADE OR DESIGN AND BUILD ALONG WITH STUDENTS AS AN EXAMPLE. WHEN READY, RESUME SLIDES.

IT IS RECOMMENDED THAT TEACHER MAKES SURE STUDENTS HAVE NOTES AND A DRAWING OF THEIR AIRCRAFT DESIGN BEFORE DISTRIBUTING MATERIALS AND ALLOWING STUDENTS TO BUILD THEIR AIRCRAFT MODELS.

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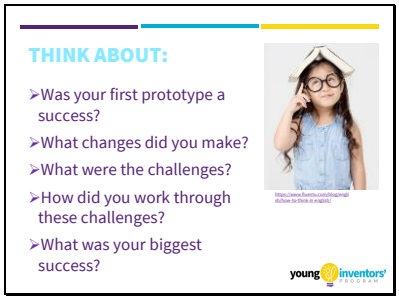
IF TEACHING IN-PERSON OR SYNCHRONOUS RECORDING, TEACHER MAY LEAD STUDENTS THROUGH EACH STEP OUTLINED IN THE PAPER AIRCRAFT ACTIVITY GUIDE AND ALLOW TIME FOR STUDENTS TO WORK AND SHARE AS THEY GO BEFORE MOVING TO THE NEXT STEP. BEGIN SLIDES WHEN READY TO RESUME.

IF PRE-RECORDING, TEACHER MAY REMIND STUDENTS OF THE STEPS OUTLINED IN THE PAPER AIRCRAFT ACTIVITY GUIDE AND THEN ASK STUDENTS TO PAUSE THE VIDEO WHILE THEY WORK INDEPENDENTLY. WHEN READY, THEY MAY RESUME VIDEO.



Before we end today, think about the following questions and then, talk about these ideas:

- Did you meet the challenge- fly 3 feet and/or hold 5 passengers?
- Was your first prototype a success? How did you decide what to change and improve in your original design?
- Did you get feedback from anyone in the process? How did you use this feedback? What did it feel like to get feedback?
- How many times did you test and re-build? Was this enough or did you need more testing?
- What were your roadblocks during the Invention Process?
- What was the most challenging step of the Invention Process? Why? How did you work through it?
- What would you do differently if you were asked to do this activity again?
- What was your biggest accomplishment?

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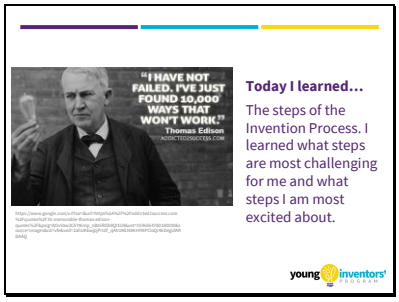

This ends our very first YIP Lesson: Understanding Design. I hope you had as much fun as I did. Next time we'll take a look at Problem Solving.

NOTE:

TEACHER MAY CHOOSE TO CLOSE THE LESSON BY GIVING A RELEVANT ASSIGNMENT OR ASKING STUDENTS TO REFLECT ON THE ACTIVITY. SEE THE YIP LESSON 1 PLAN FOR SUGGESTIONS.