

Lesson 3: Design a New Product

Summary

Grade Level: 6–12

Teams of students work cooperatively to choose the ten greatest inventions from a list of likely candidates and compile the list in a graph. Teams of students work cooperatively to design, invent, and build a model of something new, useful, or decorative to solve a problem using any combination of materials provided.

State of Wisconsin Academic Standards

Fine Arts, Language Arts, Science, Social Studies

Objectives

- Discern and discuss the importance of inventions and criteria for significant inventions
- Survey problems that need solutions
- Work in cooperative groups to develop a solution/invention
- Design, invent, and create an invention model to solve a problem
- Understand the invention process and apply problem-solving, critical thinking, and creative thinking skills
- Organize and present information about their product in a logical format to the class

Materials Needed

- *Briggs and Stratton Diesel Motor Model*
- 2-liter plastic soda bottles, egg cartons, cardboard, toilet paper and paper towel rolls, wire, plastic and paper drink jugs and cartons, straws, yarn/string, tape, hot glue and glue guns, rubber bands, dowels, coping saws, Styrofoam, scissors, rulers, pencils, markers, paint and brushes, stapler and staples, etc. for making the inventions

What to Do

Discuss with the students that some inventions are so earth-shaking that they merit their own age: the Bronze Age, the Machine Age, the Golden Age of the Automobile, the Space Age, the Computer Age. Other inventions are important because they are ubiquitous: television, clothing, paper, electric power. Still other inventions have the distinction of antiquity: the wheel, pottery, bricks, the alphabet, and so on.



Briggs and Stratton Diesel Motor Model

What makes an invention great? Either provide groups of students with a single criterion, to make the exercise easier and more concrete, or generate a list of criteria through the discussion, such as:

- Makes people's lives easier
- Brings happiness
- Saves lives
- Saves people from boring or hard work
- Advances science or technology
- Has been used for a long time by many people

Discuss with the students if all these criteria are equally important or if some matter more than others. Divide the class into teams and give the teams a few minutes to discuss or decide on criteria for a great invention, then allow time for the teams to write a list of the ten all-time most significant inventions.

Have the students compare lists and discuss some of the issues that arose. Why did groups include or omit certain inventions? Are newer inventions (printing press, typewriter, computer) greater than old inventions (ink, paper) or vice versa? Old inventions were more directly connected with basic human survival: better farming, housing, and clothing, for examples. But new inventions may affect more people at a faster rate because of global connectedness.

Is it more important to know where you are (compass, map) or what time it is (clock, sundial)? Are diversions (baseball game, movies) ever as important as inventions associated with basic human needs and/or survival (water pumps and water filtration, refrigerator, microwave)?

Have the students interpret and graph the data with a simple bar graph showing which inventions were listed most often by the groups. A more extension graph can weigh the inventions by their ratings by converting the ranking into a point system. For example, a “1” ranking earns ten points, a “2” ranking earns 9 points, and so on. Total the points for each invention and divide the totals by the number of times each invention appears on the lists; graph the inventions by their average scores.

Using the *Briggs and Stratton Diesel Motor Model* as an example, review with the students the following regarding creating an invention or innovation.

When you see an invention and think about how you can make it better, you have created an idea for an innovation. You can innovate any invention with your own creativity. Consider these steps:

Find a Problem

- List 10 things in your life that need fixing or improving.
- Pick one that interests you most

Think of Crazy Solutions

- Think small, think BIG, think of CRAZY ways to solve the problem.
- There are probably loads of ways to solve the problem, so make another list.

Choose a Solution

- Pick the one that seems most do-able.
- Decide what tools and resources are available to you.

Plan It Out

- Make a sketch or diagram and/or model.
- Write out the steps to complete the plan.

Make It

- Build or carry out your invention.
- Decide if you need other resources.
- Remember to be flexible and not to get discouraged.
- Try different approaches until you find the one that works!

Test It

Does it work? If yes, congratulations! If not, think about what needs improvement and try again.

- Begin by asking the students to conduct a survey. Tell them to interview everyone that they can to find out what problems need solutions. What kind of invention, tool, game, device, or idea would be helpful at home, work, or during leisure?
- Ask the students to list the problems that needed to be solved. Using the list of problems, ask the students to think of which problems would be possible for them to work on. They can do this by listing the pros and cons for each possibility.
- Predict the outcome or possible solution(s) for each problem. Make a decision by selecting one or two problems that provide the best options for an inventive solution.
- Divide the students into teams to work on creating an invention to solve the problem. Encourage the students to think of many, varied, and unusual ways of solving the problem they have chosen. They should list all of the possibilities on a piece of paper. After they have developed a list, have the students select one of the possible solutions to work on as a team.
- Consider having the students record their ideas, how they got the ideas, any challenges and how they solve them, a list of materials used, sketches of ideas, and work progress in a journal. Encourage the students to think about and record their responses to the following questions:
 - Is the idea practical?
 - Can it be made with the materials provided?
 - Is the solution/invention as simple as possible?
 - Is the solution/invention safe?
 - Will the invention cost too much to make or use?
 - Is the idea really new?

- Will the invention withstand use, or will it break easily?
- Is the idea similar to something else?
- Will people really use the invention?
- When the students have an idea that meets most of the above qualifications, have them plan how they are going to complete their invention and allow time for them to complete the model.
- Encourage the students to name their invention. Inventions can be named in one of the following ways:
 - Using the name of the inventor(s);
Example: Levi Strauss = LEVI’S® jeans
 - Using the components or ingredients of the invention;
Examples: root beer, peanut butter
 - Using initials or acronyms
Examples: IBM® or S.C.U.B.A.®
 - Using word combinations with repeated consonant sounds and/or rhyming words;
Examples: KIT KAT®, HULA HOOPS®, PUDDING POPS®, CAP’N CRUNCH®
 - Using the product's function; Examples: SUPERSEAL®, DUSTBUSTER®, vacuum cleaner, hairbrush, earmuffs
- Have the students present their invention models to the class. Presenters give information about what problem the invention solves and how it solves it, the name of their inventions, and what they would change or improve if they were to make another model for the same problem.

Teacher Options

- Have students create advertisements about their products and present the products to the class.
- Visit the local newspaper, or have a paper's advertising manager come into the class to speak to the students about advertising products.
- Visit a local manufacturing company to see how products are developed.
- Ask students to imagine life without one of the great inventions discussed in class. Who would suffer most? Would anyone benefit? Can something else take its place? Have the students choose an invention from the class compilation and write a diary entry of a typical family on a day without the invention.