



Children's Museum of Houston

Pre/Post Classroom Activities

Pre-Visit Activity 2: Let's Invent

Introduction

To invent something a person must look backwards and forwards. One must carefully analyze the problem behind them and then come up with a solution in front. Invention takes creativity, drive, and the ability to plan, build, test, and document ideas. This activity will let students apply these skills by creating an invention to solve a classroom problem.

Explain to the students that as a class you are going to explore the five major steps involved in creating an invention. Divide class into groups of 3-4 students and distribute face down the pre-cut cards from Blackline Master C. When each group has a set of cards, challenge them to flip them over and work together to put them in the correct order as quickly as possible.

When every team has completed the task, reveal the correct order of the steps to the invention process:

1. Get an Idea
2. Make a Plan
3. Build a Model
4. Test the Model
5. Finalize Your Invention

Inventors are scientists that use these steps to help them create or improve a product or process.

4th Grade TEKS Objectives

(Language Arts)

19.A Generate ideas and plans for writing by using such prewriting strategies as brainstorming, graphic organizers, notes, and logs (4-8)

(Science)

2.A Plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology

2.B Collect information by observing and measuring

2.C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence

2.D Communicate valid conclusions

4.A Collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses

4.B Demonstrate that repeated investigations may increase the reliability of results.

Vocabulary

Brainstorming- a process of spontaneous thinking used by an individual or by a group of people to generate numerous alternative ideas while deferring judgment.

Conceptual Models- a model that is intended to illustrate an idea that may be too large, expensive, or unsafe to test in full-scale.

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Functional Models- early versions, or prototypes, of the final invention; used to test the design and the materials used in order to refine the invention before the final product is built.

Materials (per group of students)

- Blackline Master C (invention process cards)
- Blackline Master D (inventor's log)
- Overhead, chalkboard, or chart paper
- Various recycled materials to build with such as cups, paper, string, small containers, etc.
- Blank index cards (one for each student)

Procedure

1. Get an Idea

Explain to students that inventions come from needs or problems. You can get a good idea for an invention by analyzing problems in your environment. Tell students that today you are going to give them a problem that you need a solution or an invention for.

Problem: One classmate needs to communicate with another classmate on the other side of the room. However, students in the next class are taking a test and your class is restricted from talking.

Brainstorm ideas: As a class, ask students to come up with any possible solutions to this problem. Stress to the students that you are trying to come up with as many ideas as possible. *All* solutions are acceptable and criticism is not allowed. Write all of the student's ideas on the board.

Choose an idea: Have students vote by show of hands on what they think is the best idea. Their idea should be one that is the most efficient and can be easily constructed.

2. Make a Plan

Distribute several copies of Blackline Master C to each student. As a class, discuss the details about the plan to bring this invention to life. As you model invention journaling on the board or overhead, have all students document all of their classmate's information about their solution as well. You and the students should put in writing any questions, problems, or ideas related to their solution. Stress to students the importance of labeling and dating all of their notes and drawings. They may have to refer back to some "old" ideas or they may need documentation as proof of their novel idea. Remind them to also consider and list what materials they are planning on using. Materials should be accessible and should not be harmful.

3. Build a Model

Explain the terms functional and conceptual model to the class. For this communication invention, you are interested in building a functional model so that students can better understand the idea of testing and retesting. Set up a workshop on one side of the classroom supplied with any recyclable materials that may be useful in the construction of the invention. As a whole group, work on constructing the invention model. Keep your logs handy and note any changes or ideas made along the way.

4. Test the Model

Time to test out your work! This is where the persistence quality of a good inventor really comes into play. If the message does not make it to the receiver the first time or you don't think that it is the most effective way, try again. As a group, you may have to build and test several times.

Allow every student to be involved in the rigorous testing process. Continue to discuss, journal, and make modifications to your model until an efficient solution is accomplished.

5. Finalize Your Invention

You did it! As a class discuss any final touches that may help to improve the efficiency or appearance of your product. Come up with and vote on a catchy name for you class communication invention.

Questions

Do you think that other students or classes in your school may be interested in this innovative product?

How would use of your product change the lives of the school community?

Evaluation

Exit Card- Distribute a blank index card to each student about five minutes before the end of the class period. You may ask students to write the answer to one of the following questions:

- What are the five steps to the invention process?
- What step of the invention process did you find the most challenging? Why?

Students should put their name on the card and use it as a ticket to exit that class.

If this activity is done over a period of several days, an exit card may be used at the end of each lesson to evaluate the concepts addressed that day.

Resources

Ostfeld, K. (2008). 21st Annual Young Inventors Showcase of Houston at the Children's Museum of Houston Young Inventors Guidelines. Retrieved July 22, 2009 from <http://www.cmhouston.org/inventors-showcase/>.

Erlbach, A. (1997). *The Kids' Invention Book*. Minneapolis, Learner Publication Company.



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Inventor's Process Cards

Get an Idea

Make a Plan

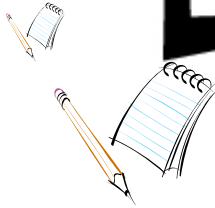
Build a Model

Test the Model

Finalize Your Invention



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Inventor's Log

Contributed by _____ Date _____

Diagrams: