



Children's Museum of Houston

Pre/Post Classroom Activities

Pre-Visit Activity 3: Invention Challenge

Introduction

In this activity, students will invent a solution for a specific problem. They will be challenged to follow the invention process to create a way to get a golf ball into a hula-hoop two feet away. This activity can be done individually or in small teams of 2-3 learners.

Explain to students that, like the communication challenge, in this activity they will be faced with a problem in which the solution requires some innovation thinking. *They* are going to invent!

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.

Persistent- persisting, esp. in spite of opposition, obstacles, discouragement, etc.

Creativity/Creative Thinking- the ability to transcend traditional ideas, rules, patterns, relationships, or the like, and to create meaningful new ideas, forms, methods, interpretations, etc.; originality, progressiveness, or imagination.

Materials

- Blackline Master E- Invention Challenge
- Blackline Master D- Inventor's Log (5 double-sided copies stapled at the top per student)

- Hula-hoops (enough for half of the class)
- Rulers or tape measures (enough for half of the class)
- Masking tape
- Golf balls (one per student)
- Various recycled materials to build with such as cups, paper, string, large and small cardboard tubes, small containers, blocks or boxes, etc.

Set up

Arrange hula-hoop “work stations” on the floor around the room. You may want to number the stations to help students find their assigned area more easily. Provide enough space for two or three students to work around each hoop.

Place all building materials in one area of the classroom so that students can conveniently borrow or return building supplies as they need it.

Procedure

Distribute Blackline Master E and Blackline Master D packets to the students. Together read aloud the problem and restrictions on the Invention Challenge guide. Allow time for questions or clarification. It is important that students completely understand all aspects of the problem that they are working on.

Assign individuals or small groups of students to a hula-hoop work station. Instruct students to use their ruler or tape measure to measure and mark two feet from the hoop. Students should mark this starting distance with masking tape.

Explain to the class that they will be following the instructions on the Invention Challenge (Blackline Master E) and documenting their progress in their Inventor’s Log packet (Blackline Master D). Point out that they are required to document their work and ideas during each step. Their log may be used later to validate their work. Require students to obtain your signature after completion of each step of the invention process. Remind them to have fun and be creative!

Extensions

Challenge students to hit a target marked with tape inside the hula-hoop with their golf ball. Add a height restriction to the activity. (For example: The ball must reach a height of at least 6 inches from the floor before landing inside the hoop)

Make a competition out of it and find out who can get their golf ball in the hoop the fastest?

Evaluation

Student work will be evaluated after completion of each step of the invention process. Upon evaluation, the teacher should guide or re-teach any part of the invention process that may appear unclear to the student.

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 Log

Contributed by _____ Date _____

Diagrams:



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Invention Challenge

1. Get an Idea

Problem: You need to get a golf ball into a hula-hoop on the floor two feet away.
Restrictions: You may not throw or toss the golf ball and the ball is not allowed to touch the floor until it is inside the hula-hoop.



Brainstorm Ideas

Write down in your invention log all possible solutions or ideas you have about the problem. Be completely open-minded and don't be afraid to make a mistake. Try looking at things in a different way. Be creative! Then, select your best idea for a functional model.

Teacher signature _____

2. Make a Plan



Write and draw everything you would need to make this plan work. Try to think of all the details, including building supplies. The materials you choose should be accessible and not harmful or dangerous in any way. Also write down any questions or potential problems that may arise. Don't forget to label and date all of your notes and drawings.

Teacher signature _____

3. Build a Model

Use the supplies provided in class or any other materials approved by your teacher and construct your model in your assigned work area.



Note any changes or ideas you make while building.

Teacher signature _____

4. Test the Model

Test it out! You may have to build, re-build and test several times. If the ball makes it in the hoop the first time, test it several more times to assure reliability.

***Be Safe!** Make sure that your work station is clear before testing your golf ball.



Keep jotting down your ideas and changes until you solve the problem.

Teacher signature _____

5. Finalize Your Invention

Make any final touches on your invention that may help to improve the efficiency or appearance of your product.



Give your invention a name.

Teacher signature _____
