Institute for Teaching through Technology and Innovative Practices

Grade 5

Promoting the Gingerbread Man at our School

Problem

You have been hired as a marketing team to promote the newly released book by the author, Laura Murray. We need to design a display to promote the author visit at our school. How can we announce the author of the Gingerbread books to increase student interest?

Lesson Summary

Student teams will study and research various ways to promote the author visit. Each team will then design a three-dimensional robotic display to promote the upcoming author event at our school. Scratch programming and at least two components from the Hummingbird robot kit will be used.

Major Topic and SOL

Math SOL (2009)	5.8 e The student will choose an appropriate unit of measure for a given situation involving measurement using U.S. Customary and metric units.
Science SOL (2010)	5.1 j The student will demonstrate and understanding of scientific reasoning, logic in which models are constructed to clarify explanations, demonstrate relationships, and data are generated.
Language Arts SOL (2010)	5.2 The student will use effective verbal and nonverbal communication skills to deliver planned oral presentations.
Visual Arts SOL (2013)	5.1 The student will use steps of the art-making process, including brainstorming, preliminary sketching, planning, reflecting, and refining to synthesize idea for and create works of art.
ISTE Standards	Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students demonstrate communication and collaborations by contributing to project teams to produce original works to solve problems. Students demonstrate critical thinking, problem solving and decision making by planning and managing activities to develop a solution to complete a project.

Length of Time 4days/1hour

Lesson Contributed by: Margo Jantzi

Funded through a 2015 State Council of Higher Education for Virginia (SCHEV) grant, PISTEM II.

Student Objectives

- Students will be able to brainstorm various designs for displaying the gingerbread man books by Laura Murray.
- Students will design and build a three dimensional Gingerbread Man display to promote the author visit.
- Students will program their gingerbread display to move using hummingbird robotics components programmed by Scratch software.

21st Century Skills

- Critical-Thinking and Problem Solving
- Communication
- Creativity and Innovation
- Collaboration
- Information and Media Literacy
- Contextual Learning

Assessment Evidence

- The students will assess the final product (Gingerbread Man model) using the rubric at the end of their design brief.
- Informal assessment using video reflection of engineering design process

Supplies/Materials/Technology

- **Hummingbird Duo robot**
- **Scratch software**
- **Laptop or desktop computer**
- **Cardboard**
- **Hot glue gun**
- **Scissors**
- **Ruler**
- **Hole punch**
- **Colored pencils and markers**
- **Duct tape**
-

Lesson 1:

- Write the steps of your learning plan. It should be organized according to the engineering design process.
- A diagram is referenced below. Have students fill in the Engineering Design Flow Chart.
- Students view online YouTube video clips for programming ideas using the hummingbird robot and Scratch software. (links included below)

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Lesson 2:

- Students build their Gingerbread Man cardboard design and program them to move and illuminate.

Lesson 3:

- Continued building and programming

Lesson 4:

- Students evaluate their Gingerbread Man creations using the Gingerbread Man Design Portfolio (Attached)

Attachments and Links

Introduction to Laura Murray, visiting author **http://www.lauramurraybooks.com/**

Hummingbird and Scratch 2.0 Intro **https://www.youtube.com/watch?v=gTZ_lvTKtkA**

Hummingbird and Scratch Blocks **https://www.youtube.com/watch?v=cUb0basD1VA**

Hummingbird and Scratch Creating a Program **https://www.youtube.com/watch?v=SyT6FYXTIHs**

Hummingbird and Scratch 2.0 Troubleshooting **https://www.youtube.com/watch?v=-eQaT-jphYc**

http://teachers.egfi-k12.org/wp-content/uploads/2010/05/Post-lesson-Student-Activities-Engineers-and-the-Engineering-Design-Process.pdf

Video Link of Student and Teacher Reflection: **https://vimeo.com/161031071**

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Challenge Title:

_____

Team members:

_____

_____

1. **Summarize** the scenario your gingerbread man display will be designed to fill.

   _____

   _____

   _____

   _____

2. **Brainstorm!** On the back of this sheet, draw or describe possible solutions.

3. **Create** your favorite design.

4. **Describe** one problem you encountered and how you solved it.

   _____

   _____

   _____

   _____

   _____

5. **Test** your solution.

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Does your gingerbread man display meet the needs described in the scenario? Yes No
How?

_____

_____

_____

_____

Does your gingerbread man move? Yes No
Does your hummingbird robot use led lights? Yes No
Does your gingerbread man move using at least 2 components of the hummingbird robot kit? Yes No
Describe how your gingerbread man is coming to life using robotics:

_____

_____

_____

_____

6.<u>Evaluate</u> your solution.
What would you do differently if you were building this author display again? How would that make your gingerbread man better?

_____

_____

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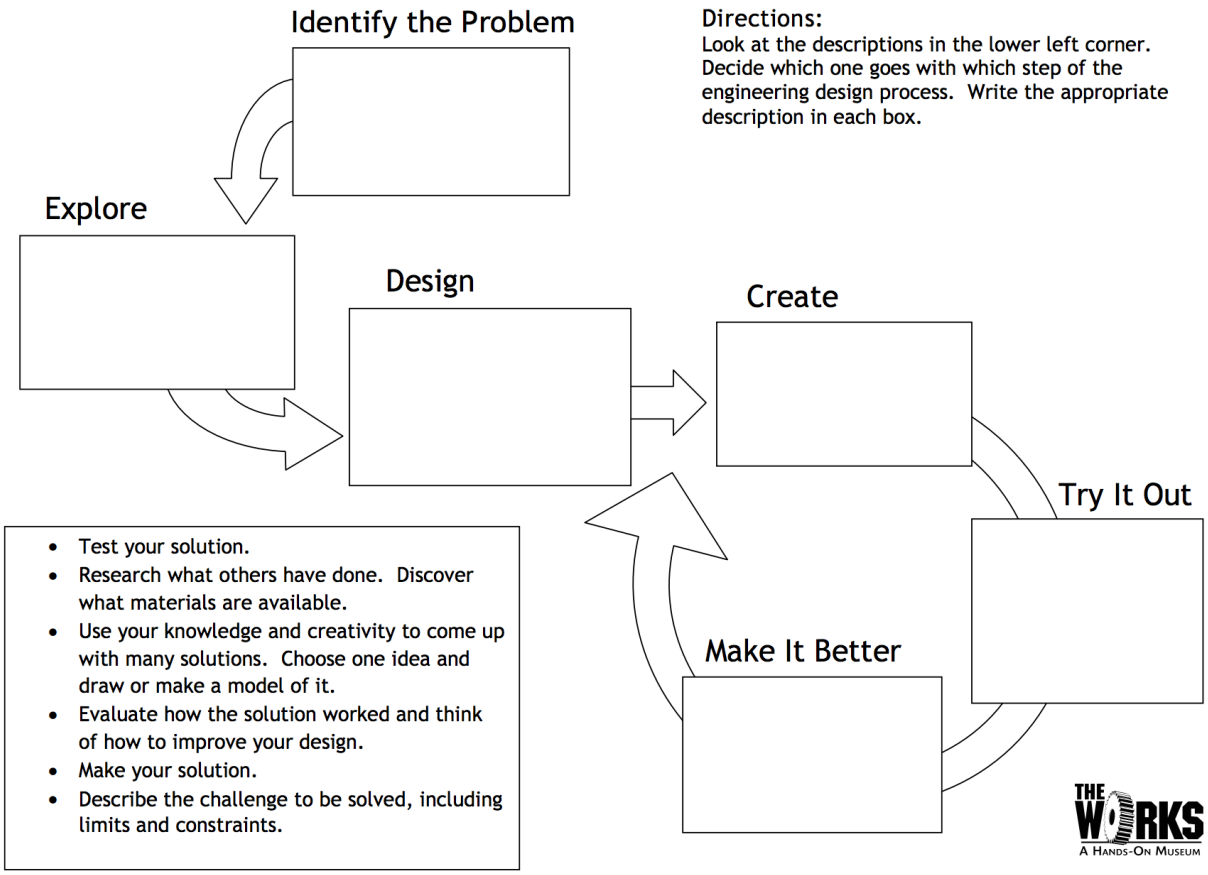
The Engineering Design Process

Name: _____

Directions:
Look at the descriptions in the lower left corner. Decide which one goes with which step of the engineering design process. Write the appropriate description in each box.



- Test your solution.
- Research what others have done. Discover what materials are available.
- Use your knowledge and creativity to come up with many solutions. Choose one idea and draw or make a model of it.
- Evaluate how the solution worked and think of how to improve your design.
- Make your solution.
- Describe the challenge to be solved, including limits and constraints.

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Name: _____ Date: _____

THE WORKS
A HANDS-ON MUSEUM

The engineering design process helps engineers and other problem-solvers come up with creative solutions. You are an engineer. Choose ONE engineering problem below, and follow the steps to invent a solution.

A. Your new pet kitten is trapped in a ten foot deep hole. You need a contraption to safely rescue your poor animal.
B. You are going on vacation for a month and can't find anyone to water your plants while you're gone. You need a device that will give your plants the right amount of water – not too much and not too little.
C. You like to read before you go to sleep, but you don't have a bedside lamp. You need a way to turn off the light switch across the room without having to get out of bed.

1. What problem did you choose? Brainstorm ways to solve the problem and list several possible solutions.

2. Choose one idea. On the back of this page, draw a detailed picture of the solution you chose. Label the drawing to explain what each part is made out of, how the parts fit together, and how it will work.

3. Where do you think you will run into problems with your solution? Where do you think the weak parts in your creation will be?

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Fifth grade design brief Name_____

Team mates _____, _____

Promoting the Gingerbread Man at Our School

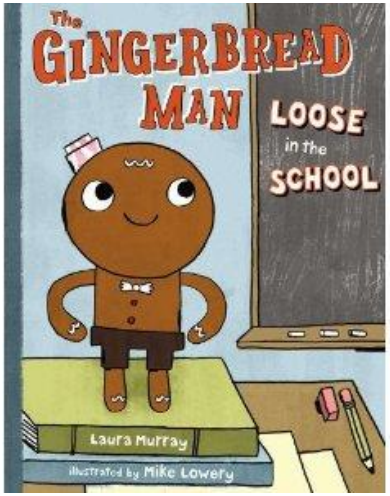
Background: We have been studying computer programming skills. You have experience with the software Scratch. You will use this free programming language to program the hummingbird robot.

Challenge: You have been hired as a marketing team to promote the newly released book by the author, Laura Murray. You need to design a display to promote the author visit at our school. How can you announce the author of the Gingerbread books to increase student interest?

Criteria:

Your Gingerbread Man display must

- ❑ Fit the needs described in your scenario
- ❑ Move using at least two components of the hummingbird robot kit
- ❑ Use LED lights
- ❑ Use recyclable materials and decorate with interesting artistic design



Materials:

Hummingbird robot kit-1 per team
Hot glue
Cardboard
Foam, Cotton, construction paper
Craft sticks, wood sticks, and dowels
Recycled and craft materials as available in the STEM lab/ classroom.

Tools:

Hot glue gun ruler writing/drawing instruments
scissors
Saw drill
Other tools as available in the STEM lab/classroom

Science SOL 5.1 Margo Jantzi November 2015

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5th grade Design Portfolio
Science SOL 5.1

Name _____

Challenge Title:

_____

Team members:

_____

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1. Summarize the scenario your gingerbread man display will be designed to fill.

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   _____

   _____

2. Brainstorm! On the back of this sheet, draw or describe possible solutions.

3. Create your favorite design.

4. Describe one problem you encountered and how you solved it.

   _____

   _____

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   _____

   _____

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Name _____

5.<u>Test</u> your solution.

Does your gingerbread man display meet the needs described in the scenario? Yes No

How?

_____

_____

_____

_____

Does your gingerbread man move? Yes No

Does your hummingbird robot use led lights? Yes No

Does your gingerbread man move using at least 2 components of the hummingbird robot kit? Yes No

Describe how your gingerbread man is coming to life using robotics:

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6.<u>Evaluate</u> your solution.

What would you do differently if you were building this author display again? How would that make your gingerbread man better?

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