

SCSU CRISP CCSA Kit Pages 2016

Title of Module: _____ Toy Design _____

Subject or Unit of Study: _____ Engineering Design/ STEM /Technology Education _____

GRADE LEVEL _____ 6-8 _____ **LENGTH OF DEMO/LESSON:** _____ 2-3 days _____

STUDENT OBJECTIVES

Students will...

1. Use the engineering design process to produce and manufacture a toy: Research, Plan, Design, Create, Test, Modify, Communicate
2. Research current toys on the market in terms of age appropriateness, safety, and categorize as educational/recreational
3. Collaborate with peers to work to accomplish a common goal
4. Identify and perform various roles that simulate manufacturing positions such as production worker, materials manager, quality control, etc.
5. Design models using an online CAD program (sketch up; Tinker CAD)
6. Create one page advertisement to promote the toy (Publisher, word, etc.)

NEXT GENERATION SCIENCE STANDARDS

MS ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solution.

MS ETS1-2 Evaluate competing design solution using a systematic process to determine how well they meet the criteria and constraints of the problem

NATIONAL STANDARDS & COMMON CORE

CC2: Cause & Effect: Mechanism and explanation

CC4: Systems and system models

CC6: Structure and function

CCRA.SL.5: Make strategic use of digital media and visual displays of data to express information

CCSS.Math.Practice.MP4: Model with Mathematics

CCSS.Math.Practice.MP5: Use appropriate tools strategically

MATERIALS

List all materials needed for this lesson/demonstration

Computers for research and design program (tinker CAD or Sketch Up)

Various recycled materials such as: felt, plastic bottles, paint, straws, aluminum foil, cardboard, etc.

Rulers

Meter Sticks

Sample manufacturing materials such as delrin plastic for demonstration

Tools

SAFETY

Desktops and surrounding should be clear of clutter
Students should wear safety if using tools such as hammers

LEARNER BACKGROUND

Describe the students' prior knowledge or skill related to the learning objective(s) and the content of this lesson, using data from pre-assessment as appropriate.

Students should have some familiarity with the computer program for designing (CAD, tinker CAD, Sketch up)
Students should be familiar with the engineering design process

LEARNING ACTIVITY OR PROCEDURE:

Explicitly layout the lesson or demonstration -(see attached handout)

Brief: Introduce students as Toy Designers that are being asked to design and produce a homemade toy with assembly instructions that can be published on a website to encourage children around the world to make their own toys.

Criteria:

Toy should be 2 ft. x 2 ft. or smaller
Toy should be made of 90% recyclable materials
Toy should be safe for young children. (O sharp edges/pieces that fall off)

Requirements:

- *Plan, Design, and build a toy or game with your group
 - *Design and create an advertisement with picture that generates interest in your toy or game
 - *Design instructions or rules for you toy or game
 - *Include an age range that toy or game is geared toward
- Students will research types of toys and games to get ideas. They can use an idea that has already been thought of, but it should be modified slightly to make it their own.
 - Students will design on paper (blue print) their idea of a toy or game and identify the recycled materials that they will use to build it.
 - Students will produce a prototype of their toy or game using various recycled materials. (Cooperative groups/manufacturing roles)
 - Design a one page marketing advertisement to promote their toy

Extension:

Produce actual model using 3-D printer if have access
Research manufacturing materials that can be used to produce their toy

ASSESSMENT:

Project Design
Built Prototype made from various materials
Finished Model made using 3-D printer (optional)

ADDITIONAL RESOURCES:

Apply any links or additional information for students or teacher including videos, websites, etc.

Research manufacturing materials that can be used to produce their toy

History of Toys and Games

<http://www.history.com/exhibits/toys/timeline.html>

Toys Are History

<http://www.yale.edu/ynhti/curriculum/units/1985/6/85.06.04.x.html>

Brief History of Toys

<http://www.hants.gov.uk/museum/toys/history/>

Hasbrotoyshop.com

The Great Outdoor Toy Company

TEACHER NOTES:

Describe any tips/tricks for implementing this lesson/demonstration that might be helpful to future educators. Provide answer keys if applicable.

Having simple toys on hand to show students and ask them to brainstorm how they would use different materials for easier production, and cost effectiveness.

STEM CAREERS:

Invite The Great Outdoor Toy Company from Westport, CT to come talk to students about their products and process

Toy Engineering

Where Does He Get all Those Wonderful Toys! ~Joker

Challenge:

The VAM Toy Company is looking for a few good homemade toys. They want to publish a web site with pictures and directions of homemade toys that will encourage children around the world to make their own toys.

Criteria:

- Toy should be 2 ft. x 2ft or smaller
- Toy should be made of 90% recyclable materials.
- Toy should be safe for young children. (No sharp edges/pieces that fall off)

Requirements:

- Plan, Design, and build a toy or game with your group.
- Design and create an advertisement with picture that generates interest in your toy or game.
- Design instructions or rules for your toy or game.
- Include age range that toy or game is geared toward.

Research:

- **On the back of this paper**, take notes (bullet points, written, sketches) on your individual research of toys and games in history.
- You will share your research, ideas, and designs with your partners in order to come up with a group design.

Use the Resources below to start off your research.

Resources About the History of Toys:

History of Toys and Games

<http://www.history.com/exhibits/toys/timeline.html>

Toys Are History

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