

Title:

Gadgets and Gizmos: Exploring Materials and Creating Solutions with Everyday Things.

Schedule:

Day One (four hours) of a five-day course (20 hours total).

Teaching Artist:

Andy Peterson

Grade(s)/Age(s):

10-15 year-olds

Number of Participants:

5-13

Description:

Students will build racecars powered by snap-action mousetraps. Students will explore everyday materials while designing and building these vehicles, utilizing a multi-stage process. The group will reflect on the process and the projects.

21st Century Skills: creative and critical thinking, collaboration, persistence and growth mindset.

Materials & Space:

Materials:

Snap-Action Mousetraps, Popsicle sticks, drinking straws, “wooden bits” (various machined wooden pieces: handles, wheels, dowels, etc.), old CD’s, string, 22GA wire, pipe cleaners, rubber bands, paper, pencils/pens, tape, hot glue.

Tools:

Pliers, scissors, wire cutters, hot glue guns, safety glasses

Space:

Tables pushed to the center of the room with chairs all around – one table against the wall with materials laid out.

Big Idea:

It is possible to solve problems by using conventional materials in unconventional ways.

Student Learning Assessment

Learning Objectives <i>What I want my students to know and be able to do.</i>	Assessment Criteria <i>What I will observe in my students – traits that can be seen and/or heard.</i>
1. Explore materials to find useful advantages of physical properties	1. Students will be able to predict and demonstrate physical characteristics of materials. (For example – “the glue sticks like this, the wheel spins, the mousetrap pulls”)
2. Assemble materials to emphasize useful advantages	2. Students can demonstrate how the materials work in assembled formats
3. Utilize five-step inventing process: plan, invent, test, reflect, and use	3. Students can indicate all five stages of the process
4. Collaborate in pairs	4. Students are effectively working together

Vocabulary:

plan, invent, test, reflect, use (projects), tinker, predict, collaborate, force, motion, balance, process, observe

State Standards:

1. The students understand and apply arts knowledge and skills

1.1.1 Understand arts concepts and vocabulary, specifically, identifies and describes materials, tools, and safety protocol for the creation of objects

1.2 Develop arts skills and techniques, specifically, manipulation of materials to achieve desired ends.

4.2.1 Analyzes and evaluates relationships between visual arts and other content areas

6-8 APPD Students reflect on their work and design improvements to provide solutions.

6-8 APPE Students work collaboratively in pairs, sharing ideas.

Sequence of Instruction

DAY 1: Title

Mousetrap racecars: unconventional approaches to everyday materials

Introduce the big idea of the lesson.

It is possible to solve problems by using conventional materials in unconventional ways: what this means and looks like in our lab/art studio.

Introduce process: “Five-Step inventing process”, tools and available materials.

- Activity title and description
 1. Introduce problem: “I want you to make a vehicle which will travel as far as it can under its own power by using only these materials.”
 2. Introduce tools and safety protocol.
 3. Describe five-stage inventing process: **plan, invent, test, reflect, use**
 4. Divide group into pairs.
 5. Guide the group through the first step: **plan**. Present drawing materials and illustrate how drawing can be an effective planning strategy. Have students make a drawing. Briefly talk about how the process of drawing can be effective for storing and sharing information, but also for the creation of an aesthetic object. Encourage youth to take their time and enjoy the (drawing) process.
 6. Checkpoint: Peer pair share.
 7. Guide the group through the second step: **invent**. Begin by demonstrating how to modify a mousetrap to prevent snapped fingers! Allow the students to freely use the tools and materials to build and tinker. (About an hour of work-time.)
 8. Monitor work time with individual/pair instruction on specific issues, as they arise (allowing for student problem-solving)
 9. Checkpoint: walkabout and instructor room scan.
 10. **test**: Assemble students to utilize projects in a *somewhat* controlled setting. Point out positives and gently guide group critique.
 11. Checkpoint: Group reflection.
 12. **reflect**: Have students return to their drawings and create a new drawing, reflecting on their inventing time and noting the test results.
 13. Checkpoint: Peer pair share and Group discussion (if youth feel comfortable showing their drawings).
 14. Have the students set projects aside and begin again. Guide students back into another hour of work-time, planning, inventing, testing and reflecting (through drawings).
 15. Checkpoint: have students respond with a checklist, identifying each step of the process.
 16. **use**: Set up a controlled setting to use the revised projects.
 17. Group discussion: have students display their favorite drawings and share.
 18. Use the remaining time for free-work, encouraging students to modify and decorate projects as desired.

Objective 1. Explore materials to find useful advantages of physical properties

Criteria 1. Students will be able to predict and demonstrate physical characteristics of materials. (For example – “the glue sticks like this, the wheel spins, the mousetrap pulls”)

Process 1. Students will discuss in a group and demonstrate through drawings and diagrams in their personal folders

Objective 2. Assemble materials to emphasize useful advantages

Criteria 2. Students can demonstrate how the materials work in assembled formats

Process 2. Students will display projects and discuss their intentions with the group and how they work

Objective 3. Utilize five-step inventing process: **plan, invent, test, reflect, and use**

Criteria 3. Students can indicate all five stages of the process

Process 3. Peer pair share and Group discussion

Objective 4. Collaborate in pairs

Criteria 4. Students are effectively working together, sharing tools and ideas with mutual respect

Process 4. Walkabout and Reverse room scan

- Closer

Class reflection time: What was good or easy? What was bad or difficult? What surprised you? What was your favorite part?

DAILY NOTES: