



Harvest Bin Project

Design and Build a Better Farming Tool

Students will design and build a better farming tool for use in the Harvest Bins that solves or improves upon a challenge they experienced during the farming process (planting, caring for the plants, or harvesting). Students will have to research the history of their tool, create a template for the design and outline how it will work and improve their farming experience. Students may use a pre-existing tool but must make a significant change to the overall design (ex. changing the material of a wooden shovel handle to something with soft grips).

Subject Levels/ Suggested Grade

Grade 6 – Applied Design, Skills, and Technologies

Grade 7 – Applied Design, Skills and Technologies



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Grade and Subject	Curricular Competencies	Content Connections
Applied Design, Skills and Technologies 6	<p>Choose a design opportunity</p> <p>Identify key features or potential users and their requirements</p> <p>Identify criteria for success and any constraints</p> <p>Generate potential ideas and add to other's ideas</p> <p>Construct a first version of the product or prototype, making changes as needed</p> <p>Identify and use appropriate tools, technologies, and materials for production</p> <p>Use materials in a way that minimizes waste</p> <p>Demonstrate their product and describe their process using appropriate terminology and providing reasons for their selected solution and modifications</p>	<p>This activity may include elements of specific ADST classes or be used as a learning exercise not connected to a specific subject area.</p> <p>ADST Subject areas could include:</p> <ul style="list-style-type: none"> • Computers • Drafting • Entrepreneurship and Marketing • Media Arts • Metalwork • Robotics • Woodwork
Applied Design, Skills, and Technologies 7	<p>Choose a design opportunity</p> <p>Identify key features or potential users and their requirements</p> <p>Identify criteria for success and any constraints</p> <p>Generate potential ideas and add to other's ideas</p> <p>Construct a first version of the product or prototype, making changes as needed</p> <p>Identify and use appropriate tools, technologies, and materials for production</p> <p>Use materials in a way that minimizes waste</p> <p>Demonstrate their product and describe their process using appropriate terminology and providing reasons for their selected solution and modifications</p>	<p>This activity may include elements of specific ADST classes or be used as a learning exercise not connected to a specific subject area.</p> <p>ADST Subject areas could include:</p> <ul style="list-style-type: none"> • Computers • Drafting • Entrepreneurship and Marketing • Media Arts • Metalwork • Robotics • Woodwork

Teacher Background

The purpose of this activity is to challenge students to think outside the box for how they could improve upon commonly used garden tools, such as trowels, watering cans, wheelbarrows, and even larger pieces of equipment such as greenhouses and gardening bins. They will be able to investigate a problem presented by an existing piece of equipment (for example, uncomfortable to hold for long periods of time) and how this could be improved upon or reinvented (addition of ergonomic handholds, cushioned grips, softer material).

While this unit is designed to touch on Applied Design, Skills, and Technology specific curricular competencies at the middle school level, it could be tied in to other grades and subjects as a critical thinking challenge. Many schools will also host “Maker Days” or Maker Spaces in their schools, which could allow for use of extra materials and guidance when supporting student’s initial ideas. The Maker movement is often described as “an artisan social movement fueled by the fundamental human need to use our hands and imaginations together to make things and then make those things better” (Hatch 2014).

Materials

- Pencils, rulers, erasers, colouring supplies
- Building Materials – dependent on age and ability levels of the students (see suggestions in Procedure Step 6)
- Computer/internet access, if needed for research or creation of tool
- Student handouts:
 - Design and Build a Better Garden Tool Planning Sheet

Procedure

1. Hook: Have students brainstorm and reflect about their experiences planting, caring for, and harvesting their crops. What were some of the things they enjoyed? What were some challenges they faced? What would they do differently?
2. As a class, compile a list (hard or digital) of TOP 5 challenges your class faced. Compare and contrast the similarities. Likely challenges to come up are:
 - a. Weather → too hot, too cold, too rainy, too dry...
 - b. Watering/feeding regularly
 - c. Moving dirt to the bins
 - d. Weeding/keeping out pests
 - e. Sharing plant care duties
 - f. Dead/unhappy plants
 - g. Small harvest
3. Using this list, have the class choose one topic they think they can improve with a better tool, system, or invention. Alternately, assign students to each topic to work as a group to develop one solution. Remind them that it is ok to start simply – you are looking to improve one piece of the farming puzzle!
4. Give students the Planning Outline Sheet. Have students fill in their topic and begin to fill out Page 1. Encourage students to come up with three different designs. Have students show drafts to teacher for feedback before proceeding to make a Good Copy Sketch.

5. Have students fill out Page 2. The materials section can be filled in for either a maker day build (craft supplies list shown to students) or for real world building. If creating the object online have the students list their materials for the latter option.
6. Building Day: students have the opportunity to put their ideas into action! There are several ways to host a Build:
 - a. Students can use craft supplies to recreate their idea (explain this is a model of their intended product and does not have to be made of real materials)
 - b. A more advanced build where students use alternate materials – wood, nails, fabric, large pieces of plastic, metal scraps, or other advanced materials. – in addition to craft supplies
 - c. Using a digital platform such as Minecraft to create a virtual design. Students must be able to display their invention and have parts clearly labelled with real world materials.
7. Following the build, have students display their inventions along with Page 2 of their planning sheets around the classroom. Have students participate in a gallery walk of their peer's projects.
8. Reflection: Give students their Peer Evaluation Sheets. Have them first fill in the questions for their own projects, and then for one fellow student. If desired, the teacher can then facilitate a conversation around the class inventions.

Extension Activities

- Have your students research the history of their tool/practice and its evolution
- Test your tools in an Agriculture Olympics style event: for example, which tool is the strongest, the most waterproof, etc.
- Bring in an outside panel of judges (local farmers, gardeners, or another class) to evaluate the projects in a science fair or Maker Day style event.

Credit

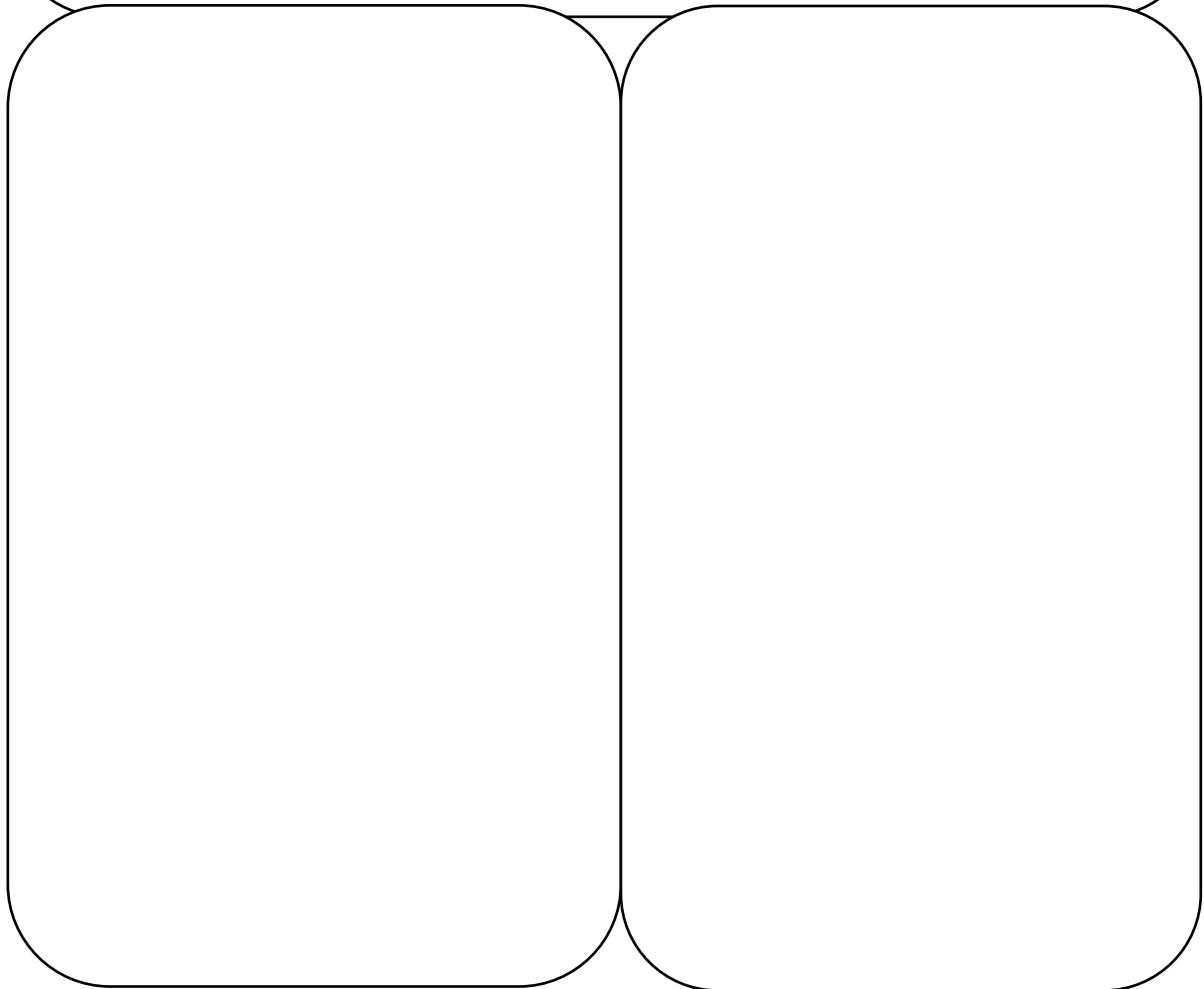

Adaptation of lesson ideas found in: "Taking Making into Classrooms: A Toolkit for Fostering Curiosity and Imagination" produced by the Innovative Learning Centre, SD33 (Chilliwack)

Design and Build a Better Garden Tool Worksheet

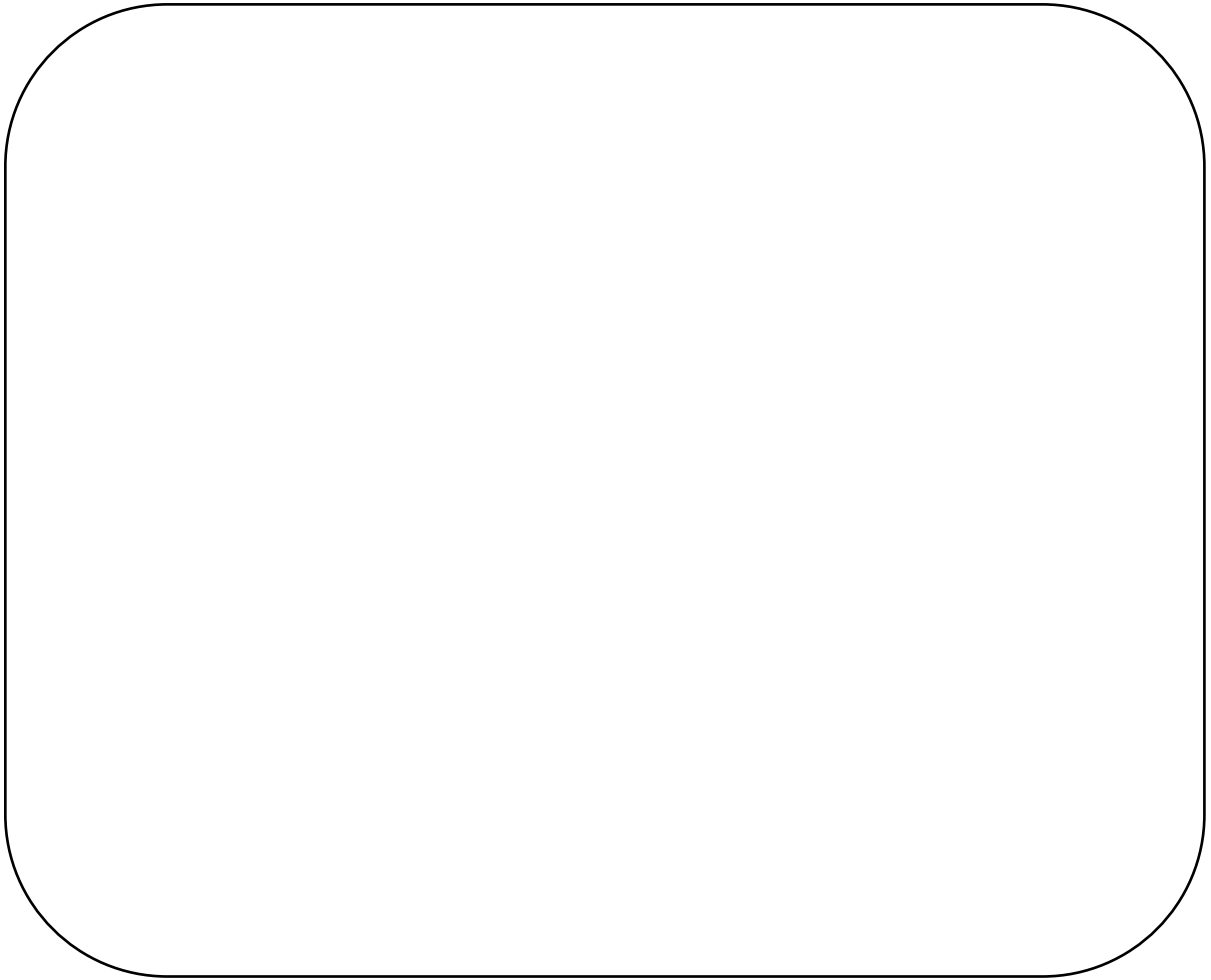
Name: _____

Date: _____

Topic: _____



GOOD COPY SKETCH



MATERIALS

SELF EVALUATION SHEET:

What problem was my invention trying to solve?

Who is this invention going to help?

Would it be possible to make this invention or improvement in real life? Why or why not?

What would you change, if you were asked to do this assignment again? Why?

PEER EVALUATION SHEET:

What was one invention you admired, and why?

Were there any inventions similar to yours? How were they similar and different?

Do you think you could combine your invention with someone else's to solve multiple gardening problems? If so, describe whose invention you could partner with and how it would solve those problems