



Music Makers

Background: We know that sound is a form of energy produced and transmitted by vibrating matter and that pitch is determined by the frequency of a vibrating object. You have been studying sound and how sound is transmitted and used as a means of communication.

Design Challenge: Design and build a musical instrument that will make at least three different pitches, and use it to create a tune of your own. You may use the materials that your teacher provides.

Criteria:

Your instrument must

<ul style="list-style-type: none"> <input type="checkbox"/> have at least three different recognizable pitches <input type="checkbox"/> be accompanied by a paragraph explaining how your instrument works • use only the materials provided by your teacher 	<ul style="list-style-type: none"> <input type="checkbox"/> be attractive and neatly made <input type="checkbox"/> be used to play a short tune
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Materials: Select from the list below.		Tools: Select from the list below.	
<ul style="list-style-type: none"> • straws • card stock • rubber bands • craft sticks • 6 inches of tape 1" x 2" wood Water bottles 	<ul style="list-style-type: none"> paper clips paper cups balloons tissue paper 24 inches of string PVC Pipe small nails 	<ul style="list-style-type: none"> Ruler Scissors Paper Drill Hole Punch 	<ul style="list-style-type: none"> Saw Hand drill Clamps Safety Glasses Hammer

Targeted Standard of Learning: Science 5.2
 Supporting Standards of Learning: Science 5.1
 Mathematics 5.8
 English 5.2, 5.3, 5.6, 5.7

Targeted Standard for Technological Literacy: 9
 Supporting Standards for Technological Literacy: 8, 10, 11, 17

Tips for Teachers

Targeted Standards of Learning: Science 5.2

Supporting SOL: Mathematics 5.8

English 5.1, 5.2, 5.3, 5.6, 5.7

Targeted Standards for Technological Literacy:



17 Students will develop an understanding of and be able to select and use information and communication technologies.

Supporting STL: 9

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Design Process
Under-standing of the design process	<ul style="list-style-type: none"> • See Design Brief for recommended materials. • Tools and materials may be limited 	Safe use of tools	Groups or individuals	Design Brief Guided Portfolio (adapt as appropriate/ optional) Rubric Assessments	Follow the Design Process: Restate the problem. Brainstorm solutions. Create the best solution. Test the solution. Evaluate the solution.

Extension Ideas: Allow students to add pitches to instruments for additional tunes

Guided Portfolio



Name _____

Group Members _____

1. What is the problem? State the problem in your own words.



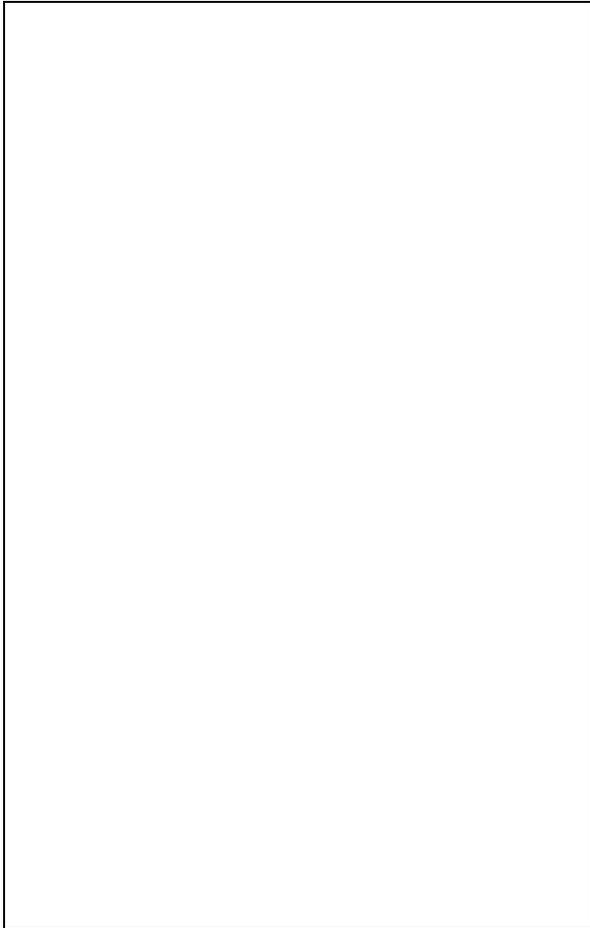
Name _____

2. Brainstorm solutions. Sketch and/or describe some possible solutions.

Name _____

3. Create the solution you think is best.

Keep notes about your problems and how you solve them. Make sketches if they help.



Name _____

4. Test your solution.

Does the instrument have 3 separate recognizable pitches? YES NO

Can the instrument be used to play a short tune? YES NO

Is your instrument neat and pleasing to look at? YES NO

Does your paragraph explain how the instrument works? YES NO

- Why, or why not? _____

Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why, or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Rubric for Music Makers

Name _____

Date _____

0—no evidence; 1—limited understanding; 2—some understanding with room for improvement; 3—good understanding with room for improvement; 4—substantial understanding

Design Brief Rubric	0	1	2	3	4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student kept notes and/or made sketches while creating a solution, to include problems and how they were solved.					
The student tested to make sure <ul style="list-style-type: none"> • the instrument has 3 distinct pitches • the instrument can play a tune more than once • the instrument is neat and pleasing to look at • the paragraph addresses all the requirements • The student evaluated how he/she could make it better next time. 					

Rubric for Music Makers

Name _____

Date _____

0—no evidence; 1—limited understanding; 2—some understanding with room for improvement; 3—good understanding with room for improvement; 4—substantial understanding

Communication: Speaking, Listening, Media Literacy Rubric	0	1	2	3	4					
<p>5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.</p> <ul style="list-style-type: none"> a) Participate in and contribute to discussions across content areas. b) Organize information to present reports of group activities. c) Summarize information gathered in group activities. d) Communicate new ideas to others. e) Demonstrate the ability to collaborate with diverse teams. f) Demonstrate the ability to work independently. 										
<p>5.2 The student will use effective verbal and nonverbal communication skills to deliver planned oral presentations.</p> <ul style="list-style-type: none"> a) Maintain eye contact with listeners. b) Use gestures to support, accentuate, and dramatize verbal message. c) Use facial expressions to support and dramatize verbal message. d) Use posture appropriate for communication setting. e) Determine appropriate content for audience. f) Organize content sequentially around major ideas. g) Summarize main points as they relate to main idea or supporting details. i) Use language and style appropriate to the audience, topic, and purpose. 										

Standards of Learning

Science

- 5.2 The student will investigate and understand how sound is created and transmitted, and how it is used. Key concepts include
- a) compression waves;
 - b) vibration, compression, wavelength, frequency, amplitude;
 - c) the ability of different media (solids, liquids, and gases) to transmit sound; and
 - d) uses and applications of sound waves.

Mathematics (2009)

Measurement

- 5.8 The student will
- a) find perimeter, area, and volume in standard units of measure;
 - b) differentiate among perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation;
 - c) identify equivalent measurements within the metric system;
 - d) estimate and then measure to solve problems, using U.S. Customary and metric units; and
 - e) choose an appropriate unit of measure for a given situation involving measurement using U.S. Customary and metric units.

English (2010)

Communication: Speaking, Listening, Media Literacy

- 5.2 The student will use effective verbal and nonverbal communication skills to deliver planned oral presentations.
- a) Maintain eye contact with listeners.
 - b) Use gestures to support, accentuate, and dramatize verbal message.
 - c) Use facial expressions to support and dramatize verbal message.

- d) Use posture appropriate for communication setting.
- e) Determine appropriate content for audience.
- f) Organize content sequentially around major ideas.
- g) Summarize main points as they relate to main idea or supporting details.
- h) Incorporate visual media to support the presentation.
- i) Use language and style appropriate to the audience, topic, and purpose.

Writing

- 5.7 The student will write for a variety of purposes: to describe, to inform, to entertain, to explain, and to persuade.
- a) Identify intended audience.
 - b) Use a variety of prewriting strategies.
 - c) Organize information to convey a central idea.
 - d) Write a clear topic sentence focusing on the main idea.
 - e) Write multiparagraph compositions.
 - f) Use precise and descriptive vocabulary to create tone and voice.
 - g) Vary sentence structure by using transition words.
 - h) Revise for clarity of content using specific vocabulary and information.
 - i) Include supporting details that elaborate the main idea.

Standards for Technological Literacy

Standard 9: Students will develop an understanding of engineering design.

Standard 8: The attributes of design

Standard 10: The role of trouble-shooting, research and development, invention and innovation and experimentation in problem solving

Standard 11: Apply Design Processes

Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.