

Musical Instruments



Topic
Sound

Key Question

What kind of instrument can you create that makes sounds by striking, plucking, or blowing?

Focus

The students will create instruments that they can strike, blow into, or pluck.

Guiding Documents

Project 2061 Benchmarks

- *People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens.*
- *Everybody can do science and invent things and ideas.*
- *Things that make sound vibrate.*
- *People can learn from each other by telling and listening, showing and watching, and imitating what others do.*

Science

Physical science
sound

Integrated Processes

Observing
Comparing and contrasting
Communicating
Classifying

Materials

Various throw-away items (see *Instrument Ideas*)
String
Balloons

Background Information

Sound is produced by vibrating objects. Sound waves are a series of disturbances traveling through the air where the air pressure is above normal (compression) or below normal (rarefaction). These waves go out in every direction so that, if you could see them, they would look like concentric, rounded shapes spreading out from

the source of the noise. The plucking of the strings of a guitar causes those strings to vibrate. The movement of those strings pushes and pulls the air around them, thus causing disturbances in the air to travel outward from the strings. A guitar has a hollow wooden body that acts as a sounding board. When the string vibrates, the wood vibrates at the same frequency. The air inside and outside the guitar vibrates so that we can hear the musical note.

All other musical instruments cause similar waves when they vibrate. While the guitar is set into vibration by plucking a string, other instruments can be set into vibration by striking them or blowing into them.

Instruments that produce sound through striking are grouped into the percussion section of a band. Woodwinds make music through blowing, which causes a reed to set an air column into vibration. Brass instruments, like trumpets, sound when the player's vibrating lips set an air column into vibration. Strings, as the name implies, have strings to originate a sound.

Management

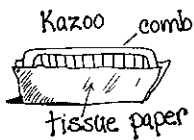
1. Send a letter home to parents asking them to save coffee cans, aluminum pie pans, clay flower pots, glass bottles, rubber bands, spoons, oatmeal boxes, and other items which can be used for band instruments.
2. Make two or three instruments to show to the class.

Procedure

1. Show the students several of the collected items. Ask them how they think these things could be used to make sounds.
2. Tell them they are going to use these items to make musical instruments.
3. Brainstorm with the students how various materials could be used to make an instrument.
4. Show the students two or three instruments you have made; have them identify the method by which each is played (blown, struck, or plucked). Play the instruments so the students can hear them.
5. Either in groups or singly, have the students make an instrument of their choice (see *How To Construct Musical Instruments*).
6. When the instruments are finished, have some students (out of sight of the others) play each instru-

ment one at a time. The rest of the class will try to guess how the sound is made and what material is used to make the instrument.

7. The students can draw a picture (see *Design an Instrument*) of the instrument they made and list what materials were in it. They should also indicate how the sound was made.



Discussion

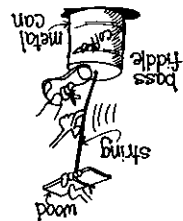
1. Did your instrument sound like you thought it would?
2. What real instrument does your instrument look and sound like?
3. Can you think of any other materials that you can use to make an instrument?
4. How can you make a "better" instrument?

Extensions

1. Students could measure and record dimensions of their instruments.
2. Have the students make up their own music to play on their instruments.
3. Bring several actual instruments into the classroom. Let the students feel the various instruments as they make sounds. Use a magnifying lens, if necessary, to observe the vibrating of the strings.
4. Create an orchestra. Have all the strings (plucking), percussion (striking), and woodwinds (blowing) sit together. Conduct your orchestra by pointing to the section when you want them to sound a note.
5. Read the poem *Orchestra* by Shel Silverstein found in his book *Where the Sidewalk Ends*. Have volunteers act it out.

How to Construct Musical Instruments

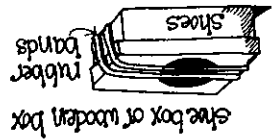
Plucking Instruments



1. Bass Fiddle
Use a two or three pound empty metal coffee can. Turn the can over and punch a hole in the bottom of the can. Thread a heavy string through the hole and make a knot or tie a paper clip on the end so the string won't pull through the hole. Tie the other end of the string around a piece of wood or stick so the string can be pulled taut. Pluck the string to get a bass fiddle sound.

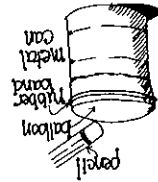
2. Rubber Band

Hold a rubber band tightly in your teeth and pluck the band. The sound will change as the rubber band is pulled tight or loosened. CAUTION – Don't let the rubber band hit you in the face.



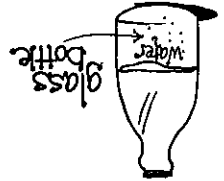
3. Shoe Box Guitar
Cut a hole in the lid of a shoe box. Stretch different width rubber bands around the box. Narrow, tight bands will have a high sound; wide, loose bands have a low sound. Pluck the rubber bands to have a guitar sound.

Striking Instruments



1. Tin Can Drum

Stretch a balloon over the open end of a coffee can or large tin can. Put a rubber band around the top to hold the balloon tightly over the can. Strike the drum head (balloon) with the eraser end of a pencil.



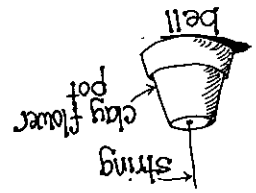
2. Glass Bottle

Glass bottles have different pitches depending on how much water is in the bottle. Get several glass bottles and fill with water to different heights. Strike the bottles with a pencil.



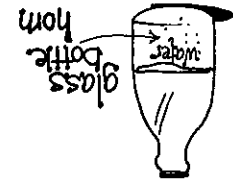
3. Xylophone

Make a xylophone by taping together different lengths of copper tubing or sprinkler pipe. Play the instrument by striking the tubing with a pencil or metal rod.

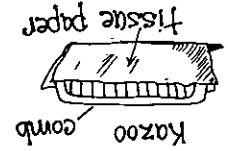


4. Clay Flower Pot

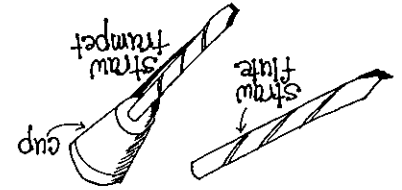
Clay flower pots have a nice bell tone when struck. Knot a string and thread it through the drainage hole in the pot. Hold the pot by the string and strike with a pencil.



3. Glass Bottle Horn
 Fill a glass bottle with water to whatever level you wish. Blow across the open mouth of the bottle.

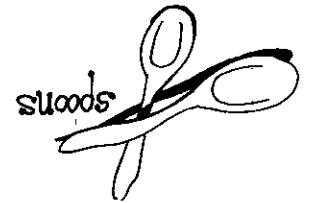


2. Comb Kazoo
 Wrap tissue paper around a comb. Hold the kazoo up to your lips and hum gently while pursing your lips and letting them vibrate against the paper.

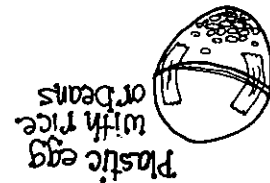


1. Straw Flute and Trumpet
 Drinking straws have a flute-like sound when blown. Flatten the first 5 cm of the straw. Snip off the corners of the flattened end with scissors. The pitch of the flute will depend on the length of the straw. To make a straw trumpet, prepare the straw the same way but insert the straw into the bottom of the paper cup.

Blowing Instruments



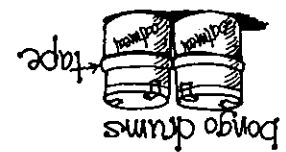
8. Spoons
 Get two metal spoons. Holding them in two hands, strike the spoons together.



7. Plastic Egg
 Put some rice, beans, or macaroni in a plastic egg. Shake the egg or hold in one hand and strike with the other hand.

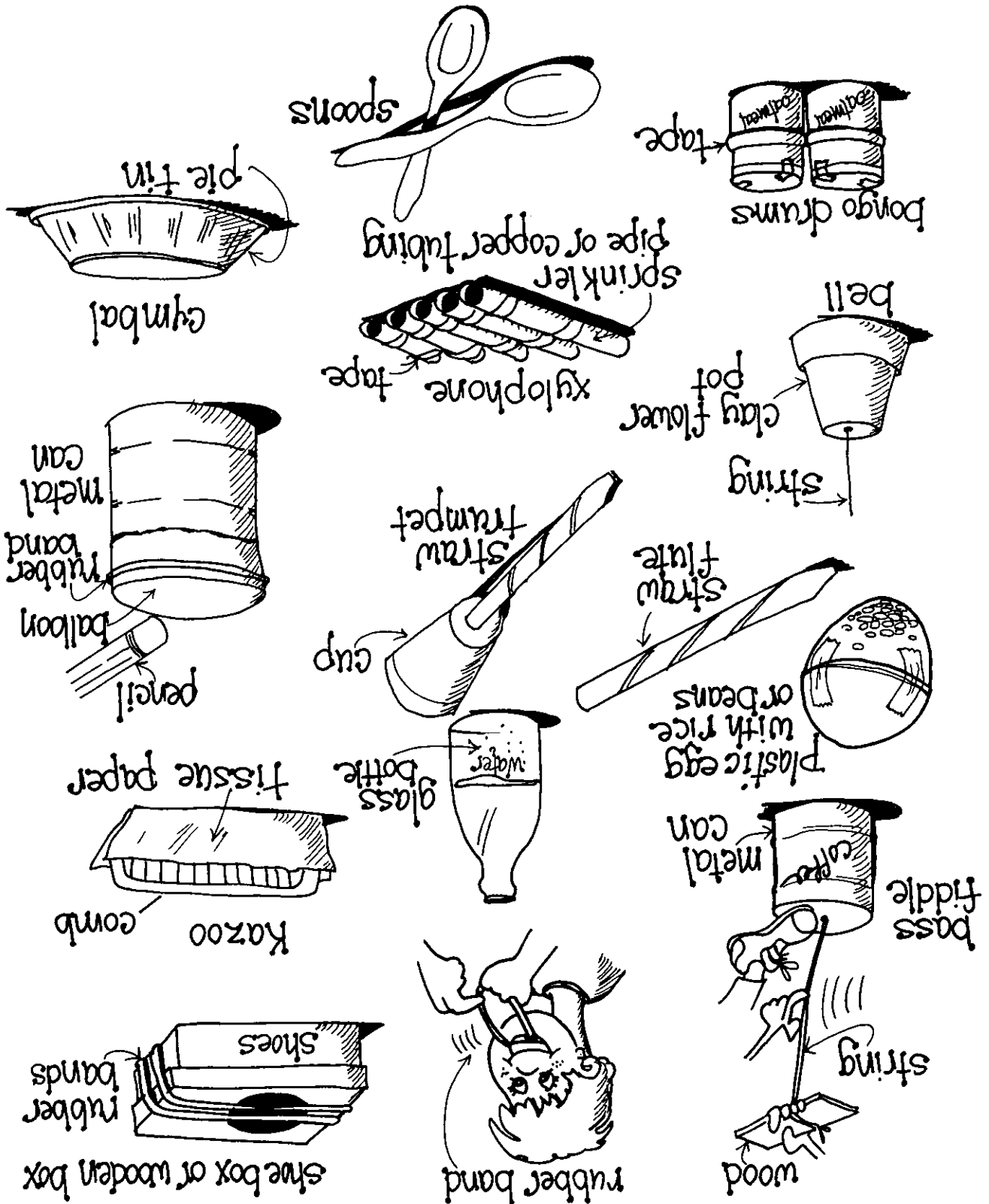


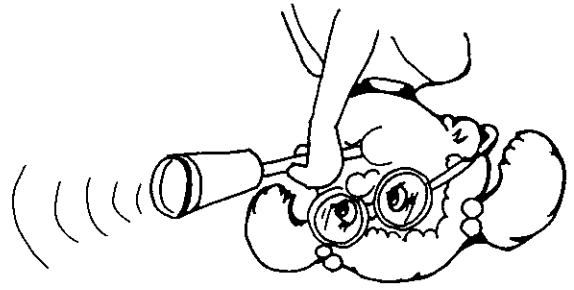
6. Pie Tin Cymbal
 Aluminum pie tins can be used as cymbals. Hold the pie tin with one hand and strike the bottom of the pan with the other hand.



5. Bongo Drums
 Oatmeal boxes can be taped together and used as bongo drums. Strike them with the finger tips. Turn over and strike the closed end of the box.

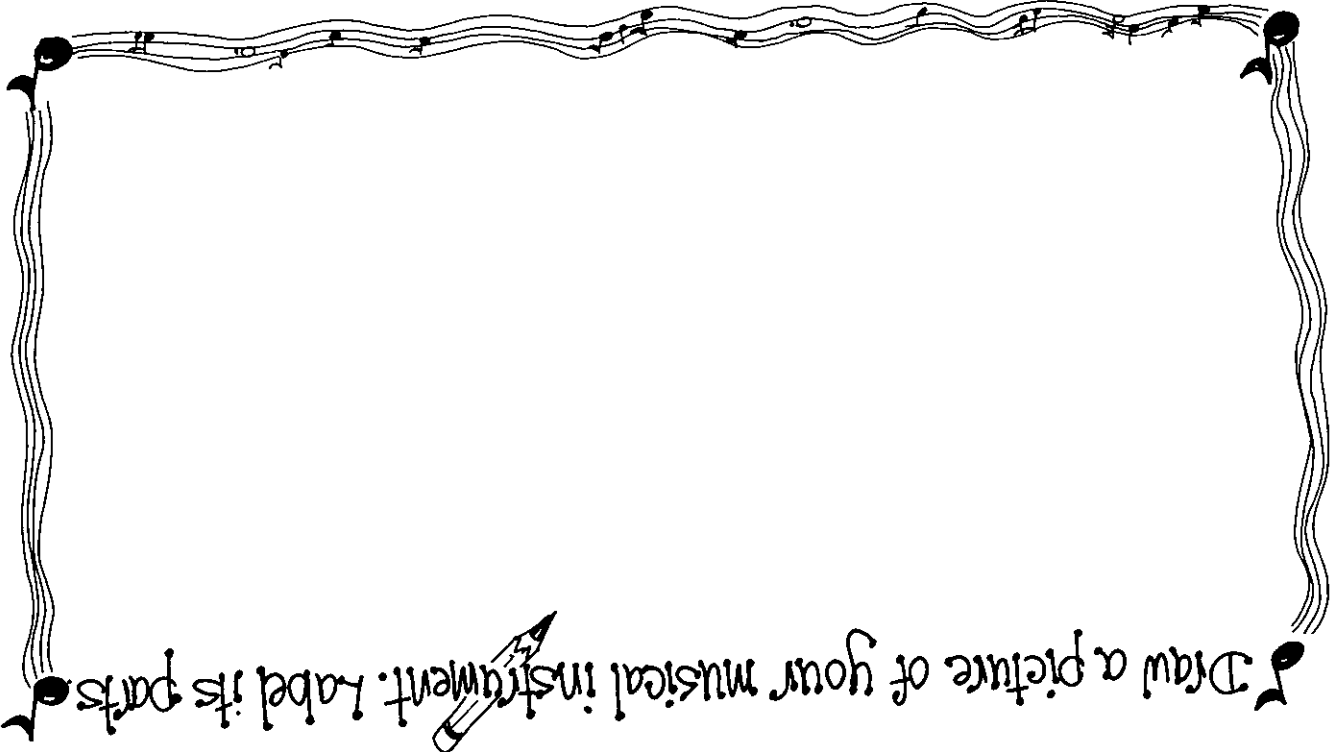
Musical Instrument Ideas





Three horizontal lines for writing.

Write directions for making your instrument.



You are an instrument designer. Invent a new musical instrument that makes sound by striking, plucking, or blowing.

Design an Instrument

Name _____