The Tingler

Thank you for downloading the science and mathematics activity packet! Below you will find a list of contents with a brief description of each of the items. This activity packet contains all the information (including any handouts) you will need to run this activity in your own classroom or at a science festival.

Please note: some activities might require the need for a facilitator to be present to oversee the activity. Activities that require a facilitator will be clearly noted.

-Community Resources for Science

The Tingler

ACTIVITY PACKET CONTENTS

1. Organizer instructions
    - Print suggestion: 1 for the facilitator
    - This is for the person running the activity
    - Includes information for setup prior to the event (e.g., materials prep)
2. What's Going On? (tabletop sign/printout)
    - Print suggestion: 1 to put in a plastic sign holder
    - Explains the science and background information behind the activity
3. Participant instructions (tabletop sign/printout)
    - Print suggestion: 1-2 to put in a plastic sign holder, about 4 for the table
4. Take home sheet for participants
    - Print suggestion: number of expected participants
    - Easy-to-follow materials list and instructions for participants to try the activity at their homes

The Tingler

ORGANIZER INSTRUCTIONS

Grade(s): 3-6

Standard connections:

Next Generation Science Standards: Science and Engineering Practices

- **Developing and Using Models:** Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system

Objective: Build a whistle out of cardboard and see how changing different factors affects the noise production

Activity overview and background: Students will build using a tingle out of cardboard

This activity should have a facilitator present to walk students through the steps

Materials

- Scissors
- Corrugated cardboard, cut in two 3-inch by 1-inch strips
- Ruler
- Masking tape
- Clear tape

Setup:

1. Lay out materials along with instruction and background handouts
2. If you have time, build your own Tingler and have it out as a model for students

Suggested Setup:

- Pre-cut the cardboard strips before the event
  - Each Tingler needs two 3” x 1” cardboard pieces
- Participants can also make an “Advanced Tingler”
  - The instructions are provided separately from the Tingler instruction

What's Going On?

Why does the sound of the Advanced Tingler change when I pull the strip?

In the Tingler; air from your mouth starts the strip of tape vibrating, which makes the buzzing sound you hear. In the Advanced Tingler, you can change the sound by pulling the strip of tape tight or letting it be loose. The tighter the strip, the faster it vibrates—and the higher the pitch of the sound.

Wow! I Didn't Know That!

In Rajasthan—a state in the northern part of India—a whistle like your Tingler is called a boli. It's used in puppet shows as the puppet's singing voice. It's also used to provide rhythm in action scenes—the high squeaky sound can be heard even over the drums.

Instructions

1. Cut two pieces of cardboard about 3 inches long and an inch wide. Make sure the two pieces are the same size
2. Fold a piece of masking tape over the long sides of each piece of cardboard
3. Wrap about 1-foot masking tape around (and around and around) one end of one of the cardboard pieces
4. Repeat step 3 until you have wrapped both ends of both pieces of cardboard
5. Cut two pieces of clear tape just a little shorter than your piece of cardboard. Put the sticky sides of the tape together to make a strip of clear plastic
6. Use the masking tape to tape one end of the plastic strip to the end of one piece of cardboard. Stretch the strip tight, then tape the other end down (but not so tight the cardboard bends)
7. Put the other piece of cardboard on top. Now you have a cardboard sandwich with a strip of plastic in the middle
8. Play your Tingler like a harmonica. Hold the taped ends of the cardboard together tightly, and blow through the middle without squeezing the middle part.

- If you get a whistle (or hum or buzz)—that's great! Wrap a piece of tape around each end of the cardboard to tape the "sandwich" together
- If you don't get a good noise, untape the plastic strip and pull it a little tighter. Move it around until you like the sound it makes, then tape everything together

9. Now play with your Tingler. *What kind of sound do you get if you blow really hard? If you tighten your lips? If you wiggle the cardboard? If you bend it a little?*

Advanced Tingler

1. You can control the sound of your Tingler by changing the design just a little.
2. Steps 1 to 4 are the same
3. In step 5, cut two pieces of tape *longer* than the cardboard, and stick them together to make a plastic strip.
4. Tape one end of the strop down, and let the other end hang out like a tail.
5. Put the two pieces of cardboard on top of each other. Now you have a sandwich with a tail. Tape around the ends so that the two pieces are held loosely together, but the tail can still move.
6. Blow through the middle of the Tingler. Pull on the plastic tail to make the sound change.

The Tingler

TRY IT AT HOME!

What you'll need:

- Scissors
- Corrugated cardboard, cut in two 3-inch by 1-inch strips
- Ruler
- Masking tape
- Clear tape

Instructions:

1. Cut two pieces of cardboard, about 3 inches long and 1 inch wide. Make sure the two pieces are the same size
2. Fold a piece of masking tape over the long sides of each piece of cardboard
3. Take about a foot of masking tape, and wrap it around (and around and around) one end of one of the cardboard pieces. It should wrap around four or five times
4. Repeat step 3 until you have wrapped both ends of both pieces of cardboard. The tape will make the ends thicker than the middle
5. Cut two pieces of clear tape just a little shorter than your piece of cardboard. Put the sticky sides of the tape together to make a strip of clear plastic
6. Use the masking tape to tape one end of the plastic strip to the end of one piece of cardboard. Stretch the strip tight, then tape the other end down
    - Don't stretch so tight that the cardboard bends
7. Put the other piece of cardboard on top. Now you have a cardboard sandwich with a strip of plastic in the middle
8. Play your Tingler like a harmonica. Hold the taped ends of the cardboard together tightly, and blow through the middle. Don't squeeze the middle part.
    - If you get a whistle (or hum or buzz)—that's great. Wrap a piece of tape around each end of the cardboard to tape the "sandwich" together
    - If you don't get a good noise, untape the plastic strip and pull it a little tighter Move it around until you like the sound it makes, then tape everything together
9. Now play with your Tingler. What kind of sound do you get if you blow really hard? If you tighten your lips? If you wiggle the cardboard? If you bend it a little?

Advanced Tingler:

1. You can control the sound of your Tingler by changing the design just a little.
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