

DANCING SALT

Background Information for Activity Leaders

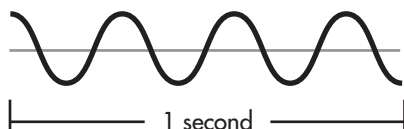
Overview

Children will investigate how sound waves can move objects and how sound energy can be manipulated.

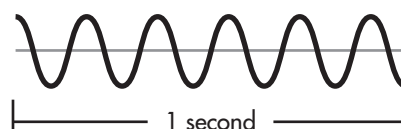
Key Concepts

- Sound energy travels as a wave created by vibrating objects and spread through a medium (like air) from one location to another. When the force of the vibration reaches a stationary object, if the force is strong enough, it may cause the object to vibrate as well.
- Frequency is the number of waves that pass a point per second. The more waves that pass by the point per second, the higher the frequency.

Low-Frequency Sound Waves



High-Frequency Sound Waves



- **Pitch** is how high or low a sound seems. Bird calls are high frequency sounds and have a high pitch while a lion's growl has a low frequency and a low pitch.
- **Amplitude**, or height of a sound wave, is a measure of the amount of energy in the wave.
- Loud sounds have more energy than soft sounds. For example, when you beat a drum with a lot of force the sound will have a high amplitude and you hear a loud sound.

Soft



Loud



Notice that both the soft and loud sounds have the same frequency (the same number of waves).

- The more energy the sound wave has, the louder the sound seems. The intensity of a sound wave is related to the amount of energy it has. You hear intensity as loudness.

What to Expect

- During the ENGAGE portion of the activity children will need 10-15 minutes to gain hands on experience raising the volume and changing the type of music to notice the changes in the salt's movement.

DANCING SALT

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Background Information for Activity Leaders

Common Misconceptions

- *Children may believe that, "Salt is alive."*

When younger children see the salt move they may believe that it is alive. Assure them that salt is not alive and that it is only moving due to the vibrations caused by sound.

- *Children may believe that, "Sounds come out of objects."*

Most children do not have a good understanding of what causes sounds to occur and what effect sound has on other objects. This association can be developed by repeated experiences with a variety of easily observed vibrating objects.

DANCING SALT

Data Collection Sheet

Name: _____

Date: _____

WONDER How do sounds make objects move?

RECORD What did you observe? Sounds can be described as “low” or “high” pitch. Sounds can also be described as “soft” or “loud”.

Data Table

Type of Sound		Describe the type of movement
amplitude (soft or loud)	frequency (low or high)	

CONCLUDE What makes the salt move? What causes differences in the way the salt moves?

Set Up the Expedition

Materials:

For the activity leader:

- (1) CD player with a flat speaker area or a stereo that can play CDs and has a separate speaker
- (1) 12" dark-colored, plastic disposable plate
- APEX Science audio CD of various types of music

For each group:

- **Dancing Salt** Learning Cards
- (1) roll of masking tape
- (1) container of salt
- (1) plastic teaspoon

For each child:

- (1) **Dancing Salt** Data Collection Sheet
- (1) pair of safety goggles
- (1) 6" dark-colored, disposable, plastic plate
- (2) empty toilet paper rolls

Prepare the demonstration:

1. Place the speaker flat on a table, so that it is pointing toward the ceiling.
2. Place a 12" plate on top of the speaker. Make certain the plate can stay on the speaker without being held.
3. Pour one teaspoon of salt on the surface of the plate.
4. Insert the audio CD of songs.

Prepare the exploration:

1. Place a pair of goggles, two empty toilet paper rolls, and the 6" dark-colored, disposable, plate at each group's station for each child.
2. Place a container of salt, and a roll of masking tape at each group station.

DANCING SALT

Activity Leader's Guide

Group Size: 4-6 children

Time: 45 minutes

Engage

- 1 Gather the children together.

Ask:

"Have you ever felt the sounds that you make when you speak?" Allow children time to discuss and share their ideas.

Say:

"Place your index and middle finger lightly on your throat. Now make a humming noise. What do you feel?" Allow children time to discuss and share their ideas.

Say:

"You just felt the vibrations or back-and-forth movement caused by sound. Sound can also make other objects vibrate."

- 2

Ask:

"Would you like to see salt dance?" Listen to the children's ideas and questions. Ask the children to gather around the table where you have set up the speaker. If there are too many children to see clearly, have children come up in groups.

Say:

"Let's be very quiet, so that the only sounds we will hear are the sounds of the music." Play a clip of the first song.

Ask:

"What did you hear? How would you describe the sounds? Were they fast? Slow? Loud? Soft?" Allow children time to discuss and share what they heard.

Ask:

"What did you see?" Allow children time to share what they saw. Remind children that salt is not alive, and that it is moving because something is making it move.

DANCING SALT

Activity Leader's Guide

Say:

“Scientists make very detailed observations. They look very closely at things and notice everything about how an object behaves.”

Say:

“Let’s see how good you are at making observations. How does the salt’s dance change when I change the type of music or adjust the volume?” Adjust the volume or play a different song, and allow the children to describe how different types of music caused the salt to move differently. Repeat with each type of music.

Explore/Expand

- 3** If you are working with more than 4-6 children, divide the children into groups. Distribute the Data Collection Sheets and the Learning Cards.

Say:

“Now you will make your own salt dance using your voice. Follow the instructions on your Learning Card.”

- 4** Allow children enough time to complete the WONDER, EXPLORE, RECORD, EXPAND and CONCLUDE sections of their Learning Card.

Conclude

- 5** Gather the children together and ask the following questions:

“How did the salt move to the sounds you made?”

The salt jumped higher to louder sounds. Lower frequency sounds (which have more bass) caused the salt to make big jumps. Fast music made it jump more frequently.

“Which sound made the salt jump the highest?”

Hip Hop music makes salt jump the highest. Responses vary according to the music they listen to.

“Which sound made the salt jump more quickly?”

Responses may vary.

“What happened when you flicked the plate lightly with your fingers?” When your finger flicks the plate, the plate vibrates. The force of the vibration causes the salt to move.

- 6** **Say:**
“Like your fingers flicking the plate, sound has force. How do you think sound travels to the salt?” Sound travels through the air. Ask children to draw a picture of how they envision sound looks as it travels through the air.

- 7** **Say:**
“Congratulations! You have earned your ‘Ask Me About Sound’ stamp. You are ready to tell people about sounds. ”

DANCING SALT

Expedition Learning Card

? Can sound make objects move?

vibration
amplitude
pitch

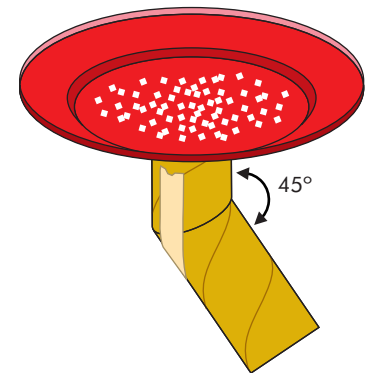
🔍 Explore how sound can move things.

1 WONDER How do sounds make objects move?

✎ Write or draw your ideas on your Data Collection Sheet.

2 EXPLORE Build a platform where your salt can dance.

- 1.** Tape a small 6" red plate to an empty toilet paper roll.
- 2.** Tape another empty toilet paper roll to the first as shown in the second picture.
- 3.** Pour about one tablespoon of salt on the red plate.
- 4.** Put on your safety goggles.
- 5.** Make different sounds into the open end of the toilet paper roll.



DANCING SALT

Expedition Learning Card

3 RECORD Observe how salt moves differently when you make loud noises and soft ones, and when the noises are fast or slow. Describe each type of sound and how it makes the salt move.

*The softness or loudness of the sound is called the **amplitude**.

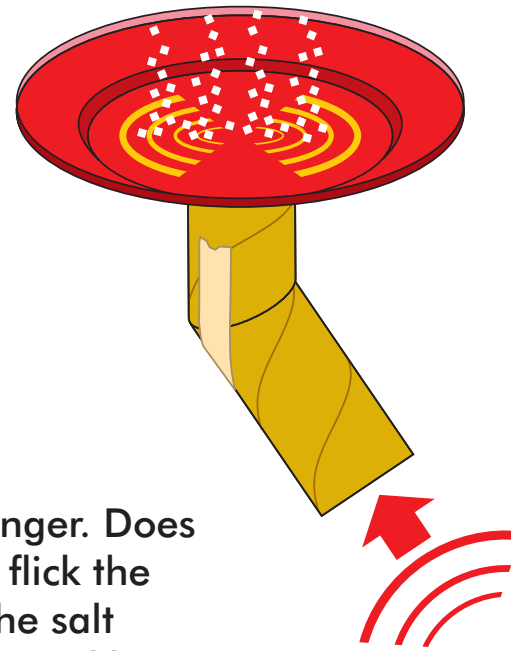
*The pitch of the sound or how low or high it is called the **frequency**.

 Draw or write on your Data Table what you hear.

4 EXPAND Flick the plate lightly with your finger. Does the salt jump with the force of the flick? Now flick the plate a little bit harder with your finger. Did the salt jump more or less? How is the flick of your finger like sound?

5 CONCLUDE Consider what you noticed. What do you think made the salt move? What other things can sound move?

 Make a drawing of other things that sound moves.



Discovery

Why did we do that?

- Vibrating objects makes sounds.
- Sounds can make things move.
- Sounds have force.
- Loud sounds can make things move more than soft sounds.

Congratulations!

You have earned your "Ask Me About Sound" stamp! Now you are ready to tell people about sound!

