

# Sound

## Section 1 The Nature of Sound

# CHAPTER 10 DRW

**Scan** Use the checklist below to preview Section 1 of your book.

- Read all section titles.
- Read all bold words.
- Read all charts and graphs.
- Look at all the pictures and read their captions.
- Think about what you already know about sound.

*Write three facts you discovered about the nature of sound as you scanned the section.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*amplify*

**Define** *amplify* in a sentence that shows its scientific meaning.

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### New Vocabulary

*eardrum*

**Define** the following terms.

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*cochlea*

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### Academic Vocabulary

*medium*

**Use a dictionary** to define *medium* as a noun that might relate to sound.

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## Section 1 The Nature of Sound (continued)

### Main Idea

#### Vibrations and Sound

I found this information on page \_\_\_\_\_.

#### Sound Waves

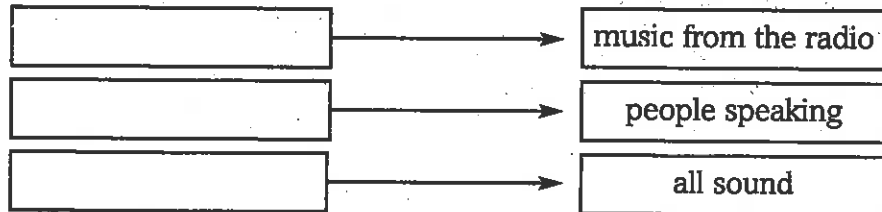
I found this information on page \_\_\_\_\_.

#### Moving Through Materials

I found this information on page \_\_\_\_\_.

### Details

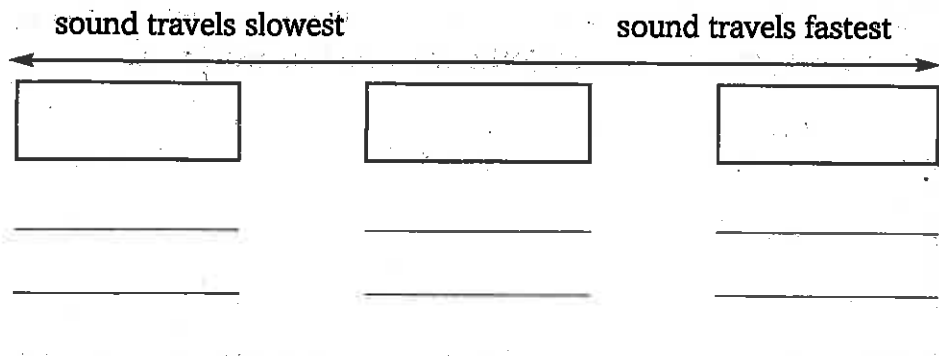
Complete the diagram showing what vibrates to produce each sound on the right.



Sequence the steps involved in creating a sound wave from a speaker. The steps are written in scrambled order at right. Write the steps in the correct order in the boxes on the left.

1.	The air molecules collide with other air molecules.
2.	A speaker vibrates.
3.	A sound wave forms.
4.	Energy is transferred between air molecules.
5.	Some energy is transferred to these air molecules.
6.	The speaker collides with nearby air molecules.

Classify the words liquid, solid, and gas on the continuum below. Describe how close the molecules are to each other in each phase.



Section 1 The Nature of Sound (continued)

**Main Idea**

**How does temperature affect the speed of sound?**

*I found this information on page \_\_\_\_\_*

**Human Hearing**

*I found this information on page \_\_\_\_\_*

**Details**

**Compare** the speed of the sound of a child yelling outside when it is 10° C to the speed of the sound when it is 30° C.

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**Create** your own sketch of an ear. Label and describe what each part of the ear does to enable you to hear.

- |             |           |              |
|-------------|-----------|--------------|
| • anvil     | • eardrum | • outer ear  |
| • cochlea   | • hammer  | • middle ear |
| • ear canal | • stirrup | • inner ear  |

**SYNTHESIZE IT**

Predict how hearing would change in a person with a damaged eardrum and hypothesize why this would be.

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# Sound

## Section 2 Properties of Sound

**Preview** the photos and illustrations in Section 2. Read the captions. Write three things you think will be discussed in this section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

**Define** frequency in a sentence that shows its scientific meaning.

*frequency*

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### New Vocabulary

**Define** the following terms.

*intensity*

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*loudness*

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*decibel*

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*pitch*

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*Doppler effect*

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### Academic Vocabulary

**Use** a dictionary to define volume as it relates to sound.

*volume*

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## Section 2 Properties of Sound (continued)

### Main Idea

#### Intensity and Loudness

I found this information on page \_\_\_\_\_

### Details

**Create** density drawings of molecules in sound waves with a high level of intensity and a low level of intensity. Label a rarefaction and a compression.

	Low Intensity
	High Intensity

I found this information on page \_\_\_\_\_

**Compare** the travel distance and energy of high and low intensity sound waves. Identify which wave will travel farther, and which wave will lose its energy more quickly.

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I found this information on page \_\_\_\_\_

**Complete** the paragraph to summarize loudness.

The perception of intensity is \_\_\_\_\_. Loud sounds come from \_\_\_\_\_ that have \_\_\_\_\_ and \_\_\_\_\_. When these waves reach your ear, they cause your \_\_\_\_\_ to \_\_\_\_\_ than sound waves with \_\_\_\_\_. This leads to \_\_\_\_\_ of the bones of the \_\_\_\_\_ and of the \_\_\_\_\_ in the inner ear. As a result, you hear a \_\_\_\_\_ sound.

## Section 2 Properties of Sound (continued)

### Main Idea

#### Intensity and Loudness

I found this information on page \_\_\_\_\_

#### Pitch

I found this information on page \_\_\_\_\_

#### The Doppler Effect

I found this information on page \_\_\_\_\_

### Details

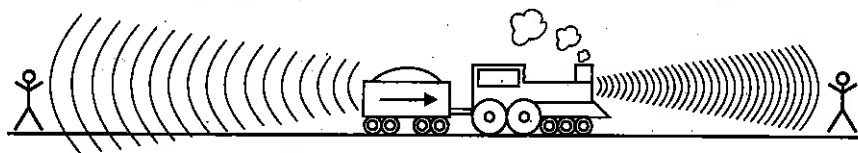
Identify the following key characteristics of sound intensity.

- how sound intensity is measured \_\_\_\_\_
- level of sound intensity that damages human hearing \_\_\_\_\_
- level of the faintest sound humans can hear \_\_\_\_\_

Organize information about sound frequencies in the table.

Name	Frequencies	Humans can hear?	Use or Examples
Infrasonic			
Sonic	20 Hz-20,000 Hz		
Ultrasonic			

Complete the graphic organizer about the Doppler effect.



When a source of sound is moving \_\_\_\_\_ you, compressions are \_\_\_\_\_, so the sound has a \_\_\_\_\_ frequency and a \_\_\_\_\_ pitch.

When a source of sound is \_\_\_\_\_ you, compressions are \_\_\_\_\_, so the sound has a \_\_\_\_\_ frequency and a \_\_\_\_\_ pitch.

### CONNECT IT

Design a simple experiment to show younger students that sound intensity decreases with distance.

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# Sound

## Section 3 Music

**Skim the headings, photos, illustrations, and captions in Section 3. Write three questions you have about this section.**

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

**Define resonance to show its scientific meaning.**

*resonance*

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### New Vocabulary

**Read the definitions below, then write the key term for each one in the left column.**

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made of sounds that are deliberately used in a regular pattern

describes the differences among sounds of the same pitch and loudness

a vibration with a frequency that is a multiple of the fundamental frequency

a hollow space filled with air that makes sound louder when the air inside of it vibrates

### Academic Vocabulary

**Use a dictionary to define fundamental as an adjective.**

*fundamental*

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Section 3 Music (continued)

**Main Idea**

**Making music**

I found this information  
on page \_\_\_\_\_

I found this information  
on page \_\_\_\_\_

I found this information  
on page \_\_\_\_\_

**Details**

*Distinguish between music and noise in your own words. Give one example of each.*

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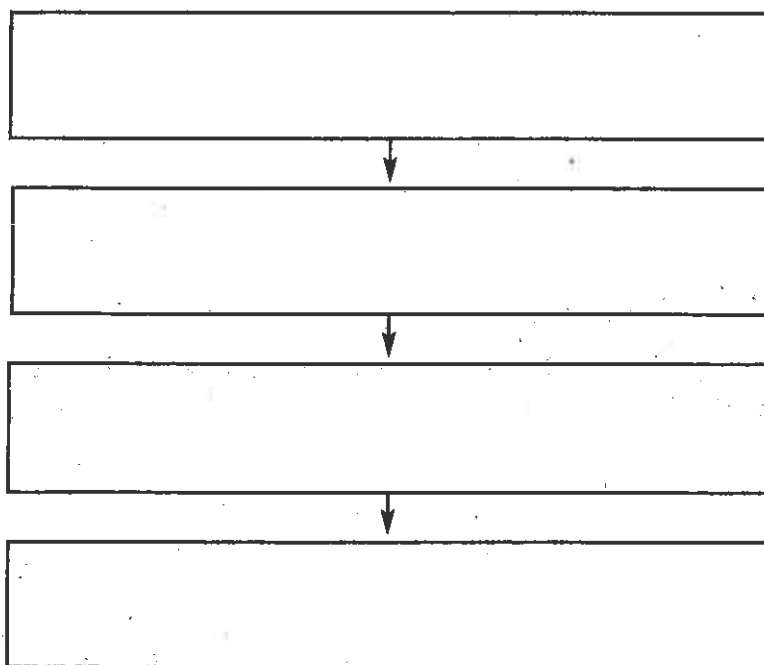
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**Summarize** the 3 things that determine the natural frequency of a guitar string.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Sequence** steps in the resonance of a woodwind instrument.





## Section 3 Music (continued)

### Main Idea

#### Sound Quality

I found this information  
on page \_\_\_\_\_

#### Musical Instruments

I found this information  
on page \_\_\_\_\_

### Details

**Analyze** the factors that cause each musical instrument to have its own unique sound quality.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Complete** the table showing the different types of musical instruments and how they produce sound.

Type of Instrument	How is sound produced?	What is the resonator?	Examples
Strings			
Brass and Woodwinds			
Percussion			

### CONNECT IT

Design a musical instrument. Make a sketch of the instrument and describe how it produces music, how you change notes, and what the resonator is.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Sound

## Section 4 Using Sound

**Objectives** Before you read Section 4, think about places where concerts take place. What sound advantages do indoor concerts have over open air concerts?

1. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

**Define** echo in a sentence of your own.

echo \_\_\_\_\_

### New Vocabulary

**Define** the following key terms. Then use each term in a sentence.

acoustics \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

echolocation \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

sonar \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ultrasound \_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

**Use** a dictionary to define design.

design \_\_\_\_\_

**Section 4 Using Sound (continued)**

**Main Idea**

**Acoustics**

*I found this information  
on page \_\_\_\_\_.*

**Details**

**Summarize** three characteristics of a room that can affect reverberation. List three materials or ways to reduce reverberation.

**Factors that Affect  
Reverberation**

**Ways to Reduce  
Reverberation**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Echolocation**

*I found this information  
on page \_\_\_\_\_.*

**Model** a bat using echolocation to identify an insect. Be sure to include the sound waves being sent from the bat and reflecting to the bat from the insect.

**Summarize** how bats use echolocation to hunt.

\_\_\_\_\_  
\_\_\_\_\_

**Sonar**

*I found this information  
on page \_\_\_\_\_.*

**Sequence** the steps involved in using sonar to find the distance to an underwater object.

1. A sound pulse is emitted toward the bottom of the ocean.

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2. \_\_\_\_\_

↓

3. \_\_\_\_\_

↓

4. \_\_\_\_\_

↓

5. \_\_\_\_\_

## Section 4 Using Sound (continued)

### **Main Idea:**

*I found this information  
on page \_\_\_\_\_.*

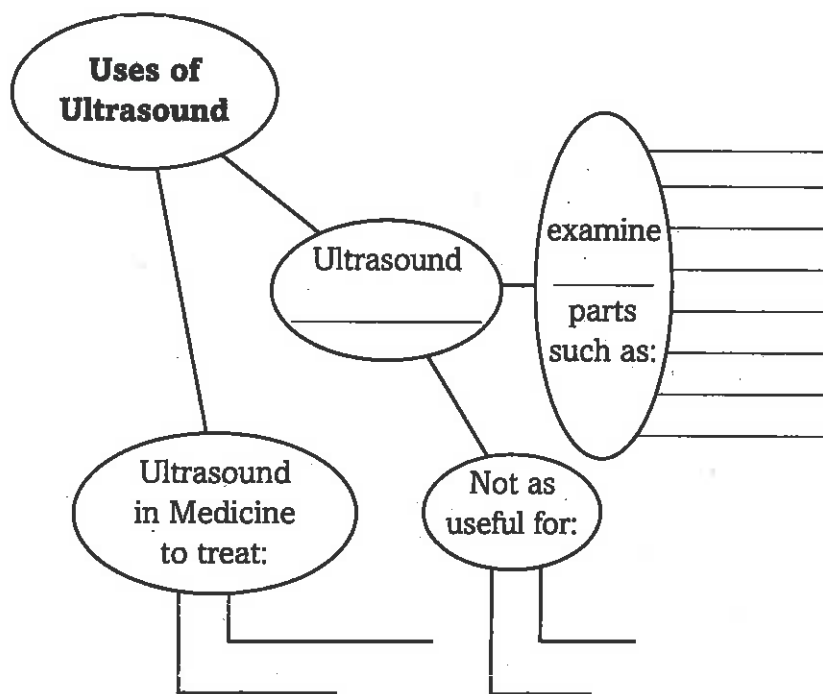
## Details

**Identify four uses of sonar.**

# Ultrasound in Medicine

*I found this information  
on page \_\_\_\_\_.*

**Organize** *information about the uses of ultrasound in medicine.*



## SYNTHESIZE IT

**SYNTHESIZE IT** Think about what you have learned about how particles absorb energy from waves to predict how ultrasonic treatments are able to break up kidney stones.