Wild Music
Sounds & Songs of Life
Whales compose, bullfrogs chorus, songbirds greet the dawn, and people everywhere sing and dance. What do we all have in common? Long before the advent of iTunes, the musical instinct ran deep. *Wild Music* explores evidence for the biological origins of music through interactive exhibits and sound experiences—and in the process, expands our understandings of what makes music.

**Big Ideas**
- We humans share sound and music with other animals.
- Music has ancient origins and is spread among all peoples.
- Humans have drawn inspiration from the natural world to make music and still do so.
- In nature, you are expected to be both performer and listener.
- All creatures live in soundscapes that contain varying sounds generated by the earth, by life, and by human technologies.
- We are all born musical.

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*Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.*

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**This guide contains:**
- Exhibition overview, page 3
- Connecting with the classroom
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- Benchmarks and standards, page 20
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**When you visit the Wild Music exhibition:**
- Share expectations, plans and schedules for the visit with students and chaperones. Give chaperones copies of any materials given to students. Give chaperones copies of any activities students will do.
- Do some preparation activities before your visit. Use suggestions in this guide and the resource list for more ideas.
- Divide your class into small groups to work together in the exhibition.
- Review this guide for connections to your curriculum. Choose the activities that meet your needs best. Add your own page(s). Use journals or composition notebooks if you use these in classroom work. Bring sturdy cardboard to write on if you plan to use single pages.
- Exhibit components are not sequential. You can start anywhere in the exhibition.
- Ask students to add their own questions and observations that arise during their exhibit explorations.

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EDGEOF THE FOREST
Hunt for sounds of forest creatures and explore exhibits about music inspired by nature.

Music and Nature/Inspired by Animals
Listen to examples of human music drawn from and influenced by a soundscape. See examples and hear sound samples of bird whistles, rasps, ocarinas, and other instruments inspired by sounds in nature. Match the sounds with the instrument. With headphones, listen to excerpts of Chinese, European, and American music that is associated with bird song.

Parabolic Microphone and Bird Song
Use a microphone with a parabolic reflector (just like one a field scientist would use) to pick out a variety of birds, squirrels, toads and even a forest stream, just like a field scientist would use. Locate and identify specific sounds and learn more about current research on bird song.

Pictures of Sound
Experience sound through touch, sight, and hearing. See how the sound patterns of animal songs look and feel on spectrogram cards. These spectrograms show how the frequencies of the songs change over time.

Instruments:
Talking Drum
For centuries, people in western Africa have used drums to communicate over long distances. Talking drums are variable pitch drums that can mimic the pitch and inflection of human speech. See a drum and listen to talking drum music from Ghana.

Xylophone
Play a wall-mounted xylophone. To the right of the xylophone is a painted deep-relief sculpture of a Palm cockatoo drumming on a tree with a stick held in its claws.

Flutes of the World
Examine a collection of flutes. Compare a replica of a 53,000 year old cave bear bone flute, a Japanese Shakuhachi, Peruvian panpipes, an Eastern European shepherd’s pipe, an Indonesian bamboo flute, and even a tin whistle.

“Musicality is universal, and innate. But it’s not just the universality that’s significant—it’s the remarkable diversity of musical expression.”
—Donald Hodges, University of North Carolina at Greensboro

“Human and animal music are remarkably similar along important dimensions—including rhythm, theme and variation, and even harmony and rhyme.”
—Patricia Gray, University of North Carolina at Greensboro

“Animals taught us to dance and sing.”
—Bernie Krause, Wild Sanctuary
Exhibition Overview, continued

**BIOACOUSTICS LABORATORY**
Explore the scientific study of sound in the natural world.

**Electronic Voice**
Use an electrolarynx to speak without using vocal cords or try it on a set of acrylic throat models. See the resulting sounds appear as a real-time spectrogram.

**Bird Voice/Human Voice**
Operate working models of a human larynx and bird syrinx.

**Touchable Sound**
Use a set of tactile, vibrating metal reeds to investigate the richness of the sound mix of musical instrument tones, animal sounds, and your own voice.

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**THE TOWN**
Human sounds reveal their deep biological origins.

**Music and Memory**
Record memories of music. Listen to a familiar song and describe the memory it evokes.

**The Music of Daily Life**
Listen to a variety of city soundscapes recorded by long-time collector Tony Schwartz, including the sounds of markets, streetcars, buskers, street vendors, and outdoor cafes.

**Music at Work**
Listen to songs inspired by physical activities such as hauling nets, moving logs, and pounding grain that require a number of people to move in unison. Improvised lyrics can relieve monotony, allow for self-expression, send messages in code.

**Jamming Room**
Compose songs using pre-recorded audio soundscapes, touch-pad activated MIDI instruments and animal voices, acoustic percussion instruments, and live vocals.

**Born Musical**
Test music-listening skills in comparing subtle differences in melody and rhythm that babies of many cultures are able to detect.
OCEAN DEEPS

Underwater Microphone
Use a hydrophone in a water-filled tank and listen to a bubbler, trolling motor, and a ratchet to explore how sound is transmitted under water.

Sea of Sounds
Investigate surprisingly diverse sounds of animals that live in the sea as well as the sounds of underwater earthquakes and cracking ice.

Music of the Deep
Explore the songs of humpback whales to hear songs of repeating phrases and themes.

Watery Music
Examples of human music drawn from and influenced by water soundscapes, including pieces by Canadian composer R. Murray Schafer, Chinese composer Gao Hong, and Tuvan throat singer Anatoli Kuular.

Shell Trumpets
See, touch, and hear an ocean shell like those used by shore-dwelling cultures for trumpeting communications.

POWER OF MUSIC

What Is Music?
“What is music, anyway?” and “How are animal sounds like music?” Audio interviews with environmental sound artist Philip Blackburn, biologist Steve Nowicki, Yup’ik artist Chuna MacIntyre, ethnomusicologist Elizabeth Tolbert, and neuroscientist Mark Tramo.

The Power of Sound and Music Theater
A seven-minute sound and video loop looks at
• Me: how humans and other animals use sound and music to advertise their presence;
• Me and You: how humans and other animals call and respond to each other;
• Us: how humans and other animals use sound and music to form and nurture social groups.

Ambient Sound
The exhibition features a three-part musical composition by composer and sound artist Philip Blackburn. This provides an “acoustic backbone” to sounds emanating from individual exhibit components.
BEFORE YOUR FIELD TRIP
Field trips are most effective when integrated with your curriculum. Below are activities that can be used as an introduction to the topics of the Wild Music exhibition. Many can be used after your trip or in an ongoing exploration of the topics.

LISTENING
Listening to “silence”
Grades K–12
Carve out a “silence time”, 1–5 minutes as age appropriate.
Afterwards, discuss: What did you hear? What are sounds you never noticed before? Was it ever totally silent, with no sound at all? Did you hear sounds of living things (including humans), human-made technology, or something else?

Everyday sounds
Grades K–4
Ask students to list the sounds they hear each day. Include:
—what you hear in the morning
—on the way to school
—in school
—after you get home
Use the list the next day and add new things as students hear them.
Grades 5–8
Ask students to make two lists: one of sounds that are electronic (on computer, TV, MP3, radio, etc.) and one of sounds that are not electronic. Discuss how the lists are different, which list has more items and which represents more time and what would it be like if one set or the other would be eliminated.

Sound map
Grades 5–8
Make a sound map. Ask students to map their route to school. Where and what are the sounds? What kind of sounds are they?

Listen to bird sounds
Grades K–12
Doug Von Gausig has recorded hundreds of bird sounds—many of them near his home in Arizona. http://www.naturesongs.com/ Click on any of the bird names to hear their sounds. If students are not familiar with any of the sounds, try these first:
http://www.naturesongs.com/mallard1.wav
http://www.naturesongs.com/mourndove1.wav
http://www.naturesongs.com/ghowl.wav
http://www.naturesongs.com/cardinal1.wav
http://www.naturesongs.com/blja1.wav
• Can you identify what bird it is? What qualities help you? (e.g., pitch, sequence of tones, reminds you of something else?) How many birds do you hear? What other sounds can you hear? Keep a bird sounds diary at home or in school.
Note:
—what sounds you hear
—what time of day is it
—where is the bird
—do you hear one or more
Representing sounds
Grades K–12
Listen to music, rhythms, songs. Ask students to draw or represent what they hear using colors, shapes, lines, or movement. Try a simple song together, like Twinkle, Twinkle, Little Star. Identify what qualities are heard and brainstorm how they could be shown: for example, high, low; slow, fast; smooth, choppy.
Challenges:
• Use standard musical notation. Listen to a song, and ask students to write down what they think it would look like on sheet music.
• Ask students to represent a song they think others would know. Can someone else “read” the representation? Is it easier to learn a new song by “reading” a representation or hearing it? Why do you think that might be?
• Listen to a soundscape. Represent a soundscape, with its many and complex sounds. Find soundscapes at http://www.wildsanctuary.com/index3.html Click on the The Wild Store. Choose a soundscape and click on the preview to sample them. Learn more about soundscapes at http://www.wildmusic.org/en/soundscapes

SCIENCE OF SOUNDS
What’s vibrating?
Grades K–4, 5–8
Provide students with materials to make “guitars.” Use empty boxes and wrap various size rubber bands around them.
Discuss:
—What do you notice when you pluck the rubber bands?
—Use your eyes and ears.
—What different sounds can you make and what seems to make different sounds?
—As a class, make a list of sound “rules”. Test them out on other musical instruments, homemade or conventional.

Can you hear without ears?
Grades K–4, 5–8
Set a tuning fork vibrating and place the end (not the “fork” part) on your skull just behind your ear. Move it away from your skull. Try it several times. Why is it louder when the tuning fork touches your skull?

Coat hanger chime—use meter-long pieces of string and hang a coat hanger or spoon from the string, with the string ends wrapped around each index finger. Stick the index fingers in your ears, and tap the dangling hanger or spoon into a table or desk.

For more Science of Sounds activities, check the Resources section, pp. 21–23.
REFLECTING ON WILD MUSIC
Grades 7–12
Introduce one of the following topics for a focused look at the exhibition. Allow time for individual journaling about the questions, then share thoughts in small groups. Return to the focusing questions after the field trip to revise or support comments with evidence from the exhibition.

Wild Music
What is music?
*During the field trip:* Choose a statement from one of the quotes in *Wild Music*. Who said it? What did they say? Do you agree or disagree? Explain.

Wild Music
Is there music in the wild? Scientists study the sounds of many creatures.
*During the field trip:* Would you call the sounds of the non-human animals in the exhibits music? Why or why not? What function do sounds serve for animals?

Using music
How do people use music?
*During the field trip:* Find examples of the function of music in people’s lives.

Additional focusing activities for secondary students:
Reverse quiz
Learn as much as you can about the *Wild Music—Sounds and Songs of Nature* exhibition. Explore and write 5 questions that a classmate could answer by exploring as you did. Be sure to include an answer key or hints.

Seeing and feeling sound
Compare ways of representing sound in *Wild Music*. What senses are used? Which one is most effective for you? Choose one exhibit and imagine a way to show sound in a new or different way.

AT THE MUSEUM

When you visit the *Wild Music* exhibition:

- Do some preparation activities before your visit. Use suggestions in this guide and the resource list for more ideas.
- Divide your class into small groups to work together in the exhibition.
- Share expectations, plans and schedules for the visit with chaperones. Give chaperones copies of any materials given to students. Give chaperones copies of any activities students will do. There is a chaperone page just for K–4 (pg. 9) that will assist chaperones in facilitating the visit, especially if the students do not have student pages to complete.
- Exhibit components are not sequential. You can start anywhere in the exhibition.
- Ask students to add their own questions and observations that arise during their exhibit explorations.
- Review the AT THE MUSEUM Student Pages templates (pp. 10–17) for connections to your curriculum. Choose the activities that meet your needs best. Add your own page(s). Use journals or composition notebooks if you use these in classroom work. Bring sturdy cardboard to write on if you plan to use single pages. Go over all pages with students before your field trip to share your expectations, clarify questions, and reinforce vocabulary.

K–4 Chaperone Page .................... 9
Student pages for K–4 ................... 10–11
Student pages for 5–8 ................... 12–15
Student pages for 9–12 ................... 16–17
Wild Music

• Allow time for student exploration.
• Interact and play with the exhibits.
• Encourage students to stay at one component long enough to hear/experience.
• Use the headphones and then share what you heard.
• Encourage playing simple tunes on the touchable instruments.

Here are some things to look for and questions to share with your group.

Feel and listen to the music of animals
Find examples, listen, make the sound yourselves.

bird
mammal
insect
spider
human
underwater animals

Be a sound scientist
Discuss what you notice when you try these:
• Use the parabolic microphone
  (Edge of the Forest) There are 8 different sounds—can your group find them all?
• Listen to sounds from the hydrophone
  (Ocean Deeps)
• Sound labs—what do you learn about sound when you try these?

Jamming Room
Can your group create a song together without talking?

Play a tune
There are instruments you can play.
Students can take turns:
• playing a song for the group to guess
• play a pattern for someone else to echo
• play a pattern for someone else to change slightly
My Secret Animal Sound

Find an animal sound in *Wild Music.*

Circle the way it sounds

high    low    smooth    choppy
fast    slow    soft    loud

More about the sound: _______________________________________________________
______________________________________________________________________
______________________________________________________________________

What kind of animal is it?
______________________________________________________________________

Draw the animal here
Guess My Tune

Listen to 2 songs in *Wild Music*. For each song, draw what you hear so that someone else could sing or play that song. Show the music you hear!

**Song 1**

**Song 2**
Guess My Tune

Listen to 2 songs. For each one, reproduce what you hear so that someone else could sing or play that song. Include pitch, rhythm, phrase, intensity (loud/soft), and tempo (speed).

Song 1

Song 2
Where in the World?

Do a treasure hunt for your friends. Include 5 examples of music from different parts of the world. Create sound clues to help them find the examples. Be sure to include answer keys.

1

Sound is from __________________________________________________________

2

Sound is from __________________________________________________________

3

Sound is from __________________________________________________________

4

Sound is from __________________________________________________________

5

Sound is from __________________________________________________________
Wild Music Expert

Get to know one exhibit component really well.
Read all of the text, do all of the activities related to this one idea.
You will be the expert on this exhibit. Make sketches with labels and describe the main point.
Here is a space for your notes:

Find evidence to support one of the following statements:
Choose one statement. Circle the statement you chose.
Find examples in Wild Music to show it is true.

• Music is found all over the world among different peoples.
• Humans have drawn inspiration from the natural world to make music.
• In nature, animals are both performer and listener.
• Creatures live in soundscapes that contain sounds generated by the earth, by living things, or by human technologies.

Examples: __________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
Field Notes

You are the scientist. Take field notes about the sounds of one creature in the *Wild Music* exhibition.

Name of species/type of animal _________________________________________________________

Location: edge of forest ocean deeps the town

Can you see the subject? yes no

How many? (one or more than one) _____________________________________________________

Distance of subject from scientist/recorder (that's you!) ________________________________

Today's date________________________Time of day_______________________________

Reproduce what you hear so that someone else could sing or play that sound. Include pitch, duration, sequence, and intensity (loudness). Use any system you like to show the sound.

If you wanted to record this creature in the wild, what equipment would you need?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Evidence

Find evidence to support the following statements:

• Music has ancient origins and is found all over the world among different peoples.

• Humans have drawn inspiration from the natural world to make music in the past and still do so today.

• In nature, animals are both performer and listener.

• Creatures live in soundscapes that contain sounds generated by
  1) the earth,
  2) by life, and/or
  3) by human technologies.

Find an example for all three.
Jamming Room
Watch the humans making sounds in the Jamming Room. Describe what you hear and see. (Types of sounds being made, do individuals work together or is there competition? Do people watch each other when they play together?)

Power of Sound and Music
Watch the entire presentation. What is the function of sound and songs in each of these segments? How are sounds used by the creatures, including humans, in:

Me

You and Me

Us
AFTER YOUR FIELD TRIP

Discuss the activities the students did during the field trip. Share what everyone found, new ideas and questions.

Review Activities
My secret animal sound
Grades K–4
Exhibit activity in which students describe an animal sound they heard, page 10. Try out student clues with a partner or two. Can other students guess the “secret animal” from the sounds alone? Create a Wild Music Gallery with student drawings of the animal with the sounds they make below. Make a class composition with all of the animal sounds students found to create a Wild Music Song.

Where in the world?
Grades 5–8
Using the examples of human music from 5 places in the world (exhibit activity, page 13), ask students to put each example on a post-it or a small piece of paper and add to a world map. Are there any places in the world that didn’t have any examples? Why not? Research music from those areas, or find further information on music enjoyed in Wild Music.

List of locations
Australia
Austria
Brazil
Cameroon
Canada
Central African Republic
China
Costa Rica
England
France
Ghana
Indonesia
Japan
Papua New Guinea
Peru
Philippines
Romania
Samoa
Scotland
Slovenia
South Africa
Tuva
USA
Vietnam

Sound poetry
Grades K–4, 5–8
Create a poem including the sounds you hear everyday. Add vocal sounds or “found sounds” for an oral reading presentation. Illustrate the poem for a sound book.

Why do birds sing?
Grades 5–8, 9–12
Review some characteristics of bird sound that students heard in Wild Music. Continue the bird sounds diary (pg. xx) and add more detail than in previous listings (loudness, change in song, habitat description, etc.). What function do you think the call may have? Use the Macaulay Library of the Cornell Lab of Ornithology or bird book (see Resources section page 21) to research one bird song.

Extension Activities
Here are a few suggestions for extension activities back in the classroom linked to areas of Wild Music.

Edge of the Forest
Grades K–6
Make an instrument (maracas or shakers). Use the http://www.wildmusic.org/en/aboutsound/soundactivities website for directions. Decorate with animal images or designs that are important for your area or students. Several resources in the resource list (pg. 21) have directions for a multitude of instruments.
Ocean Deeps
Grades 5–12
Why can some whale songs be heard over hundreds of miles? Research the effect of fresh or salt water, temperature, or frequency of the song itself on how fast or how far songs can travel.
• http://www.ifaw.org/ifaw/general/default.aspx?oid=126068
• http://whale.wheelock.edu/Welcome.html

Bioacoustics
Grades 5–12
Research sound-making of animals, especially ultra- & infra-sonic. What animals produce infrasonic sounds and what is considered “infra”? What is the function of sound produced at very low or very high frequencies?
http://www.wildmusic.org/en/aboutsound/mosquito
What benefit might hearing very high or very low sounds have for animals? How can this attribute be useful for humans?

How does a spectrogram help in studying sounds? Using the Macauley Library of sounds and spectrograms (see Resources page 21), ask students to describe several of the sounds/spectrograms and what they notice about the sounds that is more than just what they hear.

The Town
Grades K–12
Discuss the question: How do you use music? Ask students to identify ways they or their families use music. How important is music to them? To their parents? To their grandparents? Are there special songs that have important meanings personally or for groups?

Wild Music includes recorded sounds of hollers, chants, and work songs. Work songs often helped people keep a rhythm or made the work easier in some way.
What jobs would be better with a “work song”?
What other pastimes do we have today that have associated songs or chants? (e.g. lullabies, jump rope chants, marching cadences, etc.)
Share examples you and your students have heard or used.

The Power of Sound and Music
Grades 7–12
Discuss or revisit the questions discussed before your field trip (Reflecting on Wild Music, pg. 8):
What is music? Do you think the animal sounds you heard in Wild Music are music? What makes them musical to us?
Discuss the experience in the small theater: How does sound help creatures communicate with each other? What and how did this presentation communicate without using words?

Electronic technology has changed a lot about music production and listening. What are some electronic means to hear and make music? What are some of the pros and cons about using electronics in music?
The Wild Music exhibition and Teacher Guide present opportunities for students to develop arts and science understandings in integrated contexts. The exhibition and teacher guide are most closely aligned with the following content standards.

**National Standards for Music Education**

**Grades K–4**
Music is a basic expression of human culture

**Grades 5–8**
Composing and improvising provide students with unique insight into the form and structure of music and at the same time help them to develop their creativity. Broad experience with a variety of music is necessary if students are to make informed musical judgments. Similarly, this breadth of background enables them to begin to understand the connections and relationships between music and other disciplines. By understanding the cultural and historical forces that shape social attitudes and behaviors, students are better prepared to live and work in communities that are increasingly multicultural.

**Grades 9–12**
Skills in analysis, evaluation, and synthesis are important because they enable students to recognize and pursue excellence in their musical experiences and to understand and enrich their environment. Because music is an integral part of human history, the ability to listen with understanding is essential if students are to gain a broad cultural and historical perspective.

**National Science Education Standards**

**Physical Science**
K–4 Properties of objects and materials, Position and motion of objects

**Life Science**
K–4 Characteristics of organisms, Organisms and their environment
5–8 Structure and function in living systems, Regulation and behavior, Diversity and adaptation of organisms
9–12 Interdependence of organisms, Behavior of organisms

**Science and Technology**
K–4, 5–8, 9–12 Understandings about science and technology

**History and Nature of Science**
K–4, 5–8, 9–12 Science as a human endeavor
9–12 Nature of scientific knowledge

For more detail about these standards, check http://www.nap.edu/readingroom/books/nse/html/6a.html

**Benchmarks for Scientific Literacy**

From The American Association for the Advancement of Science

Wild Music topics are interdisciplinary and refer to the following sections:

**The Physical Setting**
Motion Grades K–2; 6–8

**The Mathematical World**
Symbolic Relationships K–2, 3–5, 6–8, 9–12

For more specific guidelines per grade level, view the website http://www.project2061.org/tools/benchol/bolframe.htm

For more detail about these standards, check http://www.menc.org/publication/books/standards.htm
RESOURCES

Wild Music Glossary
Includes location of an example in the Wild Music exhibit. See maps in the Exhibition Overview, (pp. 3–5).

Bioacoustics  A cross-disciplinary science that studies sound production and reception in animals, including humans. BIOACOUSTICS LABORATORY

BioMusic  A cross-disciplinary science that studies the biological basis of music and musical sounds in all species.

Didgeridoo  Ancient Australian wind instrument  EDGE OF THE FOREST

Frequency  How fast air molecules vibrate, faster creates higher pitch.

Guiro  Latin American percussion instrument, played by rubbing a stick across a ridged surface. EDGE OF THE FOREST Miniature musicians

Hertz  measuring unit for frequency (Hz); cycles or vibrations per second; khertz = 1000 Hz. BIOACOUSTICS LABORATORY Touchable Sound

Hydrophone  Underwater microphone. OCEAN DEEPS

Maraca  Musical gourd or gourd shape filled with small items (e.g. seeds) to make sounds. EDGE OF THE FOREST Inspired by Animals

Ocarina  Wind instrument, often made of clay, with several finger holes. EDGE OF THE FOREST Inspired by Animals

Oscilloscope  An electronic instrument that graphs an electrical signal. BIOACOUSTICS LABORATORY Touchable Sound

Parabolic microphone  Parabolic reflector collects sound and focuses it on a microphone; the larger the dish, the louder the sound. EDGE OF THE FOREST

Phrase  Combination of motives (human music) or units (whale songs). OCEAN DEEPS Whale Song Structure

Rasp  A grooved instrument, played by rubbing with a stick. EDGE OF THE FOREST Inspired by Animals

Soundscape  Collection of natural and human sounds that characterize a given area. All sections, especially EDGE OF THE FOREST Music & Nature

Spectrogram  A picture of sound that shows how its frequencies change over time. EDGE OF THE FOREST, BIOACOUSTIC LABORATORY, OCEANS DEEPS, POWER OF SOUND & MUSIC

Theme  Collection of 7–8 phrases (whale song) or several phrases (human music). OCEAN DEEPS Whale Song Structure

Sound Basics:
If you need a refresher on the science of sound:
http://www.yale.edu/ynhti/curriculum/units/2000/5/00.05.05.x.html#b
http://www.stomponline.com/percuss2.html (also contains sound activities)

Good overview of sound, sound in the ocean and how sound is studied in the oceans.
http://oceanexplorer.noaa.gov/explorations/sound01/background/acoustics/acoustics.html
Websites

The Wild Music website
http://www.wildmusic.org/
Includes on-line activities, directions for classroom activities, biographies of scientists working in the field of bioacoustics, and more.

Birdsong
http://www.naturesongs.com/
Lots of clips of natural sounds recorded by Doug Von Gausig. Includes links to other sites with bird sounds. Other creatures are included, but focus is on birds.

Underwater Sounds
The NOAA website has an extensive section on spectrograms of a variety of underwater sounds. They have performed continuous monitoring of ocean noise since August 1991. Try your hand at identifying these mystery sounds.
http://www.pmel.noaa.gov/vents/acoustics/specs_mystery.html

Science of Sound Activities
Numerous classroom activities to investigate sound, sound waves, and models of instruments and human sound sources and receivers (hanger on a string, the ruler on a table, model string instruments and a straw oboe). Also a source of recorded sounds.

Animal Sounds
The Macaulay Library of the Cornell Lab of Ornithology has the world's largest archive of animal sounds. You can listen and view the spectrogram at the same time. It requires a free download of Raven Lite—quick and easy to do.
http://www.animalbehaviorarchive.org/loginPublic.do

Human Sounds
Tony Schwartz has spent decades recording a variety of songs, chants, street sounds, even airport public address announcements and dog barks. One of his albums, 1,2,3, and a Zing Zing Zing, is a collection of children’s jump rope chants, camp songs, rhymes, and other childhood rhymes.
Sample his recordings at Smithsonian’s Global Sound website

Soundscapes
http://www.wildsanctuary.com/index3.html
Click on The Wild Store. Soundscapes from all over the world, from Maine to Sumatra to Antarctica.

Books and Articles
Emily Silverman, Margaret Coffman, Betty Anne, Younker, “Cheep, Chirp, Twitter, & Whistle”, Science and Children, 44/6, pp20-25. (February, 2007)
Listening to birdcalls for the elementary classroom.

Les Beletsky, ed. Foreword by Jon L. Dunn
An easy-to-use audio feature allows you to see the bird’s picture and listen to its call at the same time. All ages.
Part of the Engineering is Elementary series, this book introduces a boy from Ghana who needs to represent sounds in a different way, receiving advice from his acoustical engineer father and his associate, elephant sound researcher, Katy Payne. Teacher manual also available for classroom introduction to engineering challenges. Grades 1–5

Sounds of the neighborhood, sound around us, lots of sound words (eeee, gonk, gonk, etc.) Grades K–3


Basics of making and hearing sound, how sounds are used to communicate by a variety of animals, including humans. Includes several simple sound activities. Grades K–3

Carolrhoda Books, Inc.
Introduces animals that make sounds in the sea, how sounds are produced and received, and the role sound plays in the life of these creatures, e.g., shrimp, lobsters, seals, walruses, and giant whales. Includes color photos of the creatures. Grades 3–6

A comprehensive and accessible resource for activity-based exploration of music and sound. Includes numerous instructions for making instruments (both traditional and creative soundmakers), “scientist’s corner” to investigate the science of music, many drawings and diagrams. Grades 4–7

Making instruments from found objects, using Velcro, body drums or ripping paper for a sounds orchestra. Grades 3–7

Biomusic Overview