

DOLPHIN RESEARCH CENTER

Songs and Sounds

Grade Level: 3rd – 5th

Objectives: To increase students' awareness of: dolphin acoustics & the various interpretations and myths concerning their songs or sounds. To demonstrate their knowledge of dolphins in a creative way: the power of song.

Florida Sunshine State Standards:

Language Arts

L.A.D.2.2.2: The student identifies and refers to symbol, theme, simile, alliteration, and assonance in oral and written texts.

L.A.C.1.2.1: The student listens and responds to a variety of oral presentations, such as stories, poems, skits, songs, personal accounts, informational speeches.

National Science Education Standards

Content Standard C (K-4) - Characteristics of Organisms: Each plant or animal has different structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

Content Standard C (5-8) - Diversity and Adaptations of Organisms: Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Background: The sounds that a dolphin makes underwater serve to locate food, transfer information about the dolphin's environment, and, possibly, to communicate with other dolphins. These sounds are generated inside the head under the blowhole, and, generally, without air escaping from the dolphin's blowhole. There are two hypotheses about how dolphins produce sound underwater.

The most widely accepted hypothesis is that sounds are produced in three pairs of air sacs located underneath the blowhole. When the dolphin takes a breath, it closes its blowhole. After circulating, air returns from the lungs into the channel leading to the blowhole, and, finally, into an air sac, inflating it. At the opening of each air sac is a nasal plug. Air is forced out of the air sac and over the nasal plug, producing the various sounds.

The other hypothesis for sound production is that the air sacs act as an acoustical mirror, focusing sound produced by small knobs of fatty tissue just beneath the blowhole.

Key Terms

Echolocation: A sensory system in certain animals in which usually high-pitched sounds are emitted and their echoes interpreted to determine information about objects, including size, distance, and direction.



Songs and Sounds

These tissue knobs may act like lips that flap together when air is pushed past them, creating a pulse that is transmitted out into the water.

The reason that scientists are not sure which hypothesis is correct is that no one has ever been able to see inside a dolphin's head while it is making sounds. The medical equipment available today that could allow researchers to see what is happening is not readily accessible, too difficult to use with dolphins, or presents some danger to the dolphins' well-being. As medical technology progresses, we might one day be able to directly observe the dolphins' sound producing mechanism. For more info, see **Acoustics** information file.

Materials:

- Tape of dolphin/ whale sounds
- Balloons
- Paper
- Repertoire of familiar tunes:
*i.e. Row, Row, Row Your Boat, Take Me Out
 To The Ball Game, Ring Around The Rosies,
 The Addams Family Theme, I'm A Little Tea Pot, etc.*
- Pens/Pencils
- **Acoustics** information file handout

Teacher Prep Notes: Be familiar with tunes to facilitate students' songwriting abilities!
 Read information file on **Acoustics**

Procedures:

Introduction:

1. Play tape.
2. What was that? What do you think you heard?
3. Sailors thought these haunting songs were the ghosts of sailors.
4. Discuss what was making those songs/sounds.
5. Ask students if they would call them "sounds" or "songs".
6. Have students blow up their balloons.
7. Ask for volunteers to make different sounds - really play around with this, so that they understand the various types of sounds that can be made.
8. Do dolphins have balloons to make sounds?
9. Discuss how dolphins produce sounds by releasing air through their blowholes much like air is released from their balloons.
10. Hand out a copy of the **Acoustics** information file, read as a class and discuss.
11. We are going to make up our own songs. Because we don't have blowholes to manipulate to produce sounds and songs, we will write our own lyrics to songs we know the tunes of and have our very own concert!



Songs and Sounds

12. Have students choose to either work in groups or individually to write lyrics based on factual information they have learned about dolphins. (At least five facts should be included in their song). Their lyrics can include what certain whale sounds remind them of, what people have thought them to be (ghosts of sailors) and why (haunting/ slow/ rhythmic). They can also include their own personal metaphors. The more creative, the better!

Wrap Up: Share songs- Have concert!

Taking it Further:

- Study the physiology of dolphins as it pertains to acoustics. (See **Acoustic** diagram handout)
- Incorporate other whale sounds into lesson.
- Study current research of signature whistles - (see **Acoustics** information file)

