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Science

4th Grade Echolocation Activity Lesson Plan

1. Goal –

The learning goal for this lesson is for students to apply their knowledge of the senses animals use to survive to explain how echolocation works and how that relate to SONAR used in machines today.

2. The national and/or state standard addressed are English Language Arts Common Core Standards:

4-LS1-2.

Use a model to describe that animals' receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

3. Overall 30 day goal(s) –

A. Demonstrate how external parts, internal systems, and senses work together to help plants and animals grow and survive.

4. Week (4) Learning Target(s) –

- A. Recognize how different animals use different sense for similar functions.
- B. Evaluate how those senses interact with external and internal systems for survival and growth.

5. Connections –

A. This lesson builds on previous lessons by allowing students to apply what they've been learning about the senses of sight and sound in a way which their own senses are being used for different functions similar to echolocation. This allows them to experience echolocation firsthand after learning about it's functions in bats and dolphins in the previous lesson.

6. Materials –

Science "Dimensions" book
Science Notebook
How echolocation works ppt
Projector
Overheard projector
"Echolocation in Action" worksheets (1 per student)
Blindfolds
Whistle

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7. Instructional Activities

Introduction:

With students, recall wavelength (distance between two crests/troughs on a wave) amplitude (the measure of the strength or intensity of a wave) soundwaves (vibrating forms of energy) using their flashcards. Ask students to think about how these words relate to what we've learned about echolocation in bats and dolphins. Then ask them how machines humans use in the ocean might use something similar to echolocation (SONAR). Display comparison diagram of dolphin and submarine echolocation on projector.

Prediction:

In their Sci notebook, students will write down how they think they will react to different sounds while blindfolded and how accurate they will be. Remind them to look back in their notebooks in the sound wave section to see how sound waves travel in air. Discuss with class how other sounds around them during the experiment might disrupt their abilities while blindfolded.

Procedure Briefing:

Put students into pairs and show the "Echolocation in Action" worksheet on overhead projector. Teacher explains that the class will be going outside (or gym if raining) and students will take turns being blindfolded. The blindfolded student will stand in one spot and the other student partner will stand nearby with the worksheet and pencil. The student with the worksheet will go to the different locations on the worksheet and either snap their fingers or clap their hands. The blindfolded student then guesses the location from where the snap came from. The students will record their partners response on the echolocation worksheet after each clap/snap. The students will follow the worksheet for the nine snaps/claps and put a check mark for correct guesses and an X for incorrect guesses. Students will then switch places and repeat the procedure.

*Teacher passes out "Echolocation in Action "worksheet to each student. Remind students to bring a hard book to write on and pencil. Line class up in back of the classroom to go out to field.

Demonstration:

Once out on field (or gym) demonstrate how the experiment should run with volunteer student blindfolded. Emphasize how the blindfolded student must not peek and must stay in the same spot for it to work. Ask class why it's important for the blindfolded student not to move. Tell students they will be receiving a 5-minute warning with the whistle to let them know they're running out of time.

Activity:

Have student pairs spread out across field (or gym) and begin. Circulate and monitor

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while students are working. Make sure they are following the nine directions on the worksheet and ask probing questions while they're switching roles. Have class line up on field at the end of experiment before going back to classroom. Make sure no books/papers are left behind.

Wrap up:

Bring the class back to whole group instruction once back in classroom. Talk about the results and if there were locations that were more challenging than others. Have them think about why noise from other teams or outside variables may have made it harder to hear snaps/claps.

8. **Assessment –**

Students will bring home their results and use them to answer investigative questions in their Sci notebooks: How might sound from boats and submarines in the ocean affect animals that use echolocation? What problems might this cause? How might problems that come about because of this be resolved in the future?