

MANGROVE OBSERVATIONS

Mangroves | In Our Community

Approximate Length of Lesson

Three to five 45-minute class sessions; one-day field trip to mangrove swamp.

Approximate Number of Minutes Weekly

135 to 225 minutes in classroom; 6-8 hour field trip.

Materials

- Story on mangrove animals
- Measuring tool; observation and measurement template; pencils to record measurement and draw; copies of handout #4 with pictures and descriptions cut out and separated
- Heavy string, nails, and cardboard pieces or scrap wood for line transects
- Handouts #1, #2, #3 & #4
- K-W-L chart from lesson 2



Essential Questions:

Why are mangroves important?

- What are the physical characteristics of mangroves?
- What plants and animals are most commonly found in mangrove swamps?
- What are the connections between plants and animals?

Learning Goals

Students will be able to:

- Observe physical characteristics of common plants and animals in mangrove swamps, and additional physical characteristics of mangroves, such as salinity.
- Use line transect as a method to collect data on living things on either side of the line.
- Describe observations and data collection.
- Create a report based on observations and collected data of mangrove swamp.

Teaching Notes

Which content standards from your entity address the essential questions?

SA: Assess the observation report using rubric criteria; e.g., a) meeting purpose of the report; b) use of charts or graphs to represent sampling data; c) use of vocabulary from word wall to communicate ideas. Levels for each criteria: emerging (1), satisfactory (2), effective (3).

Sample response: People create stories about animals so we can remember all the animals people have seen in the mangroves.

Content Standards

(Record corresponding standards in space below. E.g., Grade 5: FSM Sci.1.5.1 Compare and contrast different plants and animals across and within kingdoms. FSM Mth.4.5.1 Collect data using observations, measurement, surveys or experiments.)

Formative Assessment (FA)

Teacher observes students participation, process and progress as they develop and apply specific skills and knowledge. Teacher asks specific questions to confirm learning and assigns writing and initiates conversations to support learning process (e.g., reflection, knowledge).

Summative Assessment (SA)

Students draft an observation report. Teacher uses rubric to provide specific feedback on the accuracy of the illustrations and labels to help students move to the next level of rubric.

Learning Sequence

Prior to Lesson

- Find/create short story about animals in mangroves.
- Visit local mangrove swamp. Select landmark such as a mangrove tree as starting point. Students set up line transects during lesson. Set up one line transect per 2 students. Refer to handout #1 to learn about line transects and how to set up.

Activate Prior Knowledge

- Read aloud the essential questions for this lesson.
- Give students some time to think about the questions. Ask for volunteers to share their thoughts.
- Share a local story about animals found in mangroves. Ask students: *Why did people create a story about animals?*
- Explain they will be making scientific observations and measurements at a mangrove swamp and recording their observations, so they can remember the living things seen in the mangroves.

Build Background

- Introduce the words "observe", "measure", and "height" and explain meaning.
- Show pictures of different animals found in mangroves, and come up with adjectives to describe these animals.

Teaching Notes

Add new vocabulary to word wall created in Lessons 1 & 2.

Write questions on board or chart paper. Have students offer a few responses to their predictions and record.

Provide students with observation template and pencil before going to the mangrove swamp.

Have students record their impressions.

Before students collect data, gather all students to discuss and model how to collect the data.

- Ask students what are some ways to measure height of the following objects: desk, door, a person.
- Explain to students when we measure height, we can use different tools such as non-standard tools (mats, span of palm) and standard tools (rulers, measuring tape). Review the use of inch and foot as standard measuring units.
- Teach meaning of the words “turbidity” (cloudiness, haziness) and “texture” (feel, appearance, consistency).

Prior to visit to mangrove swamp, review purpose:

To observe mangrove trees and other plants (numbers, physical characteristics, height) and common animals. Measure height of mangrove trees and other plants in the swamp. To observe and describe additional non-living characteristics: change of water levels, turbidity of water, soil texture. Turn the purpose into guiding questions for field trip. E.g., How tall are different mangrove trees? How thick are different types of leaves? What color is the water?

- Ask students what their predictions/hypotheses are to those questions. Record their hypotheses.
- Demonstrate in classroom how to set up a line transect.
- Review observation and measurement template.

At the mangrove swamp, ask the following questions:

- What is your first impression of the mangrove swamp?
- What does the environment look like?
- How does it look similar to/different from what you expected?
- At the starting point, pair up students and give each pair string, nail, and cardboard/scrap wood to set up their line transect (20 feet long). Label each line transect and map out locations of line transects from starting point for future reference.
- Students gather data: count number, observe physical characteristics, and measure height of plants; count number of and observe animals; observe non-living characteristics (height of water, turbidity of water, soil texture).

Have students work in small groups and make observations and measurements along their line transects. Observe and provide support if necessary.

Teaching Notes

Students work in pairs or groups of 3 to collect and record counting, measurement, and observation data on handout.

Add new words used in describing observations to word wall.

Provide sentence frames with key vocabulary to answer questions e.g., in English:

- *Male mangrove crabs look different from female mangrove crabs because _____.*
- *Male mangrove crabs _____, but female mangrove crabs _____.*

Have examples prepared to show students the use of x-axis and y-axis for line graphs.

When observations and measurements are complete, gather all students. Point to the surroundings and discuss:

- Why mangrove trees look the way they do (refer to handout #1).
- Why mangroves grow in that area (brackish water).
- Why mangrove trees are very special trees (importance of mangrove trees to families and communities; importance of mangrove trees for animals).

Sharing of Observations in Classroom

- Review students' hypotheses.
- Compare observations made along transect line and ask questions such as: Which types of plants and animals are most abundant? Where are they most abundant? Does the number of (insert specific plant and animal) change as we moved away from our starting point?
- Discuss how different types of animals benefit from mangroves. (Refer to handout #3)
- Show picture of two mangrove crabs. Explain that the female and male mangrove crab look different, and discuss the differences. Teach and practice using the language to differentiate male and female mangrove crabs.
- Discuss and compare observations made on height of water, turbidity, and soil texture, such as: Where is the water the deepest? Where is the water the shallowest? What is the soil texture where the water is deep? What is the soil texture where the water is shallow? Does the water become clearer or cloudier as we moved away from starting point?

Graphing Sampling Data

- Show students sample line graph, and explain how information is presented.
- As a class, pick one type of data observed (e.g., number of a type of mangrove trees in each quadrant). Label the graph accordingly (e.g., x-axis represents the quadrant number, and y-axis represents the number of trees) and plot graph.
- Discuss the graph: What relationship does it show you? Does it show a pattern? What conclusion can be made about mangroves?
- Have students work with same partner from the mangrove swamp to create graphs from their sampling data. Each pair shares and describes graph with rest of class.

Teaching Notes

Students work in small groups as they discuss animals found in mangrove swamps.

Add the term “food web” on the word wall.

Students work with the same partners as they had when they visited the mangrove swamp.

If there is time, revisit K-W-L chart from lesson 2, answer questions, record new learning, and brainstorm additional questions to extend learning.

Next class provide feedback on draft reports to improve student learning.

Connection Between Plants and Animals in Mangrove Swamp

- Distribute pictures and descriptions of common animals found in mangrove swamps (handout #4). Have students match picture with corresponding descriptions.
- Review together. Ask how animals are connected with each other? How are they connected with the mangrove trees?
- Have students organize the pictures in a way to show the connections. Then, discuss as a whole class the connections between animals, in relation to the mangroves. Introduce the concept of “food web.”

Report on Visit to Mangrove Swamp:

Draft a short report about visit to the mangrove swamp. Include observations, graph to show quadrants along line transect and relationship between height of water and the quadrants along the line transect; describe connections between plants/animals; and summarize learning from classroom discussions.

Lesson Closure

Review the essential questions for this lesson:

- What are the physical characteristics of mangroves?
- Ask for responses based on what was learned.

Constructing Ideas

Language Functions	Related Sentence Structures in the Local Language (to be completed by teacher)	Related Sentence Structures in English
Predict/Make a hypothesis		I/We think that _____. I/We predict that _____ because _____. _____
Differentiate things		Male mangrove crabs look <u>different from</u> female mangrove crabs because _____. Male mangrove crabs _____, <u>but</u> female mangrove crabs _____.
Measure things		_____ is _____ inches tall.
Compare characteristics		_____ is more _____ than _____. _____ is less _____ than _____. _____ is _____ er than _____. _____

Key Vocabulary in Local Language:



Key Vocabulary in English:

hypothesis, names of plants and animals, observe, female, male, descriptive words for describe physical characteristics, measure, height, inch, foot, food web, turbidity, texture

