

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
- Gr. 3: measuring tool; pictures or real-life samples of different mangrove plant parts such as roots and leaves; observation template; paper and pencils to record and draw
- Gr. 4 & 5: 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?
- Grade 3: What types of mangrove trees are most commonly found in local mangrove swamps? What makes them special?
- Grades 4 & 5: 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 mangrove swamps Gr3: physical characteristics of mangrove trees; Gr4 & 5: physical characteristics of common plants and animals in mangrove swamps; Gr5: 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).

For Gr. 3: Set up line transects (around 20 foot long each, with 1 foot mark along the line) from that starting point. The line transects should cover an area of the mangrove forest. Label each line transect (e.g., Line Transect 1, Line Transect 2). There should be enough line transects to assign one line transect to each pair of students. E.g., if you have 30 students in your class, there should be 15 line transects. Map out locations of line transects from starting point for future reference.

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

Sight, sound, touch, taste, and smell as the five senses.

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. For Gr 3, teacher sets up line transects. For Gr 4 & 5, 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

Gr. 3:

- Introduce the word “observe” and explain to students that when we observe, we draw on the five senses.
- Show pictures of different mangrove parts (roots, leaves)

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, paper, and pencil before going to the mangrove swamp.

from fact sheets or real-life samples of real leaves from different mangrove trees. Make connection with learning from lesson 1 (different types of mangrove trees), and brainstorm together descriptive words based on the five senses to describe them.

Gr. 4 & 5:

- 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.
- 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.

Gr. 5:

- Teach meaning of the words “turbidity” (cloudiness, haziness) and “texture” (feel, appearance, consistency).

Prior to visit to mangrove swamp, review purpose:

Gr. 3: To observe and illustrate what individual mangrove trees look like and note different mangrove trees found at the mangrove swamp using the observation template. Turn the purpose into guiding questions for field trip. E.g., What trees will be in the mangrove swamp? How will they differ?

Gr. 4 & 5: 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. For gr. 5 students, 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.

Teaching Notes

Have students record their impressions.

For Gr. 3: Before students are assigned to a line, demonstrate to students how to make observations along a line transect.

For Gr. 4 & 5: Before students collect data, gather all students to discuss and model how to collect the data.

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

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?

Gr. 3:

- Pair up students and assign each pair to a line transect.
- For each quadrant along the line transect, each pair counts the number of mangrove trees, observes the physical characteristics of mangrove trees, records their observations on handout. When finished, they draw their observations along the line transect.

- Observe students and provide support if necessary.

Gr. 4 & 5:

- 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.

- Gr. 4 students gather data: count number, observe physical characteristics, and measure height of plants; count number of and observe animals. Record counting, measurement, and observations on template.

- Gr. 5 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.

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).

Teaching Notes

Add new words used in describing observations to word wall.

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

- *This mangrove tree is the tallest.*
- *This mangrove tree is shorter than that mangrove tree.*
- *That mangrove tree is taller than this mangrove tree.*

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 _____.*

Sharing of Observations in Classroom

Gr. 3:

- Review students' predictions.
- Have students share out observations and add new words to word wall.
- Discuss different types of mangrove trees found in mangrove swamps (Refer to handout #2).
- Compare observations made along transect line and ask questions such as: Which types of mangrove trees are most abundant? Where are they most abundant? Do the number of mangrove trees change farther away from starting point?
- Discuss differences in height of mangrove trees, and teach the language to compare height of the different trees.
- Review the benefits of mangroves identified from lesson 1.
- Ask students if they know about any rules that restrict the size of the mangrove trees to be cut, and discuss why such rules exist (to prevent over-harvesting and destruction of the mangrove swamp). Based on class discussion, have students decide which of the mangrove trees they observed/measured would be ok to harvest, and which would not be.

Gr. 4 & 5:

- 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.

Gr. 5:

- 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?

Teaching Notes

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

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.

Graphing Sampling Data

- Show students sample graph (pictograph for gr. 3 & 4; line graph for gr. 5), 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., for pictographs, a chosen icon represents a specific number of trees; for line graphs, 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.

Connection Between Plants and Animals in Mangrove

Swamp (Gr. 4 & 5)

- 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 and summarize learning from classroom discussions.

Gr. 3: Include illustrations from observations and pictograph.
 Gr. 4 & 5: Include graph to show quadrants along line transect; describe connections between plants/animals.
 Gr. 5: Include a graph to show relationship between height of water and the quadrants along the line transect.

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 _____.
Describe living things (gr. 3)		_____ looks _____. _____ is _____.
Differentiate things (gr. 4 & 5)		Male mangrove crabs look <u>different from</u> female mangrove crabs because _____. Male mangrove crabs _____, <u>but</u> female mangrove crabs _____.
Measure things (gr. 4 & 5)		_____ is _____ inches tall.
Compare things in height		This mangrove tree is the <u>tallest</u> . This mangrove tree is <u>shorter than</u> that mangrove tree. That mangrove tree is <u>taller than</u> this mangrove tree.
Compare characteristics (gr. 4 & 5)		_____ is more _____ than _____. _____ is less _____ than _____. _____ is _____er than _____.

Key Vocabulary in Local Language:

Grade 3:

Grade 4:

Grade 5:

Key Vocabulary in English:

Grade 3:

- Prediction
- Names of different mangroves
- Descriptive words for physical characteristics of mangroves



Grade 4 & 5:

- Hypothesis
- Names of plants and animals
- Observe
- Female
- Male
- Descriptive words for describe physical characteristics
- Measure
- Height
- Inch
- Foot
- Food web

Gr. 5:

- Turbidity
- Texture