MANGROVES: MANGROVES IN OUR COMMUNITY

Grade 4

ESSENTIAL QUESTIONS: WHY ARE MANGROVES IMPORTANT?

- What are the physical characteristics of mangroves?
- What plants and animals are most commonly found in mangrove swamps?
- How are the plants and animals connected with each other?

LEARNING GOALS

What should learners know and be able to do by the end of the lesson?

Students will be able to:

- Make observations of mangrove swamps, focus on plants (physical characteristics, height) and common animals
- Use line transect as a method to collect data on the
- Describe observations and data collection
- Create a report based on observations and collected data of mangrove swamp

Approximate Length of Lesson: Four 45-minute class sessions; one-day field trip to mangrove swamp

Approximate Number of Minutes: 180 minutes in classroom; 480 minutes of field trip

BENCHMARKS

Sci.1.4.2 Use drawings, charts and graphs to communicate experimental information.

Sci.1.4.3 Compare and contrast similarities and differences between things they collect and observe.

Sci.1.4.5 Record and communicate data clearly.

Mth.2.4.4 Use standard and non-standard units to determine length, volume, and weight and describe the characteristics of each type of measurement.

Mth.4.4.1 Collect, organize, display and describe data systematically.

Mth.4.4.2 Read and interpret data using pictographs, tables, or charts.

SUMMATIVE ASSESSMENT

Illustrated observation report

Standards-Based Unit Template, adapted from Clementi & Terrill. (2013). *Keys to planning for learning*. ACTFL

Page 1

FORMATIVE ASSESSMENT TOOLS

- Observations and measurements
- Discussions on observations and measurements
- Discussions on plants and animals

FOCUSED LANGUAGE FEATURES: VERNACULAR + ENGLISH

Language Functions	Related Sentence Structures / Patterns (Examples)	Vocabulary
Predict/Make a **hypothesis**	I/We think that _____. I/We predict that _____ because _____.	• Hypothesis • Names of plants and animals • Observe • Female • Male • Descriptive words for describe physical characteristics • Measure • Height • Inch • Foot • Food web
Differentiate things	Male mangrove crabs look different from female mangrove crabs because _____. Male mangrove crabs _____, but female mangrove crabs _____.	
Measure things	_____ is _____ inches tall.	
Compare things in height	This mangrove tree is the tallest. This mangrove tree is shorter than that mangrove tree. That mangrove tree is taller than this mangrove tree.	
Compare characteristics	_____ is more _____ than _____. _____ is less _____ than _____. _____ is _____er than _____.	

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LEARNING SEQUENCE

Lesson: Mangroves in the community

Prior to Lesson	• Visit local mangrove swamp. Select a landmark such as a mangrove tree as a starting point
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. • Read a loud a local story about animals found in mangroves. Ask students why did people create a story about animals? (to make a literary record of animals observed in the mangroves) • Explain they will be making scientific observations and measurements (gr. 4 & 5) at a mangrove swamp
Build Background	• Introduce the words "observe", "measure", and "height" and explain meaning. • Show pictures of different animals found in mangroves, and come up with descriptive words to describe observations of these animals. Record the words. • 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.
Prior to visit to local mangrove swamp, go over the purpose of their visit with students	• Purpose: observe and measure mangrove trees (physical characteristics, height) and common animals. • 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 students 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 expect?
	• 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.
	• Gather all students together and go over how to collect data:
	    ○ Count number and observe physical characteristics of mangrove trees, measure their height, observe animals. Record counting, measurement, and observations on template.
	    ○ Record counting, measurements, and observations on template.

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- Have students work in pairs and make observations and measurements along their line transects. Monitor and provide support if necessary.
- When observations and measurements are completed, gather all students together. Point to the surroundings and discuss the following:
    - Physical characteristics of mangrove trees (roots, leaves, size) and explain why they look the way they look (refer to fact sheet #1 for more information)
    - Why mangroves grow in that area (brackish water)
    - Why mangrove trees are very special trees (importance of mangrove trees to students and families; importance of mangrove trees for animals)

Reviewing and sharing of observations in classroom	- Review students' hypotheses - Compare observations made along the 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 the different types of animals benefit from the mangrove (Refer to fact sheet #3 for reference) - Show picture of two mangrove crabs ask students if the mangrove crab they observed look the same as this. Explain that the female and male mangrove crab look different, and discuss the differences (the abdomen on the underside is narrower in males and much wider in females). Teach and practice using the language to differentiate male and female crab (e.g., "Male mangrove crabs look <u>different from</u> female mangrove crabs because _____. Male mangrove crabs _____, <u>but</u> female mangrove crabs _____.")
Graphing Sampling Data	- Show students a sample pictograph and explain the meaning of x-axis, y-axis. - As a class, pick one type of data observed (e.g., number of mangrove crab 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 the graph. - Discuss the graph: what relationship does it show you? Does it show a pattern? What conclusion can you make about the type of mangrove trees in the mangrove swamp? - Have students work with the same partner from the mangrove swamp to create graphs for their sampling data. - Have each pair share and describe a graph with rest of class.
Connection Between Plants and Animals in Mangrove Swamp	- Refer to the animals found in the local mangrove swamp - Have students get into small groups. Distribute pictures and descriptions of common animals found in mangrove swamps (from fact sheet #4). Have students work in groups to match picture with the corresponding descriptions.

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	• Go over matching together. At the end, ask how do the animals connect with each other? How do they connect with the mangrove trees?
	• Have students first work in their groups to organize the pictures in a way to show the connections. Then, discuss as a whole class the connections between the animals, in relation to the mangroves. Introduce the word "food web" and add to word wall.
Report on Visit to Mangrove Swamp	• Have students work with the same partners as their mangrove swamp visit
	• Write a short report on their visit to the Mangrove Swamp:
	o Summarize their observations and measurements
	o Create a graph to show relationship between plants/animals and the quadrants along the line transect
	o Include drawings from the observations
	o Summarize learning from the discussion in classroom

Revisit K-W-L chart from lesson 2 and answer questions/record new learning

Essential Question	Review the essential questions for this lesson. Ask for responses based on what we have learned.

RESOURCES

- Local story on animals found in mangrove
- Measuring tool; observation and measurement template; pencils to record measurement and draw; copies of fact sheet #4 with the animals and descriptions cut out and separated.
- Heavy string, nails, and cardboard pieces or scarp wood for line transects
- Fact sheets on line transect (fact sheet #1) physical characteristics of mangrove trees (fact sheet #2), types of mangrove trees (fact sheet #3), and different animals living in mangroves (fact sheet #4)
- Paper to write report
- K-W-L chart from lesson 2

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Page 5

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