

School Learning Experience

Guiding Statement: Students will explore and build a love for the kelp forest and the animals that live there.

Make a Difference Actions:

- (Today) I love kelp forest and the organisms that live there.
- (Tomorrow) I love the kelp forest and I want to learn how to protect the ocean and kelp forests with Ocean Discovery Institute in the future.

STEM Discovery Focus: Explore and Wonder

Cross Cutting Concept: Observing Patterns - *Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.*

SE Practice: Asking Questions and Defining Problems - *A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested.*

Performance Standard: Life Science: 1-LS1-1 *From Molecules to Organisms: Structures and Processes* – Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs.

Disciplinary Core Ideas:

- *LS1.A Structure and Function* - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
- *LS1.D Information Processing* - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

Performance Standard: Life Science: 1-LS3-1 *Heredity: Inheritance and Variation of Traits* - Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Disciplinary Core Ideas:

- *LS3.A: Inheritance of Traits* - Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents.
- *LS3.B: Variation of Traits* - Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

Main instructor

- Classroom management
- Watch timing of lesson
- Lead class discussion
- Provide rules for activities
- Call on students to include as much of the class as possible

Additional staff/volunteers

- Prep materials
- **Do the dance moves! Kids love it when you are a little silly and fun! 😊**
- Whenever not prepping supplies:
 - Talk to/interact with students. They LOVE talking to adults. Walk around the classroom and ask questions, help, etc.
 - When students are not engaged in an activity, spread out throughout the classroom and stand near any students struggling to pay attention.

Supplies:

- Chart paper
- Sharpies (3)
- Visuals
 - Community Agreements poster
 - Kelp forest poster
- Pencils (40)
- Giant butcher paper drawing of kelp forest (approx. 4-5 feet tall) and include:
 - Canopy, blades, stipe, airbladders, and holdfast
- 6-8 Plastic Bins with minimal art supplies
 - 2-3 pairs of scissors
 - 2-3 glue sticks
 - Multiple pieces of colored paper
 - Multiple pieces of colored tissue paper
 - 10-15 magic markers of various colors
 - Multiple feathers
 - Multiple poppoms
- Laminated Kelp Forest ID Cards
 - Marine Mammals (6)
 - Inverts (12)
 - Fish and Sharks (12)
 - Birds (6)
- Tape (3-4 rolls)
- Beads
 - 4 colors, 6 bowls per color with enough beads for multiple classes
- White pipe cleaners for bracelets (1 per student)



- Post cards from 4th graders (15) – presorted and chosen ahead of time to be shared

Time	Activity
0:00 – 0:10	Introduction & Community Agreements
0:10 – 0:55	Exploration Activity + Engagement
0:55 – 1:00	Reflection

Introduction & Community Agreement (10 minutes)

Set Up

- Introduce yourself and volunteers to teacher
- Let teacher know at which point in the lesson they can be most helpful
 - Help students with bracelet making
 - Help bring groups of students up to the front to place organisms into kelp forest
- Ask teacher for waivers (Return to Rochelle)
- Tape butcher paper kelp forest up at the front of the room.
- Bring Community Agreements poster to front of classroom
- Prepare piles of post cards for self-reflection at the end of class if there are enough adults to sit one per table with students to read postcards. If not just have one pile for instructor.

Teaching Notes

- Stand/walk around the classroom to help monitor students. If all student are sitting on a rug sit down around them. In particular sit down close to any student who seems to be struggling to pay attention.

- Introduce yourself and Ocean Discovery Institute
- All staff + volunteers take a minute each to introduce themselves and share their story. Focus on:
 - College and major (explain what your major is in student friendly language)
 - Why you work/volunteer at Ocean Discovery
 - Include something fun and interesting
 - Community connections (ODI alum, attended a school in City Heights, etc.)
 - *Ex. I'm Sally. I went to college at UC San Diego and I studied Oceanography. Oceanography is the study of the ocean, how it works and the plants and animals that live in the ocean. When I was in college I participated in research digging up clams on the beach. I went to Clark and Hoover High and was an Ocean Leader. I had a lot of great opportunities with Ocean Discovery, that why I love working there. I volunteered for Ocean Discovery Institute for two years and now I am an instructor.*
- Give a very brief overview of the program and introduce the platform.
 - You will **be scientists** with ocean discovery institute **working together as a team to explore** the kelp forest.
 - Scientists ask **questions, make observations, and look for patterns.**
- Introduce the idea of community agreements -expectations about how **scientists work together.**
- Show CA poster and ask students what each one means to them.
 - Be your best self: Responsible, helpful & kind, include others
 - Be safe: make good decisions to keep each other safe
 - Be respectful: staff, materials, classmates, each other, environment
 - Be curious: ask questions, support each other as we try new things
- Ask students if they can all agree to these community agreements since they are **scientists** with Ocean Discovery with a verbal "yes" or thumbs up, etc

Engagement (15 minutes TOTAL for ALL bracelet making throughout lesson)

Goal: Students believe they are scientists and feel like they are part of a community of scientists who think somewhat alike but are also unique.

Set Up

- Prep bracelet supplies in the back (open all bead containers and stack in groups for each table)
- Count out pipe cleaners

Teaching Notes

- Help students put bead on bracelets if they are struggling.
- Help students tie bracelets on wrists.

Introduce Bracelets (7 minutes)

- Introduce bracelet making.
- Throughout class today, we will all make a bracelet that represents ourselves as scientists and our interests.
- I will ask a question and depending on your answer you will place a bead of a certain color on your bracelet.
- For example, “Would you rather: climb the tallest mountain on Earth OR dive to the bottom of the ocean?” If you would rather climb the tallest mountain put an orange bead on your pipe cleaner (demonstrate) if you would rather dive to the bottom of the ocean, place a dark blue bead on your bracelet. While you are doing this discuss at your table which you are more interested in and why.
- Ask THREE more questions:
 - What animal superpower would you rather have? Super strength like an ant OR super vision like a hawk?
 - As a scientist would you rather study plants and animals on the land or plants and animals in the water?
 - As an engineer, would you rather draw your ideas with pen and paper or build your ideas with tools?
- Have students hold bracelets up and show each other. Point out that while they are similar because we are all scientist they are also diverse because we all have different interests.
- Explain to students that as we learn about the diverse organisms in the kelp forest we will continue to build our bracelets.

Remaining 8 minutes from the engagement section for bracelet making will be in a 3 min and 5 min portion in the exploration time. Plan accordingly to have that time to put beads on the bracelets.

Exploration (30 minutes)

Goal: Students learn about the anatomy of kelp and that it is a habitat for many organisms.

Set Up

- Prep art bins (1-2/table)

Teaching Notes

- Stand/walk around the classroom to help monitor students while the instructor is teaching.
- Label the parts of the kelp on the butcher paper as the instructor introduces them.
- Move butcher paper to a space it can lay down for students to add organisms.

Anatomy of a Kelp Forest – Intro (5 min)

- Show students large butcher paper replica of a kelp forest.
- Cover the following:
 - Kelp is similar to a rainforest.
 - Kelp lives in the ocean right here off the coast of San Diego and many other places.
 - Kelp is neither plant or animals but is brown algae. Algae is similar to plants and needs many of the same things, sunlight, water, nutrients, etc.
 - Point out and label the parts of kelp. Briefly mention what each part does.
 - Canopy – air bladder and blades gather at surface to collect sunlight
 - Air bladders – keeps blades towards the surface where sunlight is
 - Stipe – like the trunk of a tree, helps keep the kelp upright
 - Blades – like leaves collect sunlight
 - Holdfast – “holds” the kelp in place
 - Teach students the “Kelp Dance” – have students say each part out loud and do the motion with the instructor while the other volunteer points to the part on the poster.
 - Holdfast –crouch down and spread your fingers out like a holdfast
 - Stipe – stand up straight and tall and keep arms close to side
 - Air Bladders – make balls with your fists and hold them out at your sides
 - Blades – make your hands flat and wave your arms gently like kelp waving in the ocean
 - Canopy – hold hands above head with fingers spread out and wave them around
 - Repeat the kelp dance a couple of times with variations (whisper all words, slow motion, super-fast, squeaky voice, etc.)

Add to Bracelets (3 min)

- Have students pick up bracelets again.
- Ask TWO questions:
 - As a scientist would you rather look at animals far away with binoculars to tiny animals under a microscope?
 - As an engineer would you rather build an underwater robot or build an research boat?

Set Up

- Place ID cards on table (1/student) – make each table one type of card
 - Example one table: all inverts
 - Another table: all fish, etc.
- Place 1-2 art bins on the center of each table

Teaching Notes

- Walk around the classroom and help students decide which organism to make.
- Help students create animals, encourage students who are struggling to get started.
- As students are working stop and ask them the following questions so they are ready to place their organism in the kelp forest when it is time.
 - What organism are you building?
 - Where do you think it lives in the kelp forest? Why?
 - Not sure? Where do you think it might be safest for your animal to live? If you were this animal where in the kelp forest would you want to live? Why?
- Help students who are finished tape their organisms into the kelp forest.
- Throw away any old/used up art supplies.

Create Animals (15 minutes)

- Explain that students will be putting organisms into their classes kelp forest.
- Give students one minute to look over their ID cards and pick an animal they want to create to add to the kelp forest. Have students give a thumbs up when then have decided on an animal.
- Explain to students that they can draw or build their animal from the art supplies on their table.
- Tell students to look at art supplies without touching them and to think about what they want to use to build or draw their animals (30 seconds).
- Let students know that they will 10 minutes to build their animal and they must be finished when time is up. Remind them that their animal does not need to be perfect but we want as many animals as we can get in the kelp forest.
- Put a visual timer up on the board and tell students to begin working.
- Give students lots of verbal reminders of time.
- If a student finishes early invite them up to place their organism in the kelp forest (tape animals into forest).
 - Let student know they can create another animal if they have time.

Populate the Kelp Forest/Debrief (10 min)

- Tell students time is up and collect art supplies.
- If possible, have each adult in the room work with one table of students.
 - At each table pair students up and have each pair of student share with each other what their organism is and where they live in the kelp forest. (Note: you may want to pair up students with someone they are not sitting right next to as they may already know what the student next to them built.)
 - Does everyone have a partner? Give me a thumbs up if you have a partner.

- Okay, turn and face your partner so you can see them and they can see you. *Help students turn chairs to face each other.*
- We are going to share with our partner two things: What organism you made and where you think in the kelp forest your animal lives: the holdfast, the stipe or blades, or the canopy. *Make kelp forest dance motions while talking.*
- Okay the person with the longest hair will share first. Put your hand up if you have the longest hair. *Look to make sure each partner knows who will go first.*
- When that person is done sharing the other partner will share their animal and where they think it lives.
- Any questions?
 - As students share walk around and correct any misconceptions and help any students who are unsure of where their organism lives.
 - When all the partners in your group have shared bring students up to poster to tape their organisms to the kelp forest.
 - Be sure to get organisms in all parts of the kelp (blades, canopy, holdfast, etc.)
- Have all students return to tables for debrief.
- Debrief with students and cover:
 - Point out that this classes' kelp forest has organisms from holdfast to canopy!
 - The kelp forest is habitat for many different organisms, and animals live in all parts of the kelp from top to bottom.
 - Ask students if they think that having kelp forest in our oceans is important? Why?
 - Should humans help make sure kelp forests stay in the ocean? Why?

Finish Bracelets (5 min)

- Have students pick up bracelets again.
- Ask as many questions as time allows (be sure to leave time for postcards)
 - As a scientist would you rather do research on animals that live in the kelp forest, like these (point to butcher paper) or animals that visit the kelp forest like whales and birds?
 - As an engineer would you rather create a machine to help us dive deeper in the ocean or help us live in the kelp forest?
 - As a scientist would you rather find newly discovered animals or learn more about the ones we already know about?
- Show students how to make bracelet and have them help their partner.
- Two staff walk around and help students, additional staff clean up beads.
- Look around you – we all have bracelets because we are all scientists and we are all part of a community. Not everyone's bracelet is the same though! We are a diverse group of scientists with different interests just like there is diversity of animals that live in the kelp forest!
- Encourage students to share their bracelets and ideas as scientists with their families.

Self Reflection (5 minutes)

Set Up

- Collect and close up all bead containers
- Give each adult a pile of postcards if doing version 1.
- Give instructor pile of postcards if doing version 2.
- Collect post cards.

Post Card

- Explain to students that Ocean Discovery Institute works with students of all ages. Last month we worked with 4th graders who also studied the kelp forest- just like you!
- After their experience they wanted to write post cards to you to share some of the things they learned with Ocean Discovery.
- Version 1: There is an adult available to sit at each table.
 - Take a small pile of post cards (3-4) and sit at one table of students
 - Read postcards to students.
 - Turn and talk: What are you most excited about for your trip to the Living Lab?
 - If time allows in your small table group ask a few students to share their thoughts with the table.
- Version 2: There are not enough adults to sit one per table
 - Instructor reads 2-4 post cards outload to whole class.
 - Turn and talk: What are you most excited about for your trip to the Living Lab?
 - If time allows ask a few students to share their thoughts with the class.
- Thank students for their hard work and attention. Tell them you are excited to see them next week/day for their trip to the Living Lab.
- Today, we tried new things, and made new discoveries. Whenever we do that, we have an Ocean Discovery cheer to send us off. We say “Go Awesome!” Say it with me on the count of 3. 1, 2, 3... Go Awesome!!