

# Marine Biology Adventure: A 3-Week Creative Exploration

## Required Materials:

- **General Supplies:** Large sketchbook or journal, pencils, colored pencils or markers, scissors, glue, tape.
- **Week 1 Supplies:** Clear plastic bottle (like a 2-liter soda bottle), modeling clay (multiple colors), pipe cleaners, small tub or container, sand/gravel, small rocks, salt, water.
- **Week 2 Supplies:** Recyclable materials (cardboard boxes, plastic bottles, straws, foil), glow-in-the-dark paint or glow sticks, flashlight, access to the internet for research (with supervision), a dark room.
- **Week 3 Supplies:** Large clear jar or container, water, cooking oil, blue food coloring, small plastic toys (representing marine life), small bits of plastic waste (glitter, cut-up plastic bags, small plastic beads), poster board or large paper, video recording device (optional, a phone works great).

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## Week 1: The Coastal Engineer - Life in the Shallows

**Focus:** This week, you are a biological engineer! Your job is to understand how creatures are perfectly designed for their environment and how they build incredible structures. We'll focus on tide pools and coral reefs.

### Day 1-2: Project - Design a Tide Pool Survivor

- **Mission Briefing (Learning):** Watch a few short videos about tide pool ecosystems. Focus on the challenges: crashing waves, changing water levels (sometimes wet, sometimes dry), rising temperatures when the tide is out, and predators. Discuss what kinds of adaptations an animal would need to survive here (e.g., strong grip, hard shell, ability to store water).
- **Engineering Phase (Activity):** In your journal, invent a creature that is perfectly suited for a tide pool.
  1. Draw a detailed picture of your creature.
  2. Give it a creative name (e.g., the "Stone-Grip Limpet," the "Wave-Rider Crab").
  3. Label at least **four** specific adaptations. For each one, write a sentence explaining how it helps your creature survive in the tide pool. (*Example: "Slime Coat - Keeps its body from drying out when the sun is hot and the tide is out."*)
- **Field Report (Assessment):** Write a one-paragraph "Naturalist's Journal Entry" describing the first time you "discovered" your creature. Describe where you found it, what it was doing, and why it's so unique.

### Day 3-5: Project - Build a Coral Reef in a Bottle

- **Mission Briefing (Learning):** Research what a coral polyp is. Learn that corals are tiny animals (not plants!) that build huge reef structures. Understand the symbiotic relationship they have with algae (zooxanthellae).
- **Construction Phase (Activity):**
  1. Using modeling clay, sculpt the base of your reef on the bottom of the clear plastic bottle. Make it look like rocks.
  2. Create your coral polyps! Use brightly colored clay to make small, cup-shaped bodies. Use pipe cleaners for the stinging tentacles that reach out from the top. Attach your polyps to the rocky base. Make a small community of them.

3. **Extension:** Create another small sea creature out of clay (like a clownfish or a starfish) and add it to your reef scene.
  - **Oral Presentation (Assessment):** Explain your model. Point out the polyp, the tentacles, and the hard structure they are building. Explain in your own words how millions of these tiny creatures can build something as massive as the Great Barrier Reef.
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## Week 2: The Deep-Sea Inventor - Mysteries of the Abyss

**Focus:** This week, you are a deep-sea explorer and inventor! Your mission is to investigate the extreme environment of the deep ocean (the abyssal zone) and design the technology needed to explore it.

### Day 1-2: Project - A Creature of the Light

- **Mission Briefing (Learning):** The deep sea is defined by three things: immense pressure, near-freezing temperatures, and total darkness. Research the concept of bioluminescence. How and why do deep-sea creatures like the anglerfish or vampire squid create their own light?
- **Creative Exploration (Activity):**
  1. In a completely dark room, experiment with a glow stick or glow-in-the-dark paint. See how light can be used to attract, confuse, or communicate in the dark.
  2. Choose a real deep-sea creature that uses bioluminescence.
  3. In your journal, write a short story from the creature's perspective. How does it use its light to hunt for food or escape from a predator in the pitch-black water? Be creative and descriptive!
- **Scientific Log (Assessment):** After your story, write a short "Scientific Log" that states the name of your chosen creature and explains, factually, how its bioluminescence works and what it uses it for.

### Day 3-5: Project - Invent a Deep-Sea Exploration ROV

- **Mission Briefing (Learning):** Research Remotely Operated Vehicles (ROVs) like the ones used to explore the Titanic. What tools do they need? Think about lights, cameras, robotic arms for collecting samples, and a strong frame to withstand the crushing pressure.
  - **Invention Phase (Activity):**
    1. Using your recyclable materials (cardboard box for the body, bottle for a viewport, straws for arms), design and build your own model ROV.
    2. Give your ROV a name (e.g., "Abyss-Crawler 5000").
    3. Focus on the tools. What is your ROV designed to do? Will it collect strange new animals? Film underwater volcanoes? Take temperature readings? Make sure your design reflects its purpose.
  - **Investor Pitch (Assessment):** Prepare a 2-minute "pitch" to present your ROV model. Explain its name, its primary mission, and describe at least three special features and why they are essential for exploring the deep sea. (*Example: "This is the 'Pressure-Proof X-1'. Its titanium-foil hull protects it from being crushed, and its super-bright LED lights, here, are for seeing in the total darkness..."*)
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## Week 3: The Marine Conservationist - Protector of the

## Oceans

**Focus:** This week, you are a conservationist and a changemaker. Your goal is to understand the biggest threats facing our oceans and create a campaign to inspire others to help protect them.

### Day 1-2: Project - The Ocean Pollution Simulator

- **Mission Briefing (Learning):** Research the impact of plastic pollution and oil spills on marine ecosystems. How do these things harm whales, turtles, fish, and seabirds?
- **Experiment Phase (Activity):**
  1. Fill your large, clear jar 2/3 full with water and add a few drops of blue food coloring. This is your clean ocean.
  2. Add your "marine animals" (small plastic toys). Watch them float or sink.
  3. **Simulate an oil spill:** Gently pour a layer of cooking oil on top of the water. Record in your journal what happens. Does it mix? What does it do to the surface?
  4. **Simulate plastic pollution:** Add your small bits of plastic waste. Swirl the jar gently. In your journal, write or draw what you observe. Where does the plastic go? Does it get stuck in the "oil"? How might this affect the "animals"?
- **Lab Report (Assessment):** Write a one-page lab report on your experiment. It should have three sections: 1) What I Did, 2) What I Observed, and 3) What I Learned About How Pollution Harms the Ocean.

### Day 3-5: Project - Be the Voice for the Ocean

- **Mission Briefing (Learning):** A conservation campaign needs a clear message and a specific goal. Choose ONE marine issue you feel passionate about (e.g., stopping plastic pollution, protecting sharks, saving coral reefs). Research 3-5 key facts about your chosen issue.
- **Campaign Creation (Activity):** You will create a campaign to educate others. Choose **one** of the following formats:
  - **A Campaign Poster:** On your poster board, create a powerful visual. Include a catchy slogan, one shocking fact, and a simple drawing or image. Make it colorful and eye-catching.
  - **A Public Service Announcement (PSA):** Write a script for a 30-60 second video. Your script should introduce the problem, share 2-3 important facts, and tell the audience one simple thing they can do to help. If you can, record it!
  - **A Persuasive Letter:** Write a letter to a family member or local official. In the letter, explain the problem, use your researched facts to show why it's important, and respectfully ask them to take a specific action (e.g., "Please help us reduce plastic use by choosing reusable bags").
- **Final Presentation (Assessment):** Present your final project (the poster, video, or letter). Explain why you chose your topic and what you hope people will learn from your campaign. This is your chance to show everything you've learned and to be a true advocate for our oceans!