

3rd Graders Only - Oceans (On the team schedule - 30 minutes)



Description: Teams will answer questions on a written assessment about ocean zones, species adaptations for the zones, and the daily migration of organisms for survival.

Page 1 of 3

Participants per assigned Team Number: 2

- If your school has 1 team you will send 2 students
- If your school has 2 teams you will send 2 students per team number; team numbers may not intermix
- If your school has 3 teams you will send 2 students per team number; team numbers may not intermix

Spirit of the Problem:

- The goal of competition is to give one's best effort while displaying honesty, integrity, and good sportsmanship. Everyone is expected to display courtesy and respect (see Science Olympiad Pledges below). Teams are expected to make an honest effort to follow the rules and the spirit of the problem (not interpret the rules so they have an unfair advantage).
- It is a rules violation if coaches, parents, mentors, or spectators enter the competition area or communicate with the team members at any time during the competition. Violation of this rule will place the team below all other teams.

Teams Must Bring:

- Pen/Pencil

Competition:

The written assessment will contain 25-50 questions on ocean zones and how different species adapt for survival. It will only cover general adaptations and daily migrations. It will not be species specific, but teams must know some representative species for each zone.

Scoring:

- a. Points will be awarded for each correct response
- b. Ties will be broken by the accuracy or quality of answers to select questions chosen by the test writer or the Event Supervisor

Possible Resources:

- a. Division A will not release previous tests, or the exact resources used by the Event Supervisor or test writer for any events.
- b. **Use the listed resources and study guides as starting points. The study guide was created using Gemini AI and is meant as a beginning foundation! It may or may not contain topics occurring within the competition. It is up to the competitor to research further.**
 - i. National Oceanic and Atmospheric Administration (NOAA): [NOAA Ocean Exploration](#) - Excellent for deep-sea exploration and zone information.
 - ii. Monterey Bay Aquarium Research Institute (MBARI): [MBARI](#) - Deep-sea research and videos.
 - iii. Smithsonian Ocean: [Smithsonian Ocean](#) - Educational resources on marine life and ocean zones.
 - iv. Khan Academy: Search "Ocean Zones" on Khan Academy for educational videos.

Ocean Zones, Adaptations, and Migration Study Outline

1. Ocean Zones

- a. Introduction: The ocean is divided into zones based on depth, light, and pressure. Understanding these zones is key to understanding marine life.

i. Major Zones:

1. Sunlight Zone (Epipelagic Zone):
 - a. Closest to the surface.
 - b. Most sunlight, enabling photosynthesis.
 - c. Home to a wide variety of marine life.
2. Twilight Zone (Mesopelagic Zone):
 - a. Dimly lit, some sunlight penetrates.
 - b. Organisms adapted to low light.
3. Midnight Zone (Bathypelagic Zone):
 - a. No sunlight, completely dark.
 - b. High pressure, cold temperatures.
 - c. Organisms often have bioluminescence.
4. Abyssal Zone (Abyssopelagic Zone):
 - a. Very deep, extremely high pressure.
 - b. Very cold, little life.
 - c. Organisms rely on "marine snow" (falling organic matter).
5. Trenches (Hadal Zone):
 - a. Deepest ocean areas, found in trenches.
 - b. Extreme pressure, cold.
 - c. Specialized organisms adapted to these conditions.
6. Intertidal Zone:
 - a. Where the ocean meets the land.
 - b. Organisms must adapt to changing tides and exposure.

2. Adaptations

- a. Sunlight Zone Adaptations:
 - i. Camouflage (blending in).
 - ii. Speed for hunting or escaping predators.
 - iii. Photosynthesis in algae and phytoplankton.
- b. Twilight Zone Adaptations:
 - i. Large eyes for low-light vision.
 - ii. Bioluminescence (producing light).
 - iii. Countershading (dark on top, light on bottom).
- c. Midnight Zone Adaptations:
 - i. Bioluminescence for communication and hunting.
 - ii. Large mouths and sharp teeth.
 - iii. Slow metabolism to conserve energy.
 - iv. Reduced skeletal structure.
- d. Abyssal and Trenches Adaptations:
 - i. Extreme pressure tolerance.
 - ii. Chemosynthesis (producing energy from chemicals).
 - iii. Flexible bodies.
- e. Intertidal Zone Adaptations:
 - i. Ability to withstand exposure to air.
 - ii. Strong attachments to rocks.
 - iii. Burrowing to avoid predators.

3. Daily Migration (Vertical Migration)

- a. Concept: Many marine organisms move between zones daily. Typically, they rise to the surface at

night to feed and descend during the day to avoid predators.

i. Reasons for Migration:

1. Feeding: Following plankton and other food sources.
2. Predator avoidance: Staying in dark zones during the day.
3. Light levels: Responding to changes in sunlight.
4. Examples:
 - a. Zooplankton migrating to the surface at night.
 - b. Squid and fish following zooplankton.

4. Vocabulary

- a. Epipelagic Zone: The sunlight zone.
- b. Mesopelagic Zone: The twilight zone.
- c. Bathypelagic Zone: The midnight zone.
- d. Abyssopelagic Zone: The abyssal zone.
- e. Hadal Zone: The trench zone.
- f. Intertidal Zone: The area between high and low tide.
- g. Bioluminescence: The production of light by living organisms.
- h. Camouflage: Blending in with the environment.
- i. Countershading: Dark on top, light on bottom.
- j. Chemosynthesis: Producing energy from chemicals.
- k. Vertical Migration: Daily movement between ocean zones.
- l. Plankton: Microscopic organisms that drift in water.
- m. Marine Snow: Organic matter that falls from upper layers of the ocean.

5. Study Tips:

- a. Use visual aids (pictures, videos).
- b. Draw diagrams of the ocean zones.
- c. Create flashcards for vocabulary terms.
- d. Watch documentaries about ocean life.
- e. Make a chart comparing adaptations in different zones.
- f. Create a diagram showing the daily migration of creatures.