

Objectives

- ▶ To identify and differentiate between the 6 habitats of Magdalena Bay
- ▶ To research habitats and traits of organisms
- ▶ To learn about animal adaptations

Vocabulary

estuary
intertidal

fauna
mangroves

flora
subtidal

Background

From the Baja Center, you can see six distinct habitats: desert; dune; mudflat; mangrove shores; rocky intertidal; and subtidal. The student researchers take small boats two miles across the bay to Isla Magdalena to explore, identify and characterize the flora and fauna of different habitats. While walking to the boats, they pass through three habitats.

The first habitat is the dunes—undulating hills of sand. High winds may blow the sand and reshape these hills, or blow large waves past their high tide mark to erode the dunes. Fragile, low-growing plants cling to the sandy ground and provide a support structure that holds the hills together.

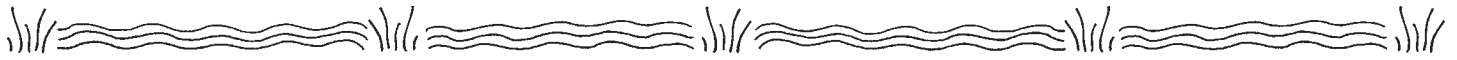
The second habitat is the mudflat. The tide covers and exposes it twice daily. Bubbles and piles of balled mud emerge from holes left by burrowing organisms. Clams squirt and shore birds dart around, poking their beaks in the mud to find food. The shallow mudflat extends 100 meters.

The third habitat is the mangrove estuary—deeper channels of water lined with trees that grow in the salty estuarine water. Large birds perch on the mangroves or float in the water waiting to grab food. Protected by the tangle of mangrove roots in the water, young fish and shellfish feed in the nutrient-rich waters, waiting to grow bigger before moving into open water.

The student researchers board the boats to investigate the fourth habitat, the subtidal, which lies beyond the low tide mark. This zone ranges from shallow to deep water. Crossing this habitat in the boats, the students see a sea lion sunning on a buoy. In winter, gray whales come to breed or calve, and dolphins are seen. Anchoring the boat, the students splash ashore.

The fifth habitat, the rocky intertidal, is found on the walk up the rocky beach. The students step around small pools filled and drained by the tide. The organisms here, like in the mudflat, must adapt to live both in and out of the water. Rocks both big and small provide attachment points or shelter for organisms. More shorebirds scurry around looking for meals.

The sixth habitat, the desert, is hard, compact sand and contains hardy cacti (1' to 10' high) able to survive with little water and to endure hot desert temperatures. Low-growing shrubs and trees make walking difficult. The students keep a lookout for rattlesnakes or scorpions. Coyote tracks are spotted. Hot and thirsty (not adapted for the desert), the group returns to the subtidal for a swim.



Materials and Preparation

Common Species List (provided)
Species Check Sheet (provided)
50-100 index cards
6 sheets of butcher paper (at least 4'x4')

Tape
Reference materials such as plant and animal identification books, encyclopedias, and on-line references (if available)

- Write the name of each species listed on the Common Species List on an index card (species card).
- Label each butcher paper sheet with one of the habitats: Desert; Dune; Mangrove Estuary; Mudflat; Rocky Intertidal; and Subtidal. Hang in the classroom.
- Find reference suggestions in the Resource Materials section.

Time

One 50-minute session

Activity

1. Read the narrative in the Background.
2. Divide class into groups of 3-4 students.
3. Pass out species cards so that each group has about 6-12 cards.
4. Have students use resource books to research each species and fill out the Species Check Sheets.
5. Have students decide in which habitat each species would most likely live. Students can make a duplicate card if their species is found in 2 or more habitats.
6. Have them hang the species cards up on the piece of butcher paper with the appropriate habitat name.
7. Once the cards are hung, discuss as a class each group (of animals and plants) living in each habitat. What similarities exist? What do they need to survive? Do any live in 2 or more habitats?
8. Have students brainstorm what adaptations would be necessary to live in each habitat. What are the challenges of living in this habitat? How do the organisms protect themselves from predators? From heat? How do they get food?
9. Have students give examples of how their species is adapted to its habitat. Corrections to the habitat collages can be made at this time. See the Common Species List for animals and plants listed by habitat.

Extend the Activity

- Design an animal or plant perfectly suited for the conditions of one habitat.
- Choose one habitat to eliminate. How would that affect the species in the other habitats?

Common Species List

Dune

sand verbena	(<i>Abronia gracilis</i>)
boxthorn	(<i>Lycium brevipes</i>)
cordgrass	(<i>Spartina foliosa</i>)
saltgrass	(<i>Distichlis spicata</i>)
heliotrope	(<i>Heliotropium curassavicum</i>)
pickleweed	(<i>Salicornia virginica</i>)
salt cedar	(<i>Monanthochloe littoralis</i>)
sea purslane	(<i>Sesuvium portulacastrum</i>)
osprey	(<i>Pandion haliaetus</i>)
western gull	(<i>Larus occidentalis</i>)
western fence lizard	(<i>Sceloporus occidentalis</i>)
western diamond rattlesnake	(<i>Crotalus atrox</i>)

Mudflat

brant	(<i>Branta bernicla</i>)
pen shell	(<i>Pinna rugosa</i>)
white clam	(<i>Dosinia ponderosa</i>)
chocolate clam	(<i>Megapitaria aurantiaca</i>)
Lewis' moon snail	(<i>Polinices lewisii</i>)
saw-toothed pen shell	(<i>Atrina serrata</i>)
Cooper's turret	(<i>Turritella cooperi</i>)
Gould's paper bubble	(<i>Haminoea vesicula</i>)
willet	(<i>Catoptrophorus semipalmatus</i>)
long-billed curlew	(<i>Neminius madagascariensis</i>)
spotted sandpiper	(<i>Actitis macularia</i>)
western gull	(<i>Larus occidentalis</i>)
cordgrass	(<i>Spartina foliosa</i>)
sea lettuce	(<i>Ulva lactuca</i>)
Western dogwhelk snail	(<i>Nassarius tegula</i>)

Mangrove Estuary

red mangrove	(<i>Rhizophora mangle</i>)
black mangrove	(<i>Avicennia germinaus</i>)
white mangrove	(<i>Laguncularis germinaus</i>)
white ibis	(<i>Endocimus albus</i>)
little blue heron	(<i>Egretta caerulea</i>)
great blue heron	(<i>Ardea herodias</i>)
snowy egret	(<i>Egretta thula</i>)
northern brown shrimp (juvenile)	(<i>Penaeus californiensis</i>)
Pacific blue crab	(<i>Callinectes bellicosus</i>)
sally lightfoot crab	(<i>Grapsus grapsus</i>)
mangrove oyster	(<i>Crassostrea palmula</i>)
striped mullet	(<i>Mugil cephalus</i>)
silver mojarra	(<i>Eucinostomus argenteus</i>)

Subtidal

grey whale	(<i>Eschrichtius gibbosus</i>)
Pacific white-sided dolphin	(<i>Lagenorhynchus obliquidens</i>)
bottlenose dolphin	(<i>Tursiops truncatus</i>)
California sea lion	(<i>Zalophus californianus</i>)
jumbo flying squid	(<i>Dosidicus gigas</i>)
northern radix murix	(<i>Muricanthus nigrinus</i>)
blue abalone	(<i>Haliotis fulgens</i>)
cortez conch	(<i>Strombus galeatus</i>)
gulf cockle	(<i>Trachycardium panamense</i>)
green sea turtle	(<i>Chelonia mydas</i>)
northern brown shrimp	(<i>Penaeus californiensis</i>)
spiny red lobster	(<i>Panulirus interruptus</i>)
finescale triggerfish	(<i>Balistes polylepis</i>)
Pacific blue crab	(<i>Callinectes bellicosus</i>)
tuna	(<i>Thunnus albacares</i>)
California halibut	(<i>Paralichthys californicus</i>)
diamond-backed sting ray	(<i>Dasyatis brevis</i>)
Pacific angel shark	(<i>Squatina californica</i>)
Catalina scallop	(<i>Argopecten circularis</i>)
Pacific herring	(<i>Clupea pallasii</i>)
brown pelican	(<i>Pelecanus occidentalis</i>)
two-spotted octopus	(<i>Octopus bimaculatus</i>)
chestnut cowrie	(<i>Cypraea spadicea</i>)
eel grass	(<i>Zostera marina</i>)

Rocky Intertidal

saucer and cup limpets	(<i>Crucibulum spinosum</i>)
checkered periwinkle	(<i>Littorina scutalata</i>)
mule's paw	(<i>Anadara tuberculosa</i>)
scaled worm snail	(<i>Serpulorbis squamigerus</i>)
sally lightfoot crab	(<i>Grapsus grapsus</i>)
ceriths	(<i>Cerithium stercusmauscarum</i>)
crowned urchin	(<i>Centrostephanus coronatus</i>)
California mussel	(<i>Mytilus californianus</i>)
leaf barnacle	(<i>Pollicipes polymerus</i>)
mossy chiton	(<i>Mopalia muscosa</i>)
western gull	(<i>Larus occidentalis</i>)

Desert

coyote	(<i>Canis latrans</i>)
western diamond rattlesnake	(<i>Crotalus atrox</i>)
cardón cactus	(<i>Pachycereus pringlei</i>)
creeping devil cactus	(<i>Machaerocereus eruca</i>)
sour pitaya	(<i>Machaerocereus gummosus</i>)
turkey vulture	(<i>Cathartes aura</i>)
greater road runner	(<i>Geococcyx californianus</i>)
common ground dove	(<i>Columbina passerina</i>)
Adam's tree	(<i>Fouquieria diguetii</i>)
pincushion cactus	(<i>Mammillaria dioica</i>)
western fence lizard	(<i>Sceloporus occidentalis</i>)
red fox	(<i>Vulpes fulva</i>)
jumping choll	(<i>Opuntia bigelovii</i>)
agave	(<i>Agave deserti</i>)

Species Check Sheet

common name: _____

Name: _____

description of species: _____

habitat type: _____

habitat description: _____

food source(s): _____



common name: _____

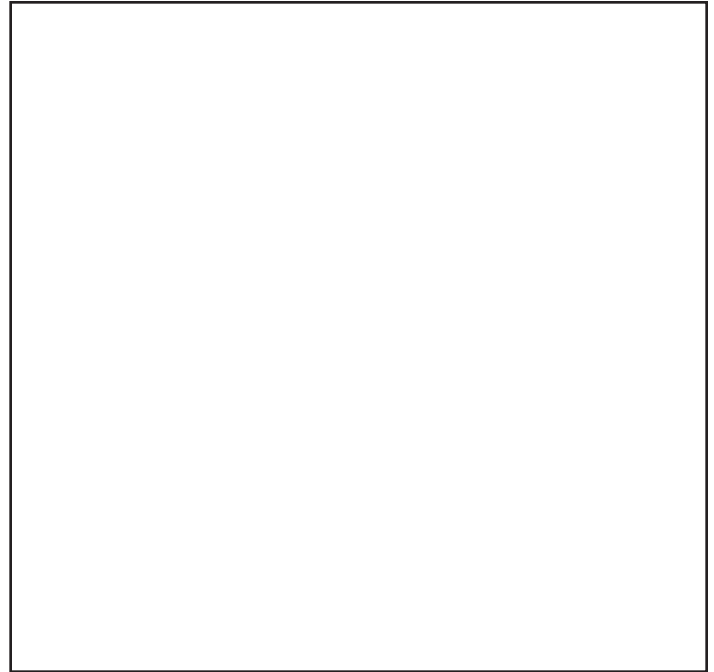
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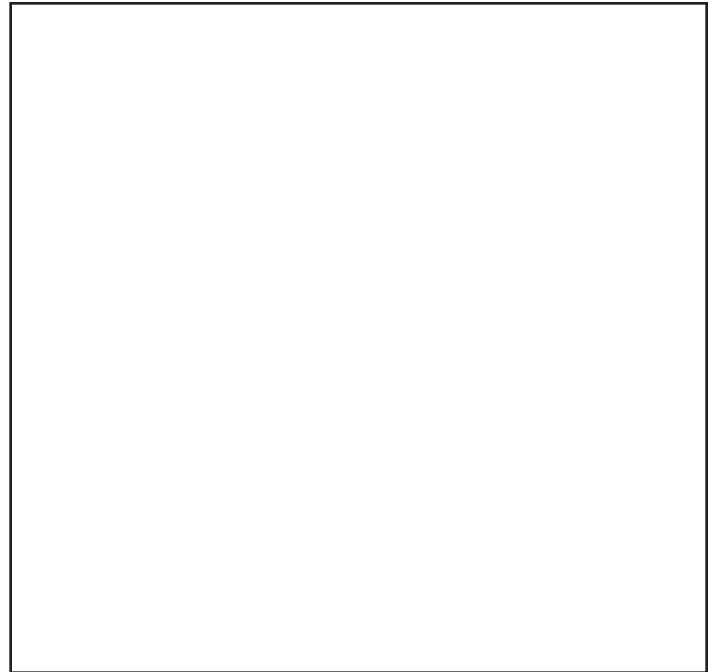
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