

CREATING OUTLINES

An **outline** is a list of main, or central, ideas, subtopics, and supporting details organized in a way that shows how the elements are related. You can use outlining as a study tool to help you recall information. Add notes to an outline to point out similarities and differences between the ideas in various sources. The outline structure below is used to take notes as you read.

I. First Main Idea

A. First Subtopic

1. supporting detail
2. supporting detail

B. Second Subtopic

1. supporting detail
2. supporting detail

The main idea of the text is presented in the title.

Satellites and Sea Lions:

Working Together to Improve Ocean Models

NASA News Release

Updated 2/6/07

The best oceanographers in the world never studied at a university. Yet they know how to **navigate** expertly along oceanic fronts, the invisible boundaries between waters of different temperatures and densities. These ocean experts can find rich fishing in places and at depths that others would assume are barren. They regularly visit the most interesting and dynamic parts of the sea.

Sea lions, seals, sharks, tuna, and other top ocean predators share some of their experiences with human researchers, thanks to electronic tags. Besides tracking the animals, these sensors also collect oceanographic data, such as temperature and salinity. Scientists are beginning to incorporate this rich store of information into ocean models providing new insights into the inner workings of the ocean and the lives of its creatures.

"Our goal is to produce a three-dimensional model of the ocean," says oceanographer Dr. Yi Chao. Chao uses data from satellites, ships, buoys and floats to map the currents, heat content and different water densities beneath the ocean surface. When Chao heard Dr. Dan Costa, a professor of **marine** biology at the University of California, Santa Cruz, present some of his animal tagging data at a scientific meeting a few years ago, he

saw an opportunity to improve his ocean models. Costa recognized a chance to get a clearer picture of the place where his research subjects live. . . .

The research collaboration now includes Dr. Barbara Block, a professor of marine sciences at Stanford University, Palo Alto, Calif., and the scientists have added tagging data collected from tuna and sharks to their studies. Together with a group called TOPP, for Tagging of Pacific Pelagics, they are now working to expand the use of environmental and biological data collected by ocean inhabitants.

"We are at the forefront of knowing how animals use the ocean," says Costa. "But we want to understand the environment better. We still see the ocean primarily as

Note the details about the scientists' goals.



Features:

- current or breaking news
- text written for a general or a specific audience



deep or shallow or near-shore or offshore. But just as there are different habitats on land, the ocean has fine-scale features that are very important to animals," he explains. "We want to be able to look at the ocean and say the equivalent of 'this is a grassland' or 'this is a forest.'"

In late January, Costa and his research group headed up the California coast to begin tagging elephant seals and collecting tags that were deployed last spring. The work is strictly regulated to ensure that the animals are protected from harm, and it requires a permit from the National Marine Fisheries Service. . . .

"Marine scientists have been tracking marine animals for years," says Chao. "It's an interesting challenge, though, to use the data. There are all sorts— from tuna, sharks, seals—you name it. Some of these

data sets have small errors, others much larger errors. Figuring out how to put these in our system is a challenge," he says. "But five years from now, we should be able to see the ocean the way a turtle sees it."

"As we are getting more data from the sea and improving our computer models," says Chao, "we should be able to make routine ocean forecasts, similar to what meteorologists have been doing in the past few decades. People who open the

newspaper or turn on the TV in the morning will see the updated ocean forecast and make appropriate decisions as they plan their activities on the sea."

What is most important about using marine animals as ocean sensors is that the work benefits the animals, Costa explains. "Collaborations between biologists like Barbara Block and me and physical oceanographers like Yi are critical for understanding why the animals go where they go," he says, "as we need to know and understand the ocean physics and its relationship to climate processes. Further, the ability to understand how climate change is affecting the world oceans is not only of benefit to humans, but is vital for trying to figure out what is going to happen to habitats of marine animals."

This paragraph lists details about the research's benefit to animals.

Cal
Sea
Zalop
meanir
with cr

DESCR
are kn
fulness
ranges
a light
may re
lbs., or
length
and up
have a
five ye
bump
tal cre
gets li
the of
extern
they
"seals
ally C

RAN
lions
Britis
Baja

The text
organiz
categor
can be
in cons
your ou

Directions: We will create an outline together as we read the news release, Satellites and Sea Lions: Working Together to Improve Ocean Models, together.

California Sea Lions

Zalophus californianus

meaning of Latin name:
with crest and of California

This title clearly states the topic, or main idea.

DESCRIPTION: California sea lions are known for their intelligence, playfulness, and noisy barking. Their color ranges from chocolate brown in males to a lighter, golden brown in females. Males may reach 1,000 lbs. (more often 850 lbs., or 390 kg) and seven feet (2.1 m) in length. Females grow to 220 lbs. (110 kg) and up to six feet (1.8 m) in length. They have a “dog-like” face, and at around five years of age, males develop a bony bump on top of their skull called a sagittal crest. The top of a male’s head often gets lighter with age. These members of the otariid or walking seal family have external ear flaps and large flippers that they use to “walk” on land. The trained “seals” in zoos and aquariums are usually California sea lions.

RANGE/HABITAT: California sea lions are found from Vancouver Island, British Columbia to the southern tip of Baja California in Mexico. They breed mainly on offshore islands, ranging from southern California’s Channel Islands south to Mexico, although a few pups have been born on Año Nuevo

The text is organized into categories that can be useful in constructing your outline.

and the Farallon Islands in central California. There is a distinct population of California sea lions at the Galapagos Islands. A third population in the Sea of Japan became extinct, probably during World War II.

BEHAVIOR: California sea lions are very social animals, and groups often rest closely packed together at favored haul-out sites on land, or float together on the ocean’s surface in “rafts.” They are some-

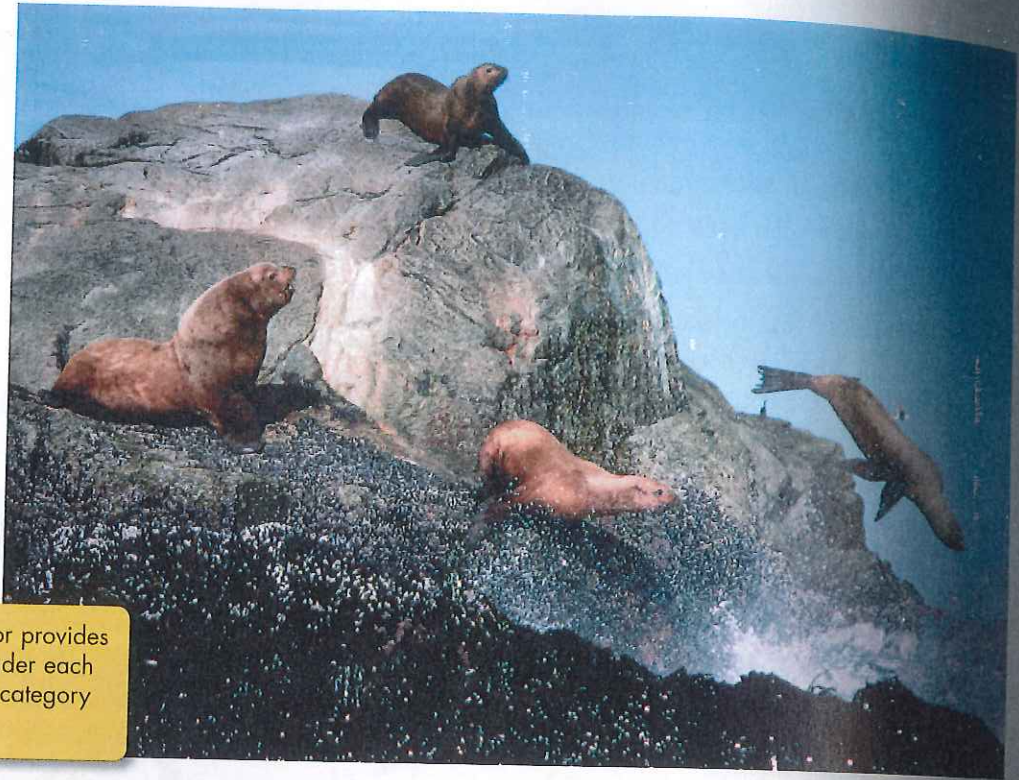


times seen porpoising, or jumping out of the water, presumably to speed up their swimming. Sea lions have also been seen “surfing” breaking waves. California sea lions are opportunistic eaters, feeding on squid, octopus, herring, rockfish, mackerel, and small sharks. In turn, sea lions are preyed upon by Orcas (killer whales) and great white sharks.

Encyclopedia Entry

Features:

- informational reading
- unbiased facts
- photographs or illustrations
- text written for a general audience



The author provides details under each boldface category heading.

MATING AND BREEDING: Most pups are born in June or July and weigh 13–20 lbs. (6–9 kg). They nurse for at least five to six months and sometimes over a year. Mothers recognize pups on crowded rookeries through smell, sight, and vocalizations. Pups also learn to recognize the vocalizations of their mothers. Breeding takes place a few weeks

after birth. Males patrol territories and bark almost continuously during the breeding season.

STATUS: Their population is growing steadily, and California sea lions can be seen in many coastal spots such as Seal Rock or Pier 39 in San Francisco. The current population is approximately 200,000.

Now it's your turn! You will fill in the following outline as you read the encyclopedia entry, California Sea Lions.

I. Description

A. Males

1.

2.

3.

B. Females

1.

2.

3.

C. Physical Features

1.

2.

II. Habitat

A.

B.

III. Behavior

A.

1.

2.

B.

1.

2.

IV. Breeding

A.

1.

2.

3.

V. Status

A.

1.

2.