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# EDUCATION and the ENVIRONMENT INITIATIVE



# What is the EEI?



- In October 2003, after extensive negotiations, California Assembly Bill 1548 was signed into law, establishing what is called the **Education and the Environment Initiative (EEI)**.
- It is a broad-ranging endeavor that connects education about the environment with California's complex standards-based instructional system.

# The EEI is Unique



**National model:** California is currently poised to lead the nation in environmental literacy.

**Unprecedented Opportunity:** The EEI institutionalizes education about the environment in California's classrooms, potentially reaching over 6 million children.

**Governor's Priority:** Funded and highlighted in the administration's key environmental initiatives.

**Comprehensive Stakeholder Involvement:** Active participation and coordination among State education and regulatory agencies, the education community and the private sector.

**Approved Instructional Materials:** The EEI will be approved by the State Board of Education and considered germane in classroom instruction.

# Broad Interagency Partnership



## Environment and Natural Resources Agencies

Environmental Protection Agency

Integrated Waste Management Board

Resources Agency

## Education Agencies

State Board of Education

Department of Education

Governor's Secretary for Education

# EEI Mandates



- **Develop Environmental Principles & Concepts (EP&C)**
- **Support Academic Content Standards**
- **Incorporate EP&C into Instructional Materials Adoption Criteria**
- **Create Model Curriculum for K-12**
- **Encourage Regulatory Consistency**
- **Coordinate State Agency Environmental Information for Children and Teachers**

# Environmental Principles and Concepts

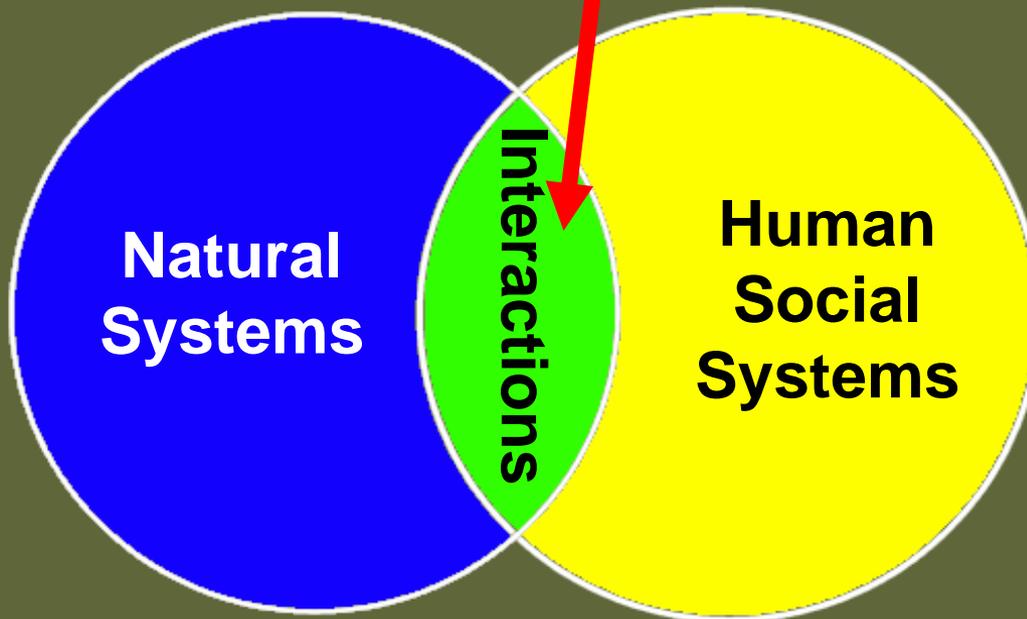


**71301. (a) ... shall develop education principles for the environment for elementary and secondary school pupils... The principles shall be aligned to the academic content standards adopted by the State Board of Education...**

# Environmental Principles and Concepts



- 5 principles and 15 concepts
- Focus on the interactions and interdependence of human societies and natural systems.



# Support Academic Content Standards



**71301 (c):** The principles shall be aligned to the applicable academic content standards adopted by the State Board of Education and shall not duplicate or conflict with any academic content standards.

**71301 (e):** If the content standards required pursuant to Section 60605 of the Education Code are revised, the education principles for the environment shall be appropriately considered for inclusion into part of the revised academic content standards.

# Alignment to Academic Content Standards



- Carried out an in-depth alignment between EP&C and the content standards.
- Developed learning objectives for the EEI Curriculum that directly teach the standards.
- Selected only those standards where it is possible to help students achieve mastery.

# Incorporate EP&C into Instructional Materials Adoption Criteria



**71301. (d) (1) ... principles for the environment shall be incorporated, as the State Board of Education determines to be appropriate, in criteria developed for textbook adoption ... in Science, Mathematics, English/Language Arts, and History/Social Sciences...**

**(2) ... the State Board of Education shall collaborate with the office to make the changes necessary to ensure that the principles are included in the textbook adoption criteria...**

# Instructional Materials Adoption Criteria



- State Board incorporated the EP&C in the Reading-Language Arts instructional materials adoption criteria.
- President of State Board of Education and State Superintendent encouraged science publishers to include the EP&C in the 2006 adoption.

# Create Model Curriculum for K-12



**71302. (a) ... shall develop ... a model environmental curriculum that incorporates these education principles for the environment ...**

**(b) The model curriculum shall be submitted to the Curriculum Development and Supplemental Materials Commission for review. The commission shall submit its recommendation to the Secretary for Environmental Protection and to the Secretary of the Resources Agency ...**

**(2) The model curriculum ... shall be submitted to the State Board of Education for its approval.**

# EEI Curriculum for K-12



- Provide a K-12<sup>th</sup> grade instructional continuum that will help students master California's academic content standards and California's EP&C's.
- 150 units K-12 focused on science and history-social science standards
- Currently 70 units are under development in every stage of the process from outline through field testing
- Comprehensive review (content and pedagogy experts, field and pilot test teachers, etc.)

# Accomplishments and Status



- **\$7.0 Million has been funded.**
- **Development of the EEI curriculum, a two-year process, is underway under the guidance of Principal Consultant Dr. Jerry Lieberman and his team.**
- **Hired professional K-12 curriculum writers, editors, and graphic designers.**
- **Established content and education working groups to conduct reviews.**
- **Recruited school districts for field and pilot testing.**
- **Partnerships with the National Geographic Society, ESRI, NOAA, and Heal the Bay.**
- **Pursuing philanthropic interest in supporting EEI implementation.**

# Field and Pilot Testing Districts of the Education and the Environment Initiative Curriculum



# Key Elements of the Instructional Units



# 1

Science Standard  
1.2.d.

Supports  
English-Language  
Arts Standard  
1.1.2.



California Education and the Environment Initiative

**DRAFT**  
for discussion purposes only



Open Wide!  
Look Inside!

Overview



Sea gull with sea star in mouth

This unit brings a unique approach to the study of how students can learn to infer what animals eat from the shapes of their teeth. The unit is designed to teach the relevant science and, at the same time, to support the development of first grade reading, writing, listening, and speaking skills. As such, the lessons focus on one Eng-

lish-Language Arts standard, Listening and Speaking Strategies 1.1.2., "asking questions for clarification and understanding." A big book is included that provides three separate stories and striking photographs to capture students' interest and attention.

In early lessons, students read a nonfiction story about the Channel Islands located off the coast of

California. They learn that animals meet their needs for food within their habitat, and they meet those needs in different ways. As lessons develop, students learn that animals' teeth and bills differ and that teeth and bills influence each species' diet.

Students envision island animals finding food by reading a second story about them hunting, foraging, and

California Content Standard

1.2. Plants and animals meet their needs in different ways.

1.2.d. Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants)

California Environmental Principle II

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

**Concept C:** Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

grazing in a complex web of life. They explore feeding strategies and tooth structures of animals that eat meat, plants, or a combination of both.

Throughout the lessons students study four types of teeth: incisors, canines, premolars, and molars. They learn that each of the different types of teeth is used for a different function, some for chewing, and others for ripping and cutting. They explore how different animals use: canine teeth for biting and tearing food; incisors to cut; premolars to shear, grind, and mash food; and, molars for chewing and breaking down pieces of food.

In later lessons, students learn about ways **human activity** influences habitats and affects animals' ability to find food. They learn about other human influences on animals' food supplies. These activities bring to light the vulnerability of animals when their food becomes unattainable and

raises awareness that animals' lives are dependent on their ability to find the right kinds and quantities of food.

They read a final story about the Channel Islands, where the introduction of non-native game species such as elk and cattle took a toll on the landscape and, in turn, the food supplies of island wildlife. At the conclusion of the unit, students explain whether there will be enough food to support the population of animals.

Threaded through all the lessons is the concept that two things influence an animal's food supply: the amount of food available and the condition of

the habitat that provides their food. The unit demonstrates that populations of animals may change because of changes to habitats, and that habitats can also change when populations of animals increase or decrease.

The final lesson facilitates a review of what animals eat based on the shapes of their teeth. It also helps students begin to understand the relationship between the population of island foxes and human activity. Ultimately, the students will see how changes in a food supply influence one animal's ability to survive on the Channel Islands.



At a Glance



**The Wild Places and Faces of the Channel Islands**  
Become familiar with the animals and habitats on the Channel Islands.



**The Wild Places and Faces of the Channel Islands**  
Learn about Channel Islands habitats and what the animals eat.



**Life on Santa Rosa Island**  
Learn about island wildlife and explore shapes of animals' teeth.



**Birds Need Food, Too**  
Study birds' bills and learn what island birds eat and why.



**Diets of Land Animals**  
Consider what happens when food changes or runs out.

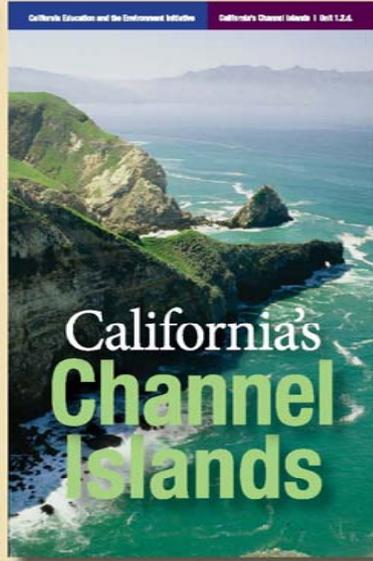


**Changes to Natural Systems**  
Take a before and after look at the Channel Islands' natural systems.

California Connections

California's Channel Islands

is a big book in three parts: The Wild Places and Faces of the Channel Islands; Life on the Santa Rosa Island; and Changing Places and Faces on the Island. Using animals that live on the islands as an example, the stories provide students with a context for understanding how the shapes of animals' teeth influence their diets and, ultimately, survival.



**Part I**  
The Wild Places and Faces of the Channel Islands

Not far from California's coast, there are eight small islands. They are called the Channel Islands.

Catalina Island is one of the Channel Islands. Many people live on Catalina. They live in a town called Avalon. Animals live on Catalina Island too.

**Fun Fact**  
Islands have water all around them!

There are seven major habitats on and near the Channel Islands: grasslands, forests, canyons, rocky shores, sandy beaches, kelp forests, and the ocean. Each of these habitats is home to different types of plants and animals.

These habitats are the places where plants and animals live and meet their needs for food, water, and shelter. Each of these habitats provides different resources to the lizards, snakes, mammals, birds and many other animals that live and eat there.

**Fun Fact**  
Sea lions live in the water and on the land.

Animals live in the habitats found on all the Channel Islands. Frogs and salamanders live in the moist canyons found on the islands. Lizards and snakes live in the grasslands, canyons, and forest.

Mammals also live in the grasslands, canyons, and forest. The mammals on the islands include island foxes, island deer mice, and island spotted skunks (found only on Santa Cruz and Santa Rosa Islands).

**Fun Fact**  
Island foxes are much smaller than other foxes.

There are also many different kinds of birds on the Channel Islands. Birds soar high above the islands. Some nest on the rocky cliffs. Others nest in trees. Some even nest on the ground.

The ocean water around the islands is also home to many plants and animals. Animals like hermit crabs, sea urchins, and sea stars live along the rocky shorelines. Sand crabs and clams live on the sandy beach.



## Differentiated Instruction & Extensions

### Strategies for Below-Level Readers

To reinforce vocabulary words, give pairs of students index cards with key words from the unit. Place the cards face up on a table. Have one student define one of the words. Ask their classmate to select the correct vocabulary word from the cards. (*Example: prey—an animal that is hunted by another animal for food.*)

Show a model of an adult human mouth and teeth. On the board, list foods an adult may eat in the course of a day. Talk about which teeth (incisor, canine, premolar, and molar) the adult may use to bite and chew each type of food.

Give each student a blank booklet with about eight pages. Have students

draw pictures of four meat eaters and four plant eaters. Have them label the major parts of the animals' bodies.

Select one of the stories from the unit. On each page, cover two words with self-adhesive notes. Ask students to read a page and supply the missing word. Tell students to use the photographs and context to help them.

Ask students to check their work by removing the self-adhesive notes, one at a time.

Create a crossword puzzle using the unit's vocabulary words. Have students fill in the answers using the Word Wall to help them.

On the board, write a rebus story using a key concept from the unit.

Have students "read" the story with help from the pictures.

Ask students to draw a small travel poster for California's Channel Islands. Have students include animals found on the islands and what they eat.

### Strategies for Above-Level Readers

Challenge students to create an imaginary animal and tell about its jaw, mouth, and teeth. Ask students to draw the animal in its ideal habitat. Have children write a story on how the animal finds and eats its food.

Have students observe an animal in their neighborhood or at a zoo. Ask students to write a brief expository description of how it finds and eats its food. Instruct students to use sensory details in their work.

Ask students to go to the school library and find books about animals and their diets. Have students read a book and give a "sales pitch" to the class on why their classmates should read the book, too.

Have students list the five most important things they learned in the unit. Have them write two sentences explaining why these things have special meaning for them.

Provide students with the photo

cards used in the unit. Challenge them to put the photo cards in a new or different order and write a story with a beginning, middle, and end. Have students read their work aloud to the whole class or their reading group.

Using words from the basic vocabulary list or from one of the stories in this unit, give pairs of students a pack of index cards with one key word per card. Suggest that students act out the

word for another pair of students, and have the classmates identify the word (like a charade).

Ask students to draw a small travel poster for California's Channel Islands. Have students tell potential visitors what animals they may see on the islands and what they might observe about the animals' eating habits.

Challenge students to create a science display for other classes in the school. Have students focus on the

theme "Animals: Open Wide! Look Inside!" Discuss what displays would be appropriate at such an event (demonstrations, talks, plays, storybooks). Have students plan the event, make invitations or posters, and show what they have learned when their guests arrive.

### Extension Ideas

Encourage students to read books on foods their favorite animal eats (for example, *Chomp! A Book About Sharks* by Melvin Berger) and create booklets on the topic.

Present a book of animal poems and read some aloud (for example,

*Creatures of Earth, Sea, and Sky: Poems* by Georgia Heard). Ask students what foods the animal in the poem eat and why.

After Lesson 4, have students create a mural—a visual profile—of an ecosystem from the Channel Islands.

The mural can show the animals in their surroundings and what they eat, as well as details about their bills and teeth.

## Lesson 3



Channel Islands fox

## Life on Santa Rosa Island

In Lesson 3, students learn about specific characteristics of meat-eaters' and plant-eaters' teeth in relation to what they eat. The lesson gives specific examples of tooth shapes and helps students see how animals' teeth correspond with their diets.

Students examine their own teeth to study tooth shape and function. They also "feel" different animal teeth and guess their function.

In addition, students learn more about the wildlife on Santa Rosa

Island, including the island fox; what and how it eats, problems when golden eagles started appearing on the island, and the resulting decrease in the number of foxes. To understand why there are fewer foxes today, students

reflect on: what they know about the foxes; what they want to learn; and what they have already learned.

Studying the fox helps them start to see the connection between animal teeth and various animal diets.

### Learning Objective

Provide examples of the shapes of specialized animals' teeth or bills and the foods they eat (for example, sharp teeth: eats meat; flat teeth: eats plants)



### Background

One way of classifying animals is by the kinds of foods they eat and the shapes of their teeth. Animals can be carnivores, herbivores, omnivores, or insectivores.

The size and shape of an animal's teeth determine what it can eat. Because animals cannot change their teeth, they cannot necessarily change their diet if the food supply in their habitat is altered.

Teeth are extremely slow to decompose and, therefore, are frequently found as fossils. Studying these fossil teeth is one of the methods that scientists use to determine the diet

### Key Vocabulary

**Flat:** Even and smooth.

**Grind:** To crush.

**Sharp:** Pointed, with an edge.

**Tear:** To shred apart.

**Teeth:** Part of the body used to bite and chew food.

and possible distribution of extinct animals.

### Carnivores

Carnivores are meat-eaters. These animals have three kinds of teeth: incisors for biting, holding prey, and cutting; canines for gripping and tearing food; and, molars and premolars for cutting, crushing, and grinding food. Island foxes, sea otters, wolves, cats, and eagles are examples of carnivorous animals.

### Herbivores

Herbivores are plant-eaters. Their teeth are flat and broad so they can grind their food. Herbivores chew their food by moving their upper and lower teeth in a circle. Many herbivores also have incisor teeth to cut plants. Most herbivores spend most of their time looking for food to get the nutrients they need. Some herbivores

eat only specific parts of a plant, such as the leaves or bark. Deer, elk, rabbits, sheep, horses, and finches are examples of herbivores.



### Omnivores

Omnivores are animals that eat both animals and plants. Omnivores have incisors, molars, and canines. Some eat other animals' eggs and most eat fruits and vegetables. Examples of omnivores are wild pigs, opossums, and raccoons. Humans are also considered omnivores.

### Insectivores

Most animals that eat insects have square molars with sharp points. This helps them break apart and tear the bodies of their prey. Praying mantises, some bats, most frogs, and many woodpeckers are insectivores.



Black-tailed jackrabbit



Toolbox



Summary of Activities

Students listen to a story about life on Santa Rosa Island and record what they know about the various animals mentioned.

Using “feely” bags, students explore animal tooth cutouts and sort them by shape and function. Students ask questions to clarify understanding about island foxes and the shapes of animals’ teeth.



Instructional Support

See Unit Resources, page 29

Prerequisite Knowledge      Advanced Preparation      Materials Needed      Visual Aids      Duration



Students should be able to:

- predict based on prior events or word clues in story.
- recognize shapes.
- recall prior knowledge and verbalize concepts learned.
- sort simple words into two categories.
- verbalize questions to clarify information gathered by listening.



Gather Materials Needed:

- Prepare the “feely” bags by cutting out the teeth on the **Animal Teeth Cutouts**. Place one of each of the four tooth cutouts in each paper lunch bag. Fold down the top of each bag so the pieces do not fall out. Prepare one bag per pair of students.

Prepare Activity Masters:

- Make copies of Activity Masters.
- Copy **Animal Teeth Cutouts**, paste them on heavy tag board, and cut them out.

Prepare Visual Aids:

- Assemble five sets of photo cards (see Visual Aids).
- Take out the big book *California Connections: California’s Channel Islands*.

Write paragraph on board:

- Copy the paragraph (with blank lines inserted) from Step 4 onto the board. Cover the writing until you have read the story.



Mirrors:

- one per group of four students, about 5” x 3”

Paper lunch bags:

- one per pair of students

Class supplies:

- crayons, pencils



Photo Cards:

- Animal Teeth, page 114



Preparation time:

25 min.

Instructional time:

45 min.



Safety Notes

None

Activity Masters

|  |
|--|
| <p><b>KWL About Island Foxes</b><br/>Page 99<br/>One per student</p> |
|--|

|   |
|---|
| <p><b>Animal Teeth Cutouts</b><br/>Page 100<br/>One per student</p> |
|---|

|  |
|--|
| <p><b>Island Fox Test</b><br/>Pages 101-102<br/>One per pair of students</p> |
|--|

Name: \_\_\_\_\_

Island Fox Test (Lesson 3 Activity Master) page 1 of 2

Choose the correct answer and write it on the line.

1. An island fox eats \_\_\_\_\_.

grass      meat and other foods      pigs      rocks

2. An animal that eats the island fox is the \_\_\_\_\_.

golden eagle      gull      skunk      snake

3. An island fox bites its food with teeth that are \_\_\_\_\_.

big      black      round      sharp

4. Tall grass helps an island fox \_\_\_\_\_.

bark      clean      eat      hide

5. An island fox eats some of its food in a \_\_\_\_\_.

den      nest      shore      tree

Name: \_\_\_\_\_

Island Fox Test (Lesson 3 Activity Master) page 2 of 2

6. Circle animals with sharp teeth. Underline animals that have many flat teeth.

Name: \_\_\_\_\_

**Animal Diets** (Lesson 5 Activity Master) page 1 of 3

Make a menu for each of these animals. Choose three foods from the page below that each animal might eat. Write these foods on each animal's menu. Think about what each animal would do if they could not find their favorite foods? Write your answer below each menu.

**Plants**



**Birds**



**Insects**



**Other Animals**



Name: \_\_\_\_\_

**Animal Diets** (Lesson 5 Activity Master) page 2 of 3



**Menu**

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If they cannot find food: \_\_\_\_\_



**Menu**

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If they cannot find food: \_\_\_\_\_

## Traditional Unit Assessment

### Description

The **Traditional Unit Assessment** (Unit Assessment Master) helps determine whether students know how to infer what animals eat from the shapes of their teeth or bills. Questions 7 and 8 indicate understanding of how habitat changes influence animals' ability to find food. Allow about 20 minutes for students to complete the test. Read aloud questions 1-7 and the possible answers.

Read questions 8 and 9. Ask if students understand the questions and simplify the language if necessary. Instruct students to write a one-sentence answer for each question.

### Suggested Scoring

Use the Answer key provided on pages 21-22.

Name: \_\_\_\_\_

**Traditional Unit Assessment** (Unit Assessment Master) page 1 of 2

Choose the correct answer and write it on the line.

1. An animal uses its \_\_\_\_\_ *teeth* \_\_\_\_\_ to eat.

eyes                  teeth                  fur

2. Meat eaters usually have \_\_\_\_\_ *sharp* \_\_\_\_\_ teeth for tearing flesh.

flat                  blue                  sharp

3. Flat teeth are used for grinding \_\_\_\_\_ *grass* \_\_\_\_\_.

grass                  mice                  fish

4. Birds use their \_\_\_\_\_ *bills* \_\_\_\_\_ to eat.

grass                  eagles                  bills

5. A bird that eats \_\_\_\_\_ *seeds* \_\_\_\_\_ has a heavy, thick bill.

seeds                  sharp                  hummingbirds

# Milestones & Estimated Timelines



**Unit & Lesson Development**

**September 2006 – October 2008**

**Field and Pilot Testing**

**April 2007 – February 2009**

**Curriculum Commission Review & Deliberations**

**March/April 2009 – August 2009**

**State Board of Education Submission**

**November 2009 – January 2010**

# Become Involved!



- Review draft units
- Provide feedback as a content reviewer
- Provide feedback as an educator reviewer
- Engage your school and district in supporting the EEI
- Join our listserve to keep abreast of EEI developments



• **EDUCATION**  
and the  
**ENVIRONMENT**  
**INITIATIVE**



**For Further Information**

**[www.calepa.ca.gov/Education/EEI](http://www.calepa.ca.gov/Education/EEI)**