



**BioTrek**

## Pre-Curriculum Grades K-5

Curator: Michael Brown  
Phone: (909) 869-4072  
E-mail: [mabrown@csupomona.edu](mailto:mabrown@csupomona.edu)  
<http://www.csupomona.edu/~biotrek>

California State Polytechnic University Pomona  
3801 West Temple Avenue • Pomona, California 91768

BioTrek



## TABLE OF CONTENTS

Grades K-2 Physical Science: Objects.....	3
Handout: Do these objects float or sink? .....	4
Grades K-2 Earth Science: Weather.....	5
Grades K-2 Life Science: Plants and Animals.....	7
Handout: Will the real bear please stand up? .....	8
Grades K-2 Activity: Walnut Word Search.....	9
Grades 3-5 Physical Science: Photosynthesis.....	10
Handout: Photosynthesis.....	12
Grades 3-5 Physical Science: Photosynthesis.....	13
Handout: Tongva Maze.....	14
Glossary of Terms.....	15



## **K-2 PHYSICAL SCIENCE OBJECTS**

### **Materials and Time:**

20 minutes

### **State Standard:**

- **Kindergarten Physical Science 1a:** *Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept: Students know objects can be described in terms of the materials they are made of (e.g., clay, cloth, paper) and their physical properties (e.g., color, size, shape, weight, texture, flexibility, attraction to magnets, floating, sinking).*

### **Objectives:**

- Students learn how to tell different shapes, colors, sizes.
- Students know size is not important when it comes to buoyancy.
- Students can describe an object in terms of color, size, shape, weight, texture etc.

### **Anticipatory Set/ Linking to prior knowledge:**

- Do cars have wheels? What shape are they? Are they hard?
- Do tables have legs? Do people have legs? Are the legs of a table like mine and yours?

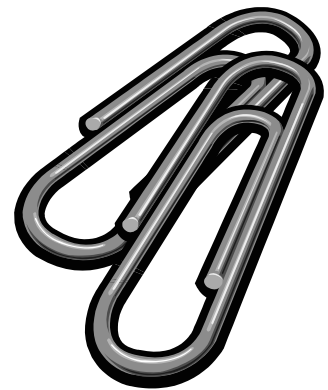
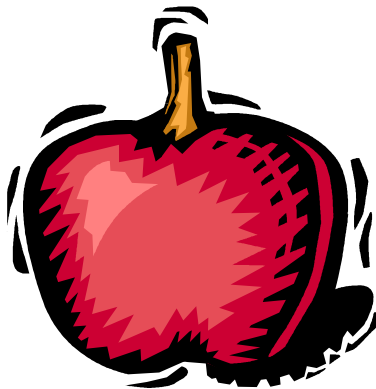
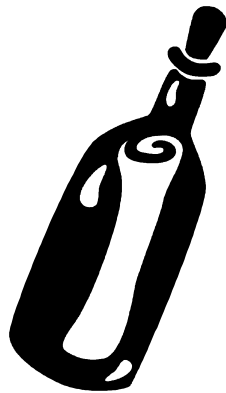
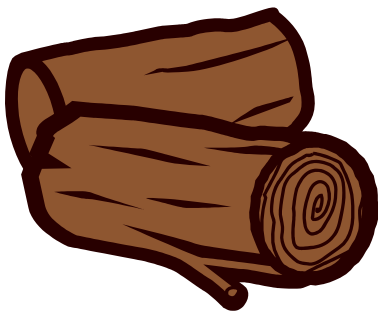
### **Instructions:**

One way that objects could be described would be – Do they float or sink?

- Look at objects in terms of floating and sinking. Compare heavy and light and big and small objects. How do they compare in terms of floating and sinking? Do big objects sink or float? Do heavy objects sink or float?
- Does size always indicate whether an object is going to sink or float?
- You could do this activity with a beach ball, rubber ball, paper clip, piece of wood and/or a piece of plastic.

# Do These Objects Float or Sink?

Circle the items you think will float.





## K-2 EARTH SCIENCE WEATHER

### Materials and Time:

20 minutes

### State Standard:

- **Kindergarten – Earth Science Standard 3b**  
*Earth is composed of land, air, and water. As a basis for understanding this concept: Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.*
- **Grade 1 - Earth Science Standard 3b**  
*Weather can be observed, measured and described. As a basis for understanding this concept: Students know that the weather changes from day to day but that trends in temperature or of rain (or snow) tend to be predictable during a season.*

### Objectives:

- Students learn the difference between seasons and weather.
- Students know that weather can change from day to day, or even change in one day.
- Students know the four seasons of the year, and what organisms do in different seasons (i.e. humans wear jackets during winter, bears hibernate, trees lose their leaves etc.)

### Anticipatory Set/ Linking to prior knowledge:

- Is it hot or cold today?
- Would you wear a jacket? Why or why not?
- What about the winter? Would you wear shorts?

### Instructions:

Compare the temperature, seasons and amount of rain between the rain forest and Southern California.

#### Southern California Weather

-Predictable  
-Seasons change; jackets are worn  
-Rain in winter (16 inches), dry in summer  
-Day to day changes

#### Rain Forest Weather

-Predictable  
-Constant warm temperature  
-Rain all year round, 200 inches  
-Day to day constant

- In Southern CA, it only rains a few months of the year. It can get cold so you may need a jacket, have to sleep with the windows closed, and use the heater.
- In the tropical rainforest lowland, it is generally 80° F in the daytime and these temperatures remain the same all year long. If you lived in the

rainforest, you would never need a warm jacket and you would never turn on a heater. You would need a big leaf for an umbrella because it can rain for a few hours almost every day. You wouldn't have to worry about too much heat because the sun would only come out from behind the clouds for a short time each day. The rainforest is a very comfortable place to live if you are a plant, insect or bird because it is never too hot, too cold or too dry.



## **K-2 LIFE SCIENCE PRE-CURRICULUM PLANTS AND ANIMALS**

### **Materials and Time:**

20 minutes

### **State Standard:**

- **Kindergarten - Life Science Standard 2b**

*Different types of plants and animals inhabit the earth. As a basis for understanding this concept: Students know stories sometimes give plants and animals attributes they do not really have.*

### **Objectives:**

- To help students understand that plants and animals don't really talk or show "emotion" the same as people

### **Anticipatory Set/ Linking to prior knowledge:**

Have you heard of Smokey the Bear or Winnie the Pooh?

- "Do bears really talk?"
- "Are real bears loveable and huggable?"

### **Instructions:**

Handout: Will the real bear please stand up?

# Will the real bear please stand up!

## CIRCLE THE RIGHT ANSWER

1. Do real bears talk? YES NO
2. Can you hug a real bear? YES NO
3. Do real bears wear clothes? YES NO



4. Which Bear can talk?  
Circle it with Green

5. Which Bear is soft and cuddly?  
Circle it with red.

6. Which bear lives in the mountains?  
Circle it with blue



COLOR ALL THE BEARS!



## Word Search



Walnuts were used by the Tongva People. Can you find five uses for this plant?

Paint   dye   food   games   baskets



## 3-5 PHYSICAL SCIENCE PHOTOSYNTHESIS

### Materials and Time:

15-20 Minutes

Handout

### State Standard:

- **Grade 3 Physical Sciences Standard 1a**

*Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept: Students know energy comes from the Sun to Earth in the form of light.*

- **Grade 5 Life Sciences Standard 2f**

*Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept: Students know plants use carbon dioxide (CO<sub>2</sub>) and energy from sunlight to build molecules of sugar and release oxygen.*

### Objectives:

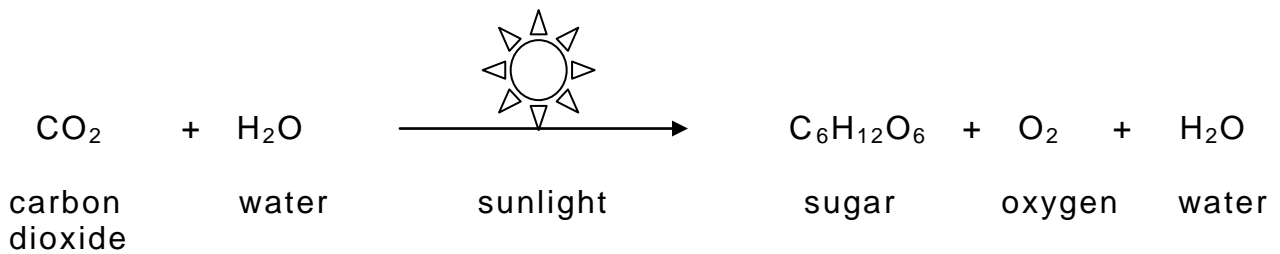
- Students know the purpose and function of photosynthesis.
- Students know that plants take in carbon dioxide and release oxygen..
- Students know plants use light to build molecules of sugar .

### Anticipatory Set/ Linking to prior knowledge:

- Why do plants need light?
- Do we need plants?
- What do we get from plants?

### Instructions:

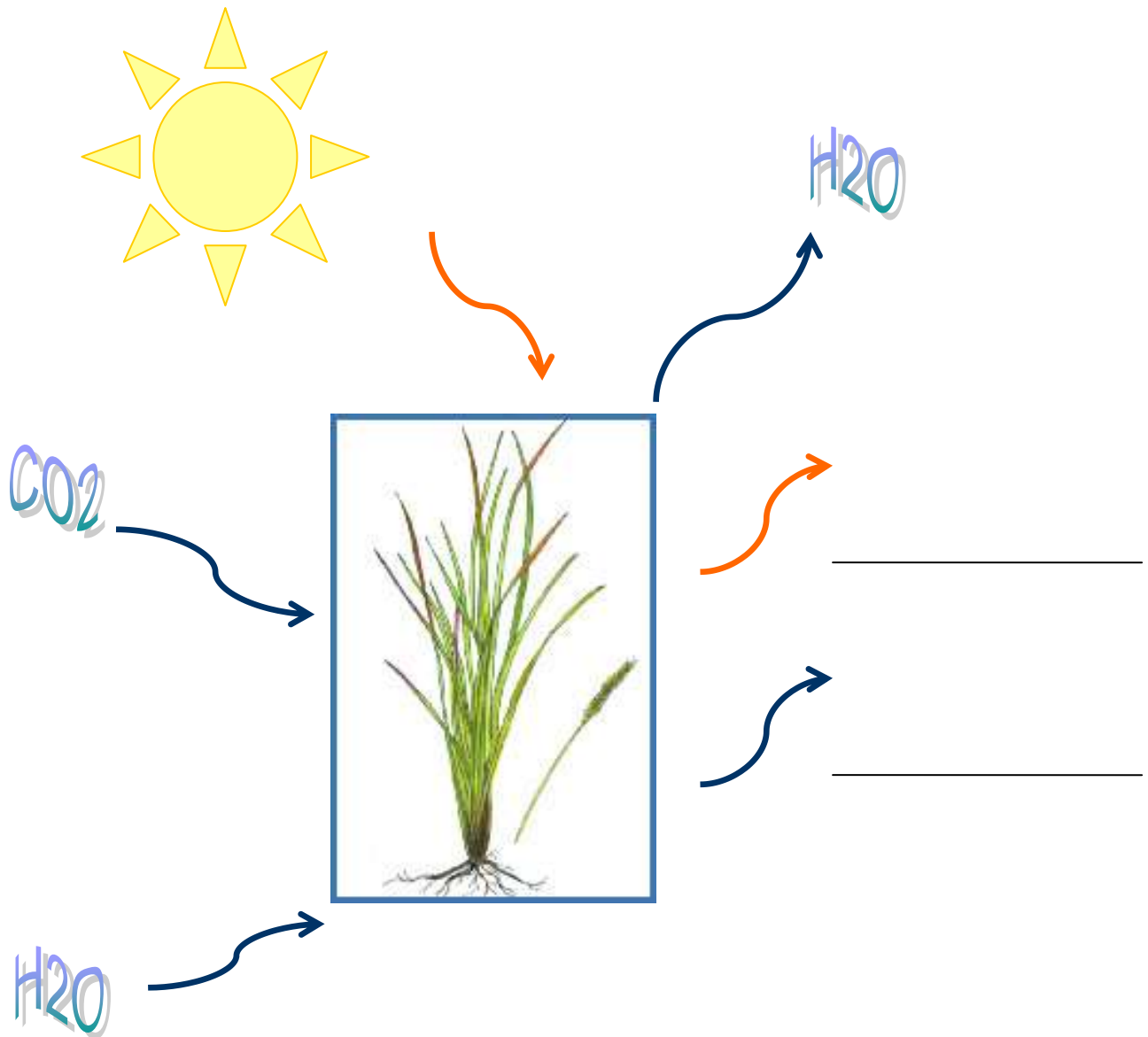
Photosynthesis: the taking in of light energy, carbon dioxide and water to produce sugars and release oxygen and water as byproducts.



- Photosynthesis converts light energy into chemical energy. Light energy comes from the sun, and plants use light and carbon dioxide to store energy as sugars, starches and oils.
- We benefit from this process because they provide us with oxygen we breathe and food we eat. When we eat a plant, we are changing the stored energy in the plant into movement and heat.

Handout: "Photosynthesis"

# photosynthesis



**Fill in the blanks on the diagram above:**

What are the two missing products of photosynthesis?

**Thinking Questions:**

1. Why are those products important?
2. What would happen if there were no plants to produce them?



## 3-5 PHYSICAL SCIENCE PHOTOSYNTHESIS

### **Materials and Time:**

5 Minutes

Acorns and Mesquite beans

### **State Standard:**

- Grade 3 Physical Sciences Standard 1b  
*Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept: Students know sources of stored energy take many forms, such as food, fuel, and batteries.*

### **Objectives:**

- Students know how plants store their energy.
- Students know that plants get energy from sun, and we in turn get energy from plants.

### **Anticipatory Set/ Linking to prior knowledge:**

- Where do we get our energy from?

### **Discussion:**

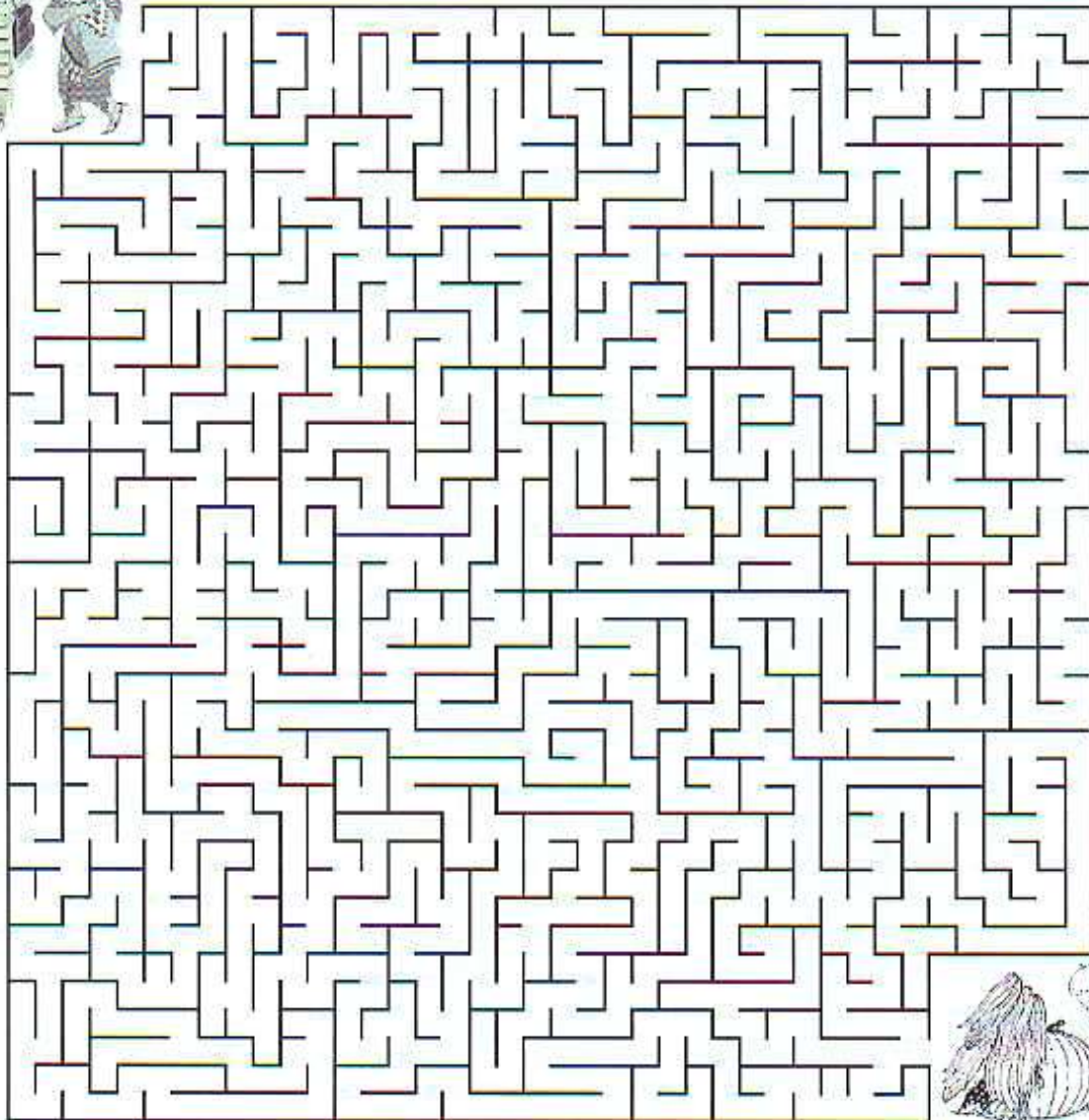
- Not only do plants produce energy, but they store it as well. In turn we benefit from this.
- Acorns are the main source of nutrients for the Tongva people.
- Acorns store energy as oil.
- Mesquite beans are like McDonald's sandwiches. They have protein in the middle (like meat) and are covered by carbohydrate (like bread).
- Mesquite beans store energy in the form of sugars.

Handout: "BioTrek's Tongva Garden"

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



## BioTrek's Tongva Garden



**Help The Tongva Find Their Food.**

**The Tongva lived carefully on the land where they got their food, medicine, and other things they needed for their families.**

**Their motto was "Maintain the Land".**



## GLOSSARY OF TERMS

### The Tropical Rainforest

<b>allspice</b>	the dried, unripe berries or leaves of an aromatic tropical American tree, <i>Pimenta dioica</i> , used whole or ground as a spice
<b>anchor</b>	to fix or fasten; affix firmly
<b>bacteria</b>	one-celled organisms, spherical, spiral, or rod-shaped and appearing singly or in chains
<b>boucan</b>	dried or smoked meat or fish, usually with allspice, bay rum, hot peppers, or other spices from the Caribbean
<b>breakage</b>	the act of breaking; state of being broken
<b>caiman</b>	any of several tropical American crocodilians of the genus <i>Caiman</i> and allied genera: some are endangered.
<b>canopy</b>	The continuous dense layer in a forest, formed by the crowns of the trees. Also called <i>crown canopy</i>
<b>carnivore</b>	An animal that feeds chiefly on the flesh of other animals
<b>chocolate</b>	a preparation of the seeds of cacao, roasted, husked, and ground, often sweetened and flavored, as with vanilla
<b>cocoa butter</b>	a fatty substance obtained from the seeds of the cacao, used in making soaps, cosmetics, and other products
<b>cyanide</b>	a salt of hydrocyanic acid, as potassium cyanide, KCN.
<b>East Indies</b>	also called the Indies, Indonesia. SE Asia, including India, Indonesia, and the Malay Archipelago
<b>emergent zone</b>	tallest rainforest layer where the tallest trees emerge above the canopy
<b>epiphyte</b>	plant that usually grows on another plant but not parasitic on it
<b>equator</b>	an imaginary line around the Earth forming the great circle that is equidistant from the north and south poles
<b>fiber</b>	a slender, tapered cell which, with like cells, serves to strengthen tissue
<b>food web</b>	a series of organisms related by predator-prey and consumer-resource interactions; the entirety of interrelated food chains in an ecological community
<b>forest floor</b>	lowest rainforest layer that consists of herbs, mosses, fungi, and very few flowering plants
<b>fungi</b>	a taxonomic kingdom, or in some classification schemes a division of the kingdom Plantae, comprising all the fungus groups and sometimes also the slime molds
<b>herbivore</b>	any animal that feeds chiefly on grass and other plants
<b>Jamaica</b>	an island in the West Indies, South of Cuba.

<b>Jamaican Jerk BBQ</b>	food seasoned with Jamaican seasonings called "jerk" including allspice and/or bay rum leaves
<b>liana</b>	any of various usually woody vines that may climb as high as the tree canopy in a tropical forest.
<b>mutualism</b>	a relationship between two species of organisms in which both benefit from the association
<b>nectary</b>	a plant organ or part that secretes nectar
<b>nutritious</b>	providing nourishment, esp. to a high degree; nourishing; healthful
<b>omnivore</b>	an animal that feeds on both animal and vegetable substances
<b>palm frond</b>	palm leaf
<b>photosynthesis</b>	a process by which plants convert the sun's energy into food energy
<b>pod</b>	fruit covering that encloses seeds
<b>prop root</b>	an adventitious root that supports the plant, as the aerial roots of the mangrove tree or of corn
<b>royalty</b>	character or quality proper to or befitting a sovereign; nobility
<b>scale</b>	one of the hard, bony or dentinal plates, either flat or tooth-like, forming the covering of animals, such as fishes
<b>seed husk</b>	the dry external covering of certain fruits or seeds, esp. of an ear of corn
<b>stilt root</b>	an aerial root that supports a plant
<b>symbiosis</b>	a close, prolonged association between two or more different organisms of different species
<b>thorn</b>	a modified branch in the form of a sharp, woody spine
<b>tortoise</b>	a land turtle characteristically having thick club-like legs and a high, rounded carapace; they cannot swim and will sink and drown in water.
<b>tropical rainforest</b>	rainforests that are generally found near the equator. They are common in Asia, Africa, South America, Central America, and on many of the Pacific Islands
<b>turtle</b>	Any of various aquatic or terrestrial reptiles having horny toothless jaws and a bony or leathery shell into which the head, limbs, and tail can be withdrawn in most species. Feet usually have claws and are adapted for swimming.
<b>understory</b>	rainforest layer of shrubs and plants growing beneath the main canopy of a forest
<b>vine</b>	any plant having a long, slender stem that trails or creeps on the ground or climbs by winding itself about a support or holding fast with tendrils or claspers
<b>West Indies</b>	an archipelago in the N Atlantic between North and South America

## Aquatic Biology

<b>adaptation</b>	a characteristic of an organism that it uses to survive in its habitat
<b>algae</b>	a plant-like organism that is photosynthetic and usually aquatic. It can be single celled or many billions of cells. Examples: giant sea kelp, sea lettuce, spirulina
<b>bay</b>	an area of water protected by land on three sides, which usually has calm waters.
<b>calcium carbonate</b>	A chemical found in rock, it is also secreted by some coral to make its burrow



<b>camouflage</b>	A type of concealing coloration that allows an otherwise visible organism or object to remain undetectable from the surrounding environment by blending in. Examples include a tiger's stripes or the eye spot on a fish's tail
<b>coral reef</b>	Coral reefs are warm, clear, shallow ocean habitats that are made by coral, which are small animals that live in the ocean. The limestone burrows made by the coral pile up, and over hundreds of years, the reefs get very large. Coral reefs occur in oceans where the water is warm, about 70 to 75 degrees Fahrenheit.
<b>defense mechanism</b>	Any adaptation an organism uses to add to its chances of survival for the species. Example: spines to prevent being eaten; a foul smell to make itself undesirable or to escape.
<b>drumming</b>	sound produced by certain catfishes by striking their gas bladder with their bones
<b>equator</b>	the parallel of latitude on the Earth at 0 degrees. It marks the artificial boundary between the Northern and Southern Hemispheres.
<b>erosion</b>	The process by which the surface of the Earth gets worn down. Erosion is caused by natural elements such as wind, water and glacial ice.
<b>freshwater</b>	Water that does not have a high concentration of salt, such as most lakes, rivers and streams
<b>gland</b>	A small organ or formation of cells that make a substance and then secrete it, such as mucous. Some glands collect harmful or excess substances such as salt and then secrete it out of the body.
<b>habitat</b>	a specific place or environment where a plant or animal lives
<b>kelp</b>	Large seaweed plants (algae), belonging to the brown algae
<b>mangrove</b>	trees and shrubs that grow in saline (brackish) coastal habitats in the tropics and subtropics.
<b>mineral</b>	a naturally occurring solid formed through geological processes that has a characteristic chemical composition and specific physical properties
<b>mucous</b>	Slimey protective coat secreted by a fish's skin. This is especially thick if the fish has no scales as in some catfishes.
<b>native</b>	living things that have always lived in a certain area and not brought in by humans
<b>nursery</b>	A protected area where animals will go to raise their young. This area usually has plenty of food nearby
<b>pitch</b>	A characteristic of sound that can be measured on a scale from low to high
<b>polyp</b>	A naked coral without its hard burrow. It has tentacles that catch sea plankton for food.
<b>predator</b>	An animal that hunts and eats other animals.
<b>saltwater</b>	Water that has a high concentration of salt, such as the ocean
<b>secrete</b>	to release a substance from a cell to serve a specific function, such as protective mucous
<b>shelter</b>	A place that provides protection or refuge from potentially harmful events, such as a storm or fire
<b>spines</b>	a hard, thorny or needle-like structure which occurs on various animals, such as fishes, sharks or sea urchins
<b>stridulation</b>	the act of producing sound by rubbing together certain body parts
<b>surf</b>	Short for "surface wave": An ocean surface wave as it breaks in shallow water or upon the shore.
<b>swamp</b>	A wetland featuring temporary or permanent inundation of woody vegetation by shallow bodies of water, either fresh or salty.

<b>swim bladder</b>	More accurately called gas bladder (or air bladder) is an internal gas-filled organ that contributes to the ability of a fish to control its buoyancy, and thus to stay at the current water depth without having to waste energy in swimming.
<b>tide</b>	The rising of Earth's ocean surface caused by the <i>tidal forces</i> of the Moon and the Sun acting on the oceans.
<b>volume</b>	The word used to describe loudness
<b>zooplankton</b>	Animal type of plankton. Some are microscopic and some are larvae of larger animals, such as jellyfish or shrimp. Others, when they mature become rooted in a single place, such as barnacles or mussels.

## Ethnobotany

<b>bladder</b>	A sack-like structure where the sack membrane is very thin but can expand, such as an animal's urinary bladder
<b>ceremonial circle</b>	A place to come together for meetings and ceremonies
<b>climate</b>	Average weather conditions of a place, as determined by the temperature and atmospheric changes over a period of years
<b>coarse</b>	A rough surface
<b>community</b>	All the interacting organisms living together in a specific habitat
<b>culture</b>	The set of shared attitudes, values, goals, and practices that characterizes a group
<b>diversity</b>	In biology, the variation of different forms of life
<b>foundation material</b>	A material such as deer grass used as the support and frame of a basket, usually stiff
<b>geography</b>	A description of the earth and its lands, features, inhabitants, and special characteristics.
<b>germinate</b>	The process by which a seed cracks open and the plant embryo pushes through the soil
<b>harvest</b>	The process of gathering mature crops, such as fruits, nuts and seeds from the land
<b>native</b>	one that develops, occurs naturally, or has existed for many years in an area
<b>nutrients</b>	Vitamins and minerals that are obtained from the soil, or food
<b>organism</b>	Any living thing, whether made of one cell or many cells
<b>petroglyph</b>	A picture carved into rocks and cave walls
<b>pictograph</b>	A pictorial representation of an object that are painted on rocks and cave walls
<b>riparian</b>	A plant community around river or lake margins
<b>seasoning</b>	A substance that can be used to enhance the flavor of food. Some are used to preserve foods too.
<b>sprout</b>	When the germinating seed breaks through the surface of the soil and is now exposed to the air and sunlight
<b>streamside</b>	The area where the stream water meets the land
<b>Tongva-Gabrielino</b>	The original inhabitants of the Los Angeles Basin.
<b>tonic</b>	A medicine that is thought to strengthen and invigorate
<b>tribal representative</b>	A person belonging to a tribe that acts and speaks for the tribe
<b>warp</b>	The material that is woven in the basket frame to cover the basket walls, such as wiregrass, which is more pliable than the foundation material
<b>waterproof</b>	A substance that is not dissolved or changed by water

## Acorn Grinding

<b>acorn</b>	Fruit of an oak tree
<b>carbohydrate</b>	A nutrient necessary for making energy in our body
<b>culture</b>	The set of shared attitudes, values, goals, and practices that characterizes a group
<b>energy</b>	The power that enables something to do work
<b>nutrients</b>	Vitamins and minerals that are obtained from the soil, or food
<b>protein</b>	A nutrient necessary to build muscle and for growth
<b>recycle</b>	The process of taking a product at the end of its useful life and using all or part of it to make another product.
<b>sandy wash</b>	A dry river bed that is mostly sand
<b>sifting basket</b>	A basket that is loosely woven so that ground meal can be passed through and large chunks cannot pass
<b>tannins (tanic acid)</b>	A bitter dark substance contained in acorns and other plants that can cause illness if ingested
<b>toxic</b>	A substance that causes harm to an individual or organism
<b>tribe</b>	A social group of humans connected by a shared system of values and organized for mutual care, defense, and survival

## Animal Foyer

<b>abundant</b>	To have plenty of something
<b>amphibian</b>	A cold-blooded animal capable of living both on land and in water. A smooth-skinned vertebrate, such as a frog or salamander, that hatches as an aquatic larva with gills and then transforms into an adult.
<b>animal</b>	Any living being capable of voluntary movement and having specialized sense organs
<b>burrowing rodents</b>	A small mammal with teeth specialized for gnawing, such as a mole or rabbit that digs a hole or tunnel in the ground for protection or as a home
<b>cocoon</b>	A silky envelope spun by the larvae of many insects to protect pupas and by spiders to protect eggs
<b>decompose</b>	To decay or go rotten
<b>dewlap</b>	a fold of loose skin hanging from the neck or throat of an animal used for body language or temperature regulation
<b>environment</b>	The surroundings in which a person, animal, or plant lives
<b>femur</b>	The bone of the thigh or upper hind limb
<b>gills</b>	Organ found in most aquatic animals that allows them to breathe by taking oxygen from water
<b>immunity</b>	Protection or ability to resist a toxin
<b>lifespan</b>	How long an animal lives
<b>mimic</b>	To copy appearance or behaviors of another animal
<b>nocturnal</b>	Active at night. i.e. Owl
<b>predator</b>	An animal that preys on other animals
<b>regenerate</b>	The ability to grow lost or damaged tissues, organs and limbs
<b>reptile</b>	Any cold-blooded, and usually egg-laying vertebrate, such as a snake, lizard, crocodile, turtle, or dinosaur; having an external covering of scales or horny plates and breathes with lungs.

<b>scales</b>	Thin flat overlapping plates covering the bodies of fishes and reptiles
<b>seasonal food reserves</b>	Fat storage for seasons when food is hard to find as found in the leopard geckos tail
<b>secrete</b>	Produce and discharge a substance from glands
<b>setae</b>	A stiff hair or bristle on an animal. Microscopic setae on the feet of geckos enables them to climb vertical surfaces.
<b>skittish</b>	Easily frightened
<b>threatened</b>	When an animal feels it is in immediate danger
<b>toxins</b>	Poisons or venom of plant or animal
<b>venomous</b>	An animal that produces a toxin (poison)
<b>vertebrae</b>	Individual back bones of an animal