

Traveling Trunk Dealing with Drought: Plant Adaptations of Coastal Sage Scrub Teacher Packet

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Lesson Packet Overview

Big Idea

Over time, native plants of San Diego have adapted to their surroundings to ensure survival.

Guiding Questions

- 1) How do plants survive in the hot-dry climate of San Diego?
- 2) Do some plants survive better than others in San Diego?

Learning Outcomes/Objectives

- 1) Recall that San Diego has a Mediterranean climate which contains several plant communities that can survive here.
- 2) Identify common plants native to San Diego.
- 3) Discuss the cause and effect relationship between plants and why they adapt.
- 4) Distinguish between making observations and making inferences.
- 5) Make scientific observations about plants to make inferences about their adaptations.
- 6) Construct an argument, based on evidence, about whether certain plants are able to survive in San Diego's Mediterranean climate.
- 7) Develop a plan to help conserve water.

Lesson Sequence

Lesson 1: Getting to Know San Diego: Natural Surroundings 101

Lesson 2: Plant Adaptations: Changing to Ensure Survival

Lesson 3: Becoming a Good Scientist: Making Observations and Inferences

Lesson 4: Traveling Trunk Introduction

Lesson 5: Traveling Trunk In the Classroom

Lesson 6: Traveling Trunk Schoolyard Exploration

Lesson 7: Making Connections through Explanatory Writing

Lesson 8: The Importance of Conserving Water in San Diego

Standards Addressed

NGSS Standards: Grade 3

<http://www.nextgenscience.org/3ire-interdependent-relationshipsecosystems>

Performance Expectation: 3-LS4-3

Construct an argument with evidence that in a particular habitat, some organisms can survive well, some survive less well, and some cannot survive at all.

| Science & Engineering Practices: | Disciplinary Core Ideas: | Crosscutting Concepts: |
|---|---------------------------------|-------------------------------|
| Engaging in Argument from Evidence Analyzing and Interpreting Data | ES4.C: Adaptation | Cause and Effect |

Interdisciplinary Common Core Connections:

ELA Literacy: W3.1 W3.2 W.3.3 W3.7 SL3.1

[CCSS.ELA-LITERACY.W.3.2](#)

Write informative/explanatory texts to examine a topic and convey ideas and information clearly

[CCSS.ELA-LITERACY.W.3.3](#)

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

[CCSS.ELA-LITERACY.W.3.1](#)

Write opinion pieces on topics or texts, supporting a point of view with reasons.

[CCSS.ELA-LITERACY.W.3.7](#)

Conduct short research projects that build knowledge about a topic.

[CCSS.ELA-LITERACY.SL.3.1](#)

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly

Materials

Lesson 1: Getting to Know San Diego: Natural Surroundings 101

| Teacher Resources | Student Worksheets | Other Materials |
|--|---|--|
| Plant ID Cards Climate Maps Vernal Pool Photo and Description Plant ID Memory Game | Pre-Field Trip Survey Plant ID Worksheet | Individual White Boards and Dry Erase Markers (optional) YouTube Videos 1) Five Habitats of San Diego (6:45) https://www.youtube.com/watch?v=CLyXOFn7488 2) Coastal Sage Scrub (5:49) https://www.youtube.com/watch?v=BuxtictTj7k |

Lesson 2: Plant Adaptations: Changing to Ensure Survival

| Teacher Resources | Student Worksheets | Other Materials |
|--------------------------|----------------------------|--|
| | Cause and Effect Worksheet | <p>Adaptation Slideshow (Slides 1-11) http://www.slideshare.net/ciellaur/en/plant-adaptation-elementary?from_action=save</p> <p>The following materials are needed for a partner activity:</p> <ul style="list-style-type: none">• Masking tape• Penny• Pencil• Paper• Scissor• Book |
| | | "Adaptations" Anchor Chart (optional) |

Lesson 3: Becoming a Good Scientist: Making Observations and Inferences

| Teacher Resources | Student Worksheets | Other Materials |
|----------------------------|--------------------|--|
| Footprint Teacher Resource | | <p>Anchor Charts (optional)</p> <ol style="list-style-type: none">1) "What Good Scientists Do"2) "Observations vs. Inferences" <p>YouTube Videos</p> <ol style="list-style-type: none">1) Making Observations and Inferences (5:44) https://www.youtube.com/watch?v=bxnosL-fso0 (use this as a model for the observations vs. inferences lesson)2) Observations and Inferences (1:43) https://www.youtube.com/watch?v=fBIR7taW9jk (show this one for the lesson) |

Lesson 4: Traveling Trunk Introduction

Lesson 5: Traveling Trunk In the Classroom

Lesson 6: Traveling Trunk Schoolyard Exploration

| Teacher Resources | Student Worksheets | Other Materials |
|--------------------------|---------------------------|--|
| | | All materials found in Traveling Trunk (see materials list in the traveling trunk section) |

Lesson 7: Making Connections through Explanatory Writing

| Teacher Resources | Student Worksheets | Other Materials |
|--------------------------|--|---|
| | Plant Project handout, Project Rubric and Presentation Rubric | Access to internet and/or library List of plants for student projects (Each student can have a different plant or they can double up. The teacher should construct this list based on accessibility to research materials.) |

Lesson 8: The Importance of Conserving Water in San Diego

| Teacher Resources | Student Worksheets | Other Materials |
|-------------------|--------------------|--|
| | | <p data-bbox="1036 409 1295 531"><u>One Well: The Story of Water on Earth</u></p> <p data-bbox="1036 537 1276 611">written by Rochelle Strauss</p> <p data-bbox="1036 667 1300 789">Large KWL Chart (butcher paper or large sticky notes)</p> <p data-bbox="1036 846 1349 1010">3 x 3 Sticky Notes for students (each student should get at least 5-10)</p> <p data-bbox="1036 1087 1370 1367">Art supplies for Water Wise Pledge (a few ideas are included, but you can make this your own depending on time and availability of resources).</p> |

Background Information

Introduction

From the coast, over the mountains, through the canyons, to the desert, San Diego is a desirable place to visit due to its agreeable climate. San Diego's Mediterranean climate is characterized by a short wet period followed by a long hot dry period. This means a lot of sunny beach days with minimal rainfall. Although these may be desirable conditions for people, they could prove to be detrimental to the plants found in this region. What adaptations have plants made in order to ensure survival here in San Diego County? Upon completion of this unit, students will learn that some plants survive better than others in certain locations. In addition, students will think like a plant and make adaptations in their everyday lives to deal with the lack of water in this region.

Climate Zones

Our planet consists of three distinct climate zones (temperate, tropical and polar). Each depends on its location on Earth in relation to latitude. The sun's angle in relation to Earth creates these climate zones. Due to the tilt of Earth on its axis, the sun is much stronger at the equator than at the polar regions. Variation in climate zones is further influenced by their location to the coast, elevation, and wind and ocean currents, which transport the heat around the globe.

Mediterranean Climate

San Diego has a Mediterranean climate which falls within the temperate climate zone. San Diego County is located on the west coast of the United States, located next to the Pacific Ocean, at about 32 degrees north latitude. Although other places in the United States have four distinct seasons, characterized by very clear climate fluctuations, San Diego only has two seasons: the wet season (approximately November-March) and the dry season (approximately April-October.) There are only four other places in the world that have a Mediterranean climate including the Mediterranean Ocean basin in Europe, the southwestern coast of Chile, the tip of South Africa, and the south and southwest coasts of Australia. All of these regions, including San Diego, are located on the west coast of their respective continents, next to a large body of water. They share similar ocean and wind currents and the landforms are all at the same relative elevation.

Plant Communities of San Diego, California

Plant communities are defined as groups of ecologically similar species that develop because plants have similar requirements for sun or shade, temperature, humidity, fog deposition, or dryness, they do better in certain types of soil, respond to various disturbances (wind or salt spray), or to avoid competition. Many local variations of plants exist because of each unique place. Because plant communities grow in various locations depending on the aforementioned factors, the plant communities that exist in San Diego County are very rare, unique and diverse. There is more plant biodiversity in San Diego County than anywhere else in United States of America because of the rarity of the Mediterranean climate and the varied topography across the county. San Diego contains plants that are considered rare and extremely endangered due to urbanization of the local landscape. Students should learn to protect their surroundings so that these rare plants will thrive for future generations to come. These unique plant communities are also very important for supporting the unique wildlife that has evolved within the area.

There are six distinct plant communities in San Diego County, each with their own special characteristics: 1) Chaparral is characterized by dense plants that are very close in proximity to one another. 2) Riparian areas are characterized by large trees and many plants located near a stream or river. 3) You will likely come across several large oak trees in the Oak Woodlands. 4) Although Vernal Pools are slowly disappearing, you can still locate these mini ponds upon the coastal bluffs after rain. They house a variety of small creatures which rely on this habitat for survival. 5) Grasslands can be found in various parts of San Diego and are recognizable by the wide open expanses of grasses. 6) Lastly, the Coastal Sage Scrub plant community is characterized by a variety of low growing aromatic plants.

Adaptations

All living things on the planet have made adaptations to ensure their survival. In order to survive, a living thing must gather enough food or energy for growth, protect itself from harm, and reproduce. To obtain or store enough water for growth, plants in a Mediterranean climate have developed various adaptations. Some plants have long taproots that can tap into the groundwater stored deep below. Others have shallow roots that spread out wide which allow the plant to absorb the water from short bursts of rainfall. Another adaptation is having organs for water storage. These organs allow the plant to hold water that can be used at a later time. Other plants have made various leaf adaptations. For example having light colored leaves may help keep the plant cool or cupped-shaped leaves help reduce water loss during transpiration.

History of Water in San Diego and Importance of Conservation

On average, San Diego receives about 10 inches of rainfall a year, but only received 5.09 inches in 2014 and 6.55 inches in 2013 (source: <http://www.sdcwa.org>). Although California is currently experiencing a severe drought, this geographical region is no stranger to the lack of water. In order to overcome the lack of water, the Kumeyaay Indians would dam the San Diego River using rocks. When the missionaries arrived in the late 1500's, the Kumeyaay people built an official dam and flume system leading to the Mission for the purpose of watering crops and feeding cattle. In the late 1800's, additional dams and flume systems were constructed in order to redirect water from the backcountry into the city of San Diego. The development of the damming and flume system allowed for a dramatic increase in population in San Diego. By 1925, parts of San Diego transformed from a rural community to an urban community, which meant even more water was needed to sustain the influx of people moving in. After WWII, San Diego could no longer sustain using local water sources and, had to resort to importing it. Currently, 90% of water is imported into San Diego County, 40% from the Colorado River and 60% from the California State Water Project (importing water from Northern California to Southern California). Now more than ever, we have to learn how to deal with the extreme lack of water in San Diego and throughout California. Although conservation efforts are currently being made, by educating our youth we can help preserve our ever changing planet.

Good Scientists

Good scientists make observations, are curious and objective, ask questions, make predictions, create and conduct experiments, make inferences, and do much more to learn about a particular subject area. Scientists are constantly making observations using their five senses – the sense of touch, smell, taste, sight, sight and sound. When conducting experiments in a laboratory or out in the field, scientists need to make detailed observations which can help them make inferences based on these observations.

Vocabulary

Adaptations: to adjust or modify to different conditions or environments

Annual plant: a plant that begins from a seed, and then grows, flowers, produces seed, and dies in less than a year

Biodiversity: variety of different types of life found on earth

Climate: The average weather of a given region taken over a significant period of time

Coastal Sage Scrub: a plant community that can withstand extreme heat and lack of water, usually found in Mediterranean climates

Deciduous: shedding, or dropping, leaves

Dormant: not growing but resting or waiting for more suitable growing conditions

Drought: a long period of dry weather (little rainfall)

Drought tolerant: being able to withstand an extreme lack of water

Evergreen: having leaves all year round

Habitat: the place where a plant or animal lives

Invasive plant: a plant invading into a space for which it does not belong

Mediterranean Climate: is characterized by a long, dry season (spring, summer, and fall) followed by a short, wet season (winter).

Native plant: a plant that originated from particular place

Perennial plant: a plant that lives for many years

Plant Communities: a collection of plants with similar characteristics

Protection: the act of preservation from harm

Reproduction: the act of producing another organism again by a natural process

Urbanization: the process by which rural areas transform into urban areas due to population influx

Weather: the state of the atmosphere in regards to temperature, humidity, wind, cloudiness, etc., which can change day to day

Lesson 1: Getting to Know San Diego: Natural Surroundings

101

Guiding Question

What does climate have to do with plants?

Learning Objectives

Recall that San Diego has a Mediterranean climate which contains several plant communities that can survive here.

- 1) Identify popular plants native to San Diego.

Time

50 minutes

Materials

Lesson 1

| Teacher Resources | Student Worksheets | Other Materials |
|---|---|--|
| Plant ID Cards Climate Maps Vernal Pool Photo and Description Plant ID Memory Game | Pre-Field Trip Survey Plant ID Worksheet | Individual White Boards and Dry Erase Markers (optional) YouTube Videos Five Habitats of San Diego (6:45) https://www.youtube.com/watch?v=CLyXOFn7488 Coastal Sage Scrub (5:49) https://www.youtube.com/watch?v=BuxtictTj7k |

Lesson Preparation

1. Copy Student Worksheets
2. Administer the Pre-Field Trip Survey (You may want to give this survey prior to beginning the lesson)
3. Prepare Plant ID Memory Game
4. Prepare Teacher Resources
5. Load YouTube videos

Background Information

Climate Zones

Our planet consists of three distinct climate zones (temperate, tropical and polar). Each depends on its location on Earth in relation to latitude. The sun's angle in relation to Earth creates these climate zones. Due to the tilt of Earth on its axis, the sun is much stronger at the equator than at the polar regions. Variation in climate zones is further influenced by their location to the coast, elevation, and wind and ocean currents, which transport the heat around the globe.

| Climate Zone | Location | Climate Description |
|-----------------------|--|--|
| Polar Zone | <p>Northern Hemisphere: Arctic Circle; extending from 66.5 degrees north to the pole</p> <p>Southern Hemisphere: Antarctic Circle; extending from 66.5 degrees south latitude to the pole</p> | <p>Short, cool summer and long, bitterly cold winter</p> <p>Frequent snowfall, particularly during the winter months</p> |
| Temperate Zone | <p>Northern Hemisphere: southern edge of the Arctic Circle to the Tropic of Cancer; between 23.5 degrees and 66.5 degrees north latitude.</p> <p>Southern Hemisphere: northern edge of the Antarctic Circle to the Tropic of Capricorn; between 23.5 degrees and 66.5 degrees south latitude</p> | <p>Warm to hot summers and cool winters</p> <p>Greatest temperature variations throughout the year of any climate zone</p> |
| Tropical Zone | <p>Stretches from the Tropic of Cancer at 23.5 degrees north latitude to the Tropic of Capricorn at 23.5 degrees south latitude</p> <p>Equator centered within this zone.</p> | <p>Tropical wet region - Hot and humid, with frequent rainfall and little temperature variation</p> <p>Arid and Semi-Arid region - Wet, warm summers and cooler, drier winters, with much greater temperature variation than the tropical wet zone</p> |

Mediterranean Climate

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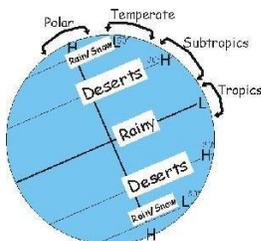
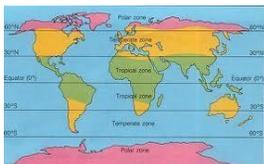
Plant Communities of San Diego, California

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There are six distinct plant communities in San Diego County, each with their own special characteristics: 1) Chaparral is characterized by dense plants that are very close in proximity to one another. 2) Riparian areas are characterized by large trees and many plants located near a stream or river. 3) You will likely come across several large Oak trees in the Oak Woodlands. 4) Although Vernal Pools are slowly disappearing, you can still locate these mini ponds upon the coastal bluffs after rain. They house a variety of small creatures which rely on this habitat for survival. 5) Grasslands can be found in various parts of San Diego and are

recognizable by the wide open expanses of grasses. 6) Lastly, the Coastal Sage Scrub plant community is characterized by a variety of low growing aromatic plants.

These samples are located in the Teacher Resource document.



Engage

- 1) Engage students in a conversation about weather and climate by wearing winter clothes for the introduction of this lesson to get the students excited. You could also show a series of photos of people wearing different clothing and ask the same questions.
 - What areas of the world would you wear these types of clothing items? Why?
 - Would we wear them here in San Diego? Why or why not?
- 2) Discuss the difference between weather and climate.
 - What is the typical type of weather here in San Diego? ☺ **sunny, cloudy, foggy, partly cloudy, doesn't rain very much**
 - What do you wear when it's hot? When it's cold?
 - Does anyone know what type of climate we have in San Diego? ☺ **temperate climate zone; Mediterranean climate ☺ hot, dry spring, summer, fall and short wet winters; little rain (less than 10 inches a year)**
 - So what's the difference between weather and climate? ☺ **weather varies day to day; climate is a pattern of weather taken over time; what we decide to wear each day depends on the weather, but what we decide to keep in our closet is based on the climate.**
 - Would people who live in Alaska have the same clothes in their closet as we do in San Diego? ☺ **we may share a of the same clothing items, but in San Diego we have more flip flops and shorts then they would...we have only a few jackets, they have many heavy coats...etc.**

- 3) Introduce climate zones (temperate, tropical, and polar) using the teacher resources provided at the end of the lesson or use a world map. Use the chart provided to help students understand the differences between each of the three zones.
- 4) Discuss the cause and effect relationship between climate zones and weather (Example: Because California is in the temperate zone the effect on weather is that we have hot summers and cool winters, with little rainfall.)
- 5) Introduce Mediterranean climate. Explain that even though California falls in the temperate climate zone, we can be further be categorized as having a Mediterranean climate because we are on the west coast and near a large body of water. Explain that there are only five areas in the world with a Mediterranean climate, California being one of them. These regions are all located on the west coast of a continent, near a large body of water, and between 31 and 40 degrees latitude north and south of the equator. You may want to take this opportunity to review basic geography vocabulary (cardinal directions, equator, poles, longitude and latitude). You can use the map provided in the Teacher Resources section to help. If you have laminated world maps, you could have students use white board markers to locate the various regions with Mediterranean climates.
- 6) Explain that certain plants live in different types of climates. Explain that in San Diego we have six different types of plant communities that can survive in a Mediterranean climate. The plants located in these plant communities are rare and very special because they don't grow in many other places in the world.
- 7) Introduce the first YouTube video (Five Habitats of San Diego) by asking students if they have ever visited a Federal, State, County, or City park like Cabrillo National Monument (Federal) or Mission Trails Regional Park (City).
- 8) Continue this discussion by asking them if they know which plant communities/habitats can be found here in San Diego. Explain that the video they are about to watch highlights five of the plant communities/habitats located here in San Diego.
- 9) Show YouTube video. <https://www.youtube.com/watch?v=CLyXOFn7488> (6:45)
- 10) After the video is complete you can inform students about the other plant community/habitat that was not included in the video (Vernal Pools). You can find a photo and brief description in the teacher resource portion of the packet.
- 11) Explain that on their field trip that they will see mostly Chaparral and Coastal Sage Scrub plant communities. They may also hear the word habitat instead of plant communities. They can be used interchangeably.
- 12) Explain that it is important to recognize common plants native to San Diego. You may need to discuss what it means to be "native." Tell students to pay close attention to the plants in the video because they will need to identify them later.

13) Show video on Coastal Sage Scrub.

<https://www.youtube.com/watch?v=Buxtictj7k> (5:49)

Explore

- 1) Pass out the Plant ID Worksheet.
- 2) Ask students to look over the worksheet to see if they recognize any plants from the video. In table groups, ask students to see if they can name any of the plants on the worksheet.
- 3) Introduce the ten common plants found in San Diego using the picture identification cards located at the end of the packet in the Teacher Resources section. Have students fill out worksheet as you go.
- 4) Let's Practice! Have students fold over the column on their worksheet that covers the pictures of the plants. Mix up the plant ID cards and show examples of the plants that were just introduced one at a time. Have students share out what plant they think each one is. You can use a variety of strategies here. Students can use their white boards to display the name of the plant. You can have them work as tables to discuss their answers and then share out. Another option is have them shout out their answers. Continue with this until you think they have a good grasp of the various native plants.
- 5) Game Time! Pass out the Plant ID Memory Game to partners or table groups. Students play memory game several times in order to become familiar with the plants and their names. They can use their worksheet as an answer key. Variation to the Memory Game: students can just match the picture card to the name cards or they can play Go Fish matching the name to the picture.

Extend

Geography: If you have an opportunity to integrate a geography lesson, this would be a great place to do so.

CA SS Continuity and Change

3.1 Students describe the physical and human geography and use maps, tables, graphs, photographs, and charts to organize information about people, places, and environments in a spatial context.

1. Identify geographical features in their local region (e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes).

2. Trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).

Lesson 2: Plant Adaptations: Changing to Ensure Survival

Guiding Question

Why do plants adapt?

Learning Objective:

Recall that plants adapt for various reasons to ensure survival.

Time

50 Minutes

Materials

Lesson 2

| Teacher Resources | Student Worksheets | Other Materials |
|-------------------|----------------------------|--|
| | Cause and Effect Worksheet | Adaptation Slideshow (Slides 1-11) http://www.slideshare.net/ciellaur/en/plant-adaptation-elementary?from_action=save The following materials are needed for a partner activity: <ul style="list-style-type: none">• Masking tape• Penny• Pencil• Paper• Scissors• Book "Adaptations" Anchor Chart (optional) |

Lesson Preparation

- 1) Prepare Adaptation Slideshow
- 2) Gather materials for partner activity and decide how you will disseminate the materials
- 3) Prepare "Adaptations" Anchor Chart (optional) 4) Copy Cause and Effect Student Worksheets

Teacher Background

Adaptations

All living things on the planet have made adaptations ensure their survival. In order to survive, a living thing must gather enough food or energy for growth, protect itself from harm, and reproduce. To obtain or store enough water for growth, plants in a Mediterranean climate have developed various adaptations. Some plants have long taproots that can tap into the groundwater stored deep below. Others have shallow roots that spread out wide which allow the plant to absorb the water from short bursts of rainfall. Another adaptation is having organs for water storage. These organs allow the plant to hold water that can be used at a later time. Other plants have made various leaf adaptations. For example having light colored leaves may help keep the plant cool or cupped-shaped leaves help reduce water loss during transpiration.

Engage

- 1) Have students choose a partner or choose ahead of time for them.
- 2) Pass out partner materials.
- 3) Have students tape one another's thumbs to their own hands with masking tape. Both partners should have their thumbs taped down.
- 4) They will then work together to perform a variety of activities: pick up a penny, write their name, turn the pages of a book, tie shoe, etc.
- 5) Have them then remove the tape and try the activities again, noting the difference when they have operable opposable thumbs.

- 6) Discuss how man's opposable thumbs are an example of an adaptation for survival. You can explain that humans have adapted to survive and so have plants and animals. Further explain that today's discussion on adaptations will focus on how plants have adapted for survival.
- 7) Collect materials.
- 8) Hang up Adaptations Anchor Chart (optional).
- 9) Have students brainstorm ideas about various plant adaptations and record on the anchor chart (Protection, Reproduction, or Climate/Location) in the appropriate section. Separate the ideas into three columns, but don't add the headings until after the discussion. See if the students can come up with the headings. If this is too difficult, skip to the next step.
- 10) Show slides from the adaptations power point and facilitate a discussion for each section.
- 11) Add the appropriate headings to the anchor chart (Protection, Reproduction, and Climate/Location).
- 12) Discuss the cause and effect relationships between plants and their adaptations. (Example: What caused the plant to have red petals? ● Reproduction. Some pollinators like hummingbirds are attracted to the color red).

Evaluate

- 1) Explain to students that they will show what they know by completing the Cause and Effect worksheet (this is found at the end of the packet in the Student Worksheet section).

Lesson 3: Becoming a Good Scientist: Making Observations and Inferences

Guiding Question

What is the difference between making observations and making inferences?

Learning Objective

Distinguish between making observations and making inferences.

Time

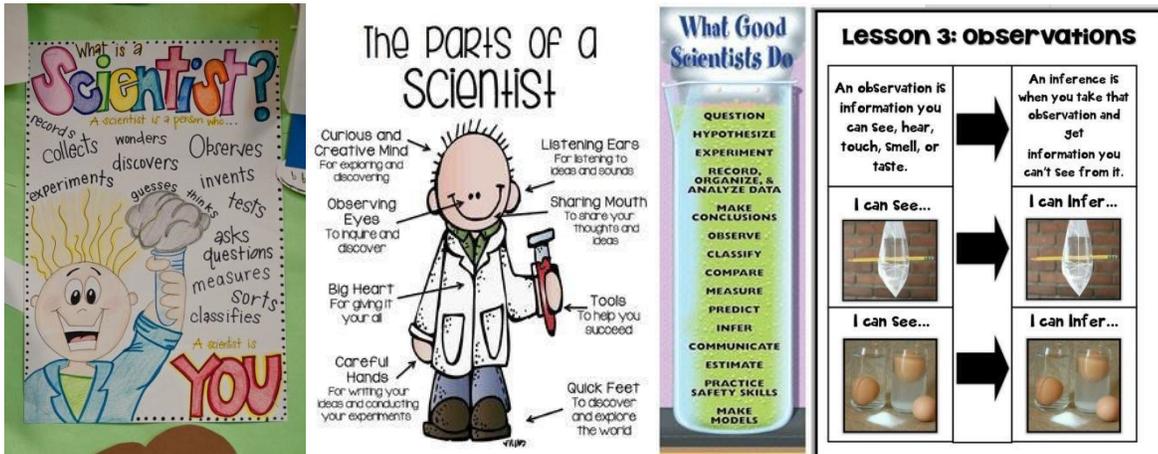
50 minutes

Materials

Lesson 3: Becoming a Good Scientist: Making Observations and Inferences

| Teacher Resources | Student Worksheets | Other Materials |
|----------------------------|--------------------|---|
| Footprint Teacher Resource | | Anchor Charts (optional) 3) "What Good Scientists Do" 4) "Observations vs. Inferences" YouTube Videos 1) Making Observations and Inferences (5:44) https://www.youtube.com/watch?v=bxnosL-fso0 (use this as a model for the observations vs. inferences lesson) 2) Observations and Inferences (1:43) https://www.youtube.com/watch?v=fBIR7taW9jk (show this one for the lesson) |

Here are some ideas to get you started.



Lesson Preparation

- 1) Prepare Anchor Charts (optional)
- 2) Prepare Footprint Resource to show to students
- 3) Prepare YouTube videos

Teacher Background

Good Scientists

Good scientists make observations, are curious and objective, ask questions, make predictions, create and conduct experiments, make inferences, and do much more to learn about a particular subject area. Scientists are constantly making observations using their five senses – the sense of touch, smell, taste, sight, sight and sound. When conducting experiments in a laboratory or out in the field, scientists need to make detailed observations which can help them make inferences based on these observations.

Engage

- 1) Have students discuss the following topics in their table groups or with a partner:
 - What characteristics/skills/tools do “good students” have?
 - What characteristics/skills/tools do “good athletes” have?
- 2) Have students share out their ideas.
- 3) Have students continue the discussion with the following question:
 - What characteristics/skills/tools do “good scientists” have?
- 4) Have students share out their ideas.
- 5) Add these ideas to your “What Good Scientists Do” anchor chart.

- 6) Discuss each idea, but lead the conversation to "Making Observations" and "Making Inferences".
- 7) Hang up the next anchor chart on observations and inferences.
- 8) Show the YouTube video on making observations and inferences.
<https://www.youtube.com/watch?v=fBIR7taW9jk> (1:43)
- 9) Discuss the differences and document on the anchor chart.
- 10) Have the students practice these skills using the footprint exercise. Show the first third of the footprint teacher resource and ask students to name three observations and then make an inference based on their observations. Continue by showing the next third of the picture and asking the same questions. Finally, show the remaining third of the picture and complete the exercise in the same manner.

Explore

- 1) Explain to your students that they will need to be good scientists and make a lot of observations on their field trip tomorrow.
- 2) Go over what they will be seeing on their field trip.
- 3) Discuss rules and expectations.
- 4) Remind students about what supplies to bring (lunches, sunscreen, hats, water...).

Extend

- 1) Project Learning Tree Activities on 5 senses <http://www.howweelearn.com/five-senses-activities-kids-outdoors/>
- 2) The Magic School Bus Explores the Senses by Joanna Cole
Call Number 612.8/COLE available at San Diego
Public Library ISBN: 9780590446983 9780590446983

Lesson 4: Traveling Trunk Introduction

Introduction to Trunk

Cabrillo National Monument would like to introduce you to our very first Traveling Trunk (Dealing with Drought: Plant Adaptations of the Coastal Sage Scrub). In this trunk you will find supplies, teacher and student resources and lesson plans that will help you guide your students on an exploration of Coastal Sage Scrub plants and their leaf adaptations. Students will be able to experience the natural world in their very own schoolyard or nearby canyon/park/open space. We hope you enjoy exploring and learning about the Coastal Sage Scrub habitat from your classroom and schoolyard.

Rules and Regulations

- 1) The trunk is available to teachers in San Diego County for pick-up and drop-off only.
- 2) The teacher is responsible for returning all contents of the traveling trunk.
- 3) The trunk is available to borrow for a two week period.
- 4) Make reservations for the trunk on nps.gov/cabrillo.
- 5) Inventory the traveling trunk before you remove from Cabrillo NM.
- 6) Upon return, inventory the trunk once more to ensure all contents have been returned.
- 7) Anything missing from the trunk should be replaced at the borrower's expense.

Traveling Trunk Contents

Books

- Project Learning Tree: Environmental Education Activity Guide
- Habitats: Science Works for Kids
- Activity Cards For California Elfin Forests (6 Cards: Lizard Push-ups, Rising From The Ashes, The Elfin Forest, Water Misers, A Bird In The Bush, and Taking It For Granite)
- The Jumbo Book of Outdoor Art
- The California Chaparral: An Elfin Forest
- The Lorax
- The Great Big Green Book
- The Kid's Guide To Exploring Nature
- One Well: The Story of Water on Earth
- How Does a Seed Sprout? And Other Questions About . . . Plants
- Earth in 30 Seconds: 30 amazing topics for Earth explorers explained in half a minute.
- The Magic School Bus and the Climate Challenge

- The Magic School Bus: Explores the Senses
- National Geographic: Student World Atlas (Fourth Edition)
- Eyewitness Books: Plant, with Clip Art CD

DVDs

- Bill Nye Climate DVD
- Bill Nye Plants DVD
- Eye Witness Plants DVD

Other Resources

- Plant Poster
- Plant Defenses: Physical and Chemical Survival Strategies Display Box
- The Chaparral Shrublands of Southern California Pocket Guide
- Tool-Kit Lanyards – Qty 10 (stored in 2 boxes)
- Mini-microscopes – Qty 10 (stored in 1 box)
- Laminated World Maps – Qty 10
- Dry Erase Markers with Erasers – Qty 12 (stored in 1 box)
- Senses Exploration Kit (stored in 1 box)
- Optic One Multiuse Instrument and Instructions (stored in 1 box)
- Planning your Schoolyard Exploration Guide Book (only available in Trunk)
- Vocabulary/Picture Cards
- Laminated Plant Samples
- Trunk

Lesson 5: Traveling Trunk In the Classroom

Lesson Overview

The purpose of this lesson is to prepare students for the schoolyard exploration. This lesson is center-based. Below you will find several suggested centers, but you will need to make the final decisions for specific centers and make any additional preparations. The teacher-directed center lesson plan is included in detail.

Time

Allow 10-15 minutes to complete each teacher-directed center

Materials

All materials found in Traveling Trunk

Lesson Preparation

- 1) Prepare Independent Student Centers. Below you will find a list of suggested centers and in parentheses you find materials from trunk that can be used to assist.
 - a. Reading Center (Student books from trunk)
 - b. Game Center (Memory/Matching Game)
 - c. Observation Center (Plant ID Cards)
 - d. Art Center (Ideas found in The Jumbo Book of Outdoor Art)
 - e. Geography Center (laminated world maps and whiteboard markers; National Geographic: Student World Atlas)
 - f. Writing Center (Perhaps create a Nature Journal for the school yard exploration)
 - g. Habitat Flip-Book Center (Habitats: Science Works for Kids)
 - h. Explore your 5 Senses Center (The Magic School Bus: Explores the Senses and activities in Project Learning Tree: Environmental Education Activity Guide)
 - i. Activity Center (Activity Cards For California Elfin Forests)
- 2) Prepare the Teacher-Directed Center
 - a. Gather materials (see specifics below)

Prior Knowledge

Lessons 1-3

Teacher-Directed Center

Learning Objective

Review objectives from pre-field trip lessons and introduce schoolyard exploration.

Time

15 minutes (recommended)

Materials

| Teacher Resources | Student Worksheets | Other Materials |
|--------------------------|---------------------------|--|
| | | Senses Exploration Kit Optic One Multiuse Instrument and Instructions The Chaparral Shrublands of Southern California Pocket Guide Planning your Schoolyard Exploration Guide Book Vocabulary/Picture Flip Book Mini-microscopes Laminated Plant Samples |

Engage

- 1) Start center by reviewing a series of questions with your students. **(Use the vocabulary/picture flip book to help guide the discussion.)** Stop after each question and solicit answers from students.
 - What is the typical type of weather here in San Diego? **☉sunny, cloudy, foggy, partly cloudy, doesn't rain very much**
 - What do you wear when it's hot? When it's cold?
 - What type of climate we have in San Diego? **☉ temperate climate zone; Mediterranean climate☉ hot, dry spring, summer, fall and short wet winters; little rain (less than 10 inches a year)**
 - What is the difference between weather and climate? **☉ weather varies day to day; climate is a pattern of weather taken over time; what we decide to wear each day depends on the weather, but what we decide to keep in our closet is based on the climate.**
 - Would people who live in Alaska have the same clothes in their closet as we do in San Diego? **☉ we may share a of the same clothing items, but in San Diego we have more flip flops and shorts then they would...we have only a few jackets, they have many heavy coats...etc.**
 - What do you think plants do when it's hot? When it's cold? **☉ • Do they put on coats or wear flip flops?**
- 2) Explain that tomorrow's schoolyard exploration is all about looking at how the plants in San Diego, survive in our hot, dry Mediterranean climate. You may need to review what a **Mediterranean climate** is once again to emphasize the **lack of water**, but don't explicitly tell the students. This is what they will discover along the way.
- 3) Review that we need to be good scientists when we explore new and exciting things.
 - What do you think is important to make a good scientist?
- 4) Lead the conversation to what it means to **make observations (using their five senses)**. Ask them if they recall what **an inference is (using their observations to explain something they can't see)**. Explain that they will be making observations and inferences about various plants on their schoolyard exploration.
- 5) Ask students if they know what kind of tools scientists use to help them make observations and inferences. **(Show them the Optic One Multiuse Instrument as an example of a tool that scientists could use).**
- 6) Explain they will be using a mini-microscope to help them on their exploration.
- 7) Pass out mini-microscopes. Use caution when opening them.

Explore

- 1) Use the laminated plant samples and the senses exploration box to allow students practice being scientists.
 - Now, let's become scientists and make some observations about this plant. ⑦ **make sure to explain the difference between observations and inferences when appropriate.**
- 2) Facilitate a discussion about the plants and objects in the senses exploration box emphasizing the use of the five senses. Use your Planning your Schoolyard Exploration Guide Book to assist.
- 3) At the end of the center, collect materials and explain that on tomorrow's exploration students will be using their five senses and a few other "tools" to learn more about how the plants in the Coastal Sage Scrub adapt to the Mediterranean climate here in San Diego.
- 4) Rotate Centers.
- 5) At the end of all centers, have students return to their seats.
- 6) Go over expectations for behavior on the schoolyard exploration.
- 7) Provide a preview description of the exploration (optional).

Lesson 6: Traveling Trunk Schoolyard Exploration

Guiding Questions

- 1) How do plants survive in the hot-dry climate of San Diego?
- 2) Do some plants survive better than others in San Diego?

Learning Objectives: At the completion of this program, students will be able to...

Make scientific observations about plants to make inferences about adaptations.

Time

90 minutes minimum (3 hours recommended)

Materials

| Teacher Resources | Student Worksheets | Other Materials |
|-------------------|--------------------|---|
| | | <p>Vocabulary/picture card flip-book (can be used back in the classroom to wrap-up exploration)</p> <p>Tool-Kit Lanyards (one per group/team)</p> <p>The Chaparral Shrublands of Southern California Pocket Guide</p> <p>Planning your Schoolyard Exploration Guide Book</p> <p>OPTIONAL: Nature Journals (you would need to prepare these ahead of time)</p> |

Lesson Preparation

- Pre-walk schoolyard/canyon/open space to identify plants that will be discussed based on the six leaf adaptations that will be focused on during in this exploration. Use the Planning your Schoolyard Exploration Guide Book and Field Guide to help (The Guide book contains detailed instructions to help you prepare for your exploration).
- Recruit parent volunteers. One parent per group or team if possible.
- Nature Journals (optional)
- You may want to have an **Alternate Assignment** (book work 📖) for students who do not participate or who don't follow the rules.

Prior Knowledge

Lessons 1-4

Engage

- 1) Sort students into teams as they will be sharing a tool-kit lanyard.

- 2) Walk students to your starting destination.
- 3) Remind students of the weather and climate discussions from prior lessons. Ask a few questions:
 - What do you think plants do when it's hot? When it's cold? Do they put on coats or wear flip flops?
 - Do you remember that the climate affects what plants can live here?
- 4) Explain that today's exploration is all about looking at how the plants in San Diego, specifically plants in the Coastal Sage Scrub plant community, have adapted to survive in our hot, dry Mediterranean climate. You may need to review what a **Mediterranean climate** is once again to emphasize the **lack of water**, but don't explicitly tell them. This is what they will discover along the way.
- 5) Tell students that just like scientists, plants use tools as well. Explain that on today's field trip they will discover how plants use these different "tools".
- 6) Pass out tool-kit lanyards to teams. Devise a plan to rotate lanyard so all students stay engaged (perhaps after each plant). Remind students of the "Alternate Assignment" if they don't participate or follow the rules.
- 7) Remind the students about what good scientists do when they explore.

Explore

NOTE: Your discussion will vary depending on the plants you have chosen to discuss. The following portion of this lesson plan is a recommended conversation you may have with your students.

- 1) As you walk along the designated path with the students encourage the students to stay nearby so they won't miss out on important information.
- 2) Stop at the first plant and engage students in the following discussion:

PLANT IDENTIFICATION

- Does anyone know the name of this plant? 🗨 **provide name**

MAKE OBSERVATIONS

- Now, let's be scientists and make some observations about this plant. 🗨 **make sure to explain the difference between observations and inferences when appropriate.**
- Although we won't be tasting this plant today (explain that some may be poisonous or someone may have allergies), we will be using the other four senses to make observations. **(The fruit of the Lemonade Berry is edible, but it contains an allergen. This plant is in the cashew family, so any child with allergies to cashews should not taste this fruit.)**

- First, I want to teach you how to make observations using the sense of touch. We have to be very careful when we touch plants for several reasons. Some plants, like poison oak, can give you a rash when you come in contact with it. Other plants are endangered, so we have to be sure not to harm it in any way, especially in a protected park such as this, but we should always use caution when handling plants. 🚫 **show students how to touch the plants without breaking off any parts (gently rub your hands on the plant)** • What do you feel?
- Now let's smell this plant. What do you smell?
- Let's now take a moment to listen. **(Listening is a bit harder, but sometimes we can hear rustling of leaves or critters that may be living on the plant.)** Do you hear anything?
- Lastly, let's take a good look at this plant. What do you see?
- Wow! You guys are great scientists so far. All of these suggestions are great observations.

MAKE INFERENCES/CAUSE AND EFFECT/TYPE OF LEAF ADAPTATION

- Now let's take a step back, make some **inferences** about this plant. Why do you think this plant has that sweet smell? 🚫 **to attract pollinators**
- Why do you think it has these soft leaves? 🚫 **don't tell them yet, but solicit responses**
- Do you remember, that I mentioned before, that plants use tools just like scientists do? Let's look at the different tools on your lanyard. Which tool do you think this plant is using?
 🚫**Right! The material! ...and...white verses black tool. They will need to place this tool in the sun and see which side is hotter. They should discover the white side is cooler.**
- Why do you think the plant has these velvety, soft leaves? 🚫 **help shade the plant, reduce water loss**
- Why do you think the plant has these white colored leaves? 🚫 **help keep the plant cool.**
You can relate this to wearing a black shirt or white shirt.
- What do you think caused this plant to need these types of leaves? 🚫**hot temperatures, lack of rain, our climate, our weather in San Diego**

- Right! This is a tool that a plant has to help reduce water loss and to shade the plant. Why is this so important here in San Diego? 🚫 **little rain, hot weather, dry weather, all plants need water to survive**
- This is one type of **adaptation** that a plant in the Coastal Sage Scrub has to ensure survival.

(You may need to review what an adaptation is at this point).

- 3) For each plant you encounter, follow the format above. You can put a different spin on each type leaf adaptation. In your discussion make sure to include the following information:
- Plant Identification
 - Make Observations
 - Make Inferences
 - Discuss Cause and Effect
 - Discuss Type of Leaf Adaptation
- 4) At the close of your exploration collect the lanyards.

Explain

NOTE: This portion can be done back in the classroom.

- 1) At the close of the exploration have the following discussion. **(You can utilize your vocabulary/picture flip book again to aide this discussion).**
- I'm so impressed by what great scientists you all are.
 - Today we made a lot of detailed observations about some of the common plants you will find in the Coastal Sage Scrub plant community here in San Diego and their adaptations to our Mediterranean climate.
 - Let's review some of the adaptations we discovered along the way. 🚫 **light colored leaves (white verses black tool), fuzzy, hairy leaves (velvet), small leaves (small verses large washer), drought deciduous leaves (boy in a coat), fleshy succulent leaves (sponge), waxy leaves (crayon).**
 - All of these adaptations have something in common. What is the main cause of these various leaf adaptations? 🚫 **help reduce water loss in our dry hot climate**
 - Of course there are other types of adaptations that plants have that help them survive in this type of climate. Do you have any ideas about what they might be? **NOTE:** You may want to ask guiding questions to lead them to these answers. 🚫 **long tap roots to get water from groundwater stored deep below; shallow roots that spread out wide to grab water from short bursts of rainfall; cupped shaped leaves or leaves held vertically reduce**

the surface area exposed to the sun; annual plants that only bloom when the weather is perfect and there is enough rain; slow growing plants that don't need a lot of water to grow.

- Before we continue, what does it mean to be a **native** plant? An **invasive** plant? **Native is originally from a particular place and invasive is not**
- Now, I want you to work in pairs or groups to answer the following questions. Discuss and use evidence from today's field trip to support your answers.
- Do you think plants that are **native** to San Diego can survive in other climates? Would they survive in Alaska? Would they survive in Arizona? Why or why not?
- Do you think **seaweed** would survive here in San Diego? Why or why not? **(Seaweed grows underwater, so although it has green leaves, it would not survive on land.)**
- What about an **orchid**, a type of flower that normally grows in the rain forest? Would they survive here? Why or why not? **(Although most orchids grow in the tropic climate zone, some can grow where it is hot and dry. In this case they have waxy, leathery leaves. Other orchids maybe shade-loving and have long, thin leaves.)**
- How about a Joshua Tree, found in the desert near Palm Springs? Why or why not? **(The Joshua Tree has long tap roots, possibly reaching 36ft deep, and evergreen leaves shaped like a bayonet.)**
- Great. Plants that are native here to San Diego have adapted to live in this climate. Not all plants can survive here and not all native San Diego plants can survive in other places.
- Now let's shift our conversation just a little. How many of you know that California has been experiencing a drought? What is a **drought**? **Extreme lack of rainfall**
- What happens if non-native or invasive plants move in? **They will take the precious water from our native plants**
- This is why it's important to plant native plants in your yards and to help remove invasive plants.
- Plants have learned to adapt to our dry climate, so what can we do to help with this drought? **Turn off water when brushing teeth, take 5 minute showers or less, only water plants in your yard during early hours of the morning, wash full loads of laundry and dishes...**

1) Invite them to use their new skills when they are in the parks with their families but of course to be careful about touching and tasting plants! Also, encourage them to share ideas to help with drought with their families and friends.

Lesson 7: Making Connections through Explanatory Writing

Guiding Question

Do some plants survive better than others in San Diego?

Learning Objective

Construct an argument, based on evidence, about whether certain plants are able to survive in San Diego's Mediterranean climate.

Time

TBD by teacher – This is a research project, so it can take anywhere between 1 week and 1 month depending.

Materials

| Teacher Resources | Student Worksheets | Other Materials |
|--------------------------|---|--|
| | Plant Project handout, Project Rubric and Presentation Rubric | Access to internet and/or library List of plants for student projects (Each student can have a different plant or they can double up. The teacher should construct this list based on accessibility to research materials.) |

Lesson Preparation

- 1) Teacher will need to decide how long students have to complete this project, then reserve computer labs and library slots for the appropriate time duration.
- 2) Inform resource librarian about the project, so that the books can be reserved or pulled from the shelves.
- 3) Possibly, check out books from San Diego Public Library if needed.
- 4) Print Plant Project Handouts and Rubrics.

Explain

- 1) Have students complete the Post-Field Trip Survey.
- 2) Have a class discussion about the field trip from the previous day (Possible discussion points:
specific plants they saw, different leaf adaptations, preservation, conservation of natural resources, water conservation, favorite part, etc.)

Evaluate

- 1) Either engage students in a class discussion or have students write answers down for the following questions (These are the guiding questions from Part 1 and Part 2):
 - a. What does climate have to do with plants?
 - b. Why do plants adapt?
 - c. How do plants survive in the hot-dry climate of San Diego?
 - d. Do some plants survive better than others in San Diego?

Elaborate

- 1) Explain to students that they will conduct a research project on different plants and then present to their fellow classmates in class.
- 2) Pass out Plant Project handouts and explain directions for project and grading.
- 3) This project should be paced and scaffolded at teacher's discretion. Teacher may use this time to teach other Common Core Writing Standards pertinent to the time of year in which this project is completed.
- 4) Set-up presentation schedule when project is nearing completion.
- 5) Review Project Grading Rubric and Presentation Rubric.

Extend

- 1) A narrative writing aspect has also been included in this lesson packet.

Lesson 8: The Importance of Conserving Water in San Diego

Guiding Question

What can we do to help conserve water in San Diego?

Learning Objective

Develop a plan to help conserve water.

Time

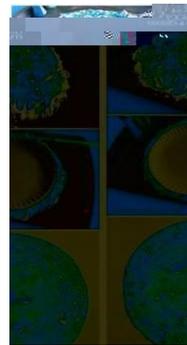
2 hours (split into 60 minute sessions)

Materials:

| Teacher Resources | Student Worksheets | Other Materials |
|-------------------|--------------------|--|
| | | <p><u>One Well: The Story of Water on Earth</u> written by Rochelle Strauss</p> <p>Large KWL Chart (butcher paper or large sticky notes)</p> <p>3 x 3 Sticky Notes for students (each student should get at least 5-10)</p> <p>Art supplies for Water Wise Pledge (a few ideas are included, but you can make this your own depending on time and availability of resources).</p> |



<http://katiescrochetgoodies.com/2014/04/easy-earth-day-craft-with-coffee-filter.html>



<http://www.craftymorning.com/shaving-cream-marbled-earth-day-craft/>



<http://www.craftymorning.com/shaving-cream-marbled-earth-day-craft/>



<http://www.classifiedmom.com/2011/04/kids-craft-earth-day-mobile.html>

Lesson Preparation

- 1) Check out or purchase **One Well: The Story of Water on Earth** written by Rochelle Strauss
- 2) Decide on art project and gather supplies
- 3) Prepare large KWL chart

Teacher Background

History of Water in San Diego and Importance of Conservation

On average, San Diego receives about 10 inches of rainfall a year, but only received 5.09 inches in 2014 and 6.55 inches in 2013 (source: <http://www.sdcwa.org>). Although California is currently experiencing a severe drought, this geographical region is no stranger to the lack of water. In order to overcome the lack of water, the Kumeyaay Indians would dam the San Diego River using rocks. When the missionaries arrived in the late 1500's, the Kumeyaay people built an official dam and flume system leading to the Mission for the purpose of watering crops and feeding cattle. In the late 1800's, additional dams and flume systems were constructed in order to redirect water from the backcountry into the city of San Diego. The development of the damming and flume system allowed for a dramatic increase in population

in San Diego. By 1925, parts of San Diego transformed from a rural community to an urban community, which meant even more water was needed to sustain the influx of people moving in. After WWII, San Diego could no longer sustain using local water sources and, had to resort to importing it. Currently, 90% of water is imported into San Diego County, 40% from the Colorado River and 60% from the California State Water Project (importing water from Northern California to Southern California). Now more than ever, we have to learn how to deal with the extreme lack of water in San Diego and throughout California. Although conservation efforts are currently being made, by educating our youth we can help preserve our ever changing planet.

Background on the Book (Provided by blog.richmond.edu):

In the book [One Well: The Story of Water on Earth](#) author Rochelle Strauss explores the concept that all water is connected – oceans, rivers, glaciers and raindrops are all a part of the global well. The book is illustrated beautifully by Rosemary Woods and is part of the series Citizen Kid, a collection of books that inspire children to be better global citizens.

The author has created an engaging and insightful story about the water cycle, how we use water on Earth and the need for conservation. The book begins by explaining the concept that all water on earth is connected. "So whether you are turning on a faucet in North America or pulling water from a well in Kenya, or bathing in a river in India, it is all the same water." Each page spread is dedicated to addressing an aspect of water on Earth. Children learn about the recycling of water (the water cycle), and how plants, animals and human beings depend on water to live. Children are presented with some uses of water they may be less familiar with. "About 21 percent of the water we use goes to making everything from computers to cars... Water vapor runs machinery. Water is an ingredient in many products such as lotions, shampoos, chemicals and drinks." Throughout the book there are collections of interesting facts about water and it's uses. "Every day 1.8 million tonnes (2 million tons) of garbage are dumped into Earth's water – enough to fill more than 15,000 boxcars." The last pages of the book explore access, demand, pollution and conservation. The author addresses the need to think now about how we treat our water supply because it affects the entire earth and its inhabitants for years to come.

Curriculum Connections

This book pairs nicely with curriculum that teaches conservation or the water cycle and would be appropriate for grades 3-5. Students can learn about the processes involved in the water cycle (evaporation, condensation, precipitation) , that water is essential for living things, and about the supply and conservation of water. Teachers may also find the book a good fit when teaching about natural resources and how human influences can affect the survival of species.

Engage

- 1) Pass out sticky notes to students.
- 2) Ask students to write down what they know about "WATER" on their sticky notes. You can offer suggestions or guiding questions to help get the students started.
- 3) Have students share what they wrote with a partner or at their table.
- 4) Ask for students to share their ideas with the entire class. Have each student come stick their sticky note under the "K" section of the KWL anchor chart.
- 5) Gather students on the carpet or wherever you conduct your read aloud. They can bring their sticky notes and something to write with (if it is not a management concern). They will continue using sticky notes to fill in the "W" portion of the class KWL chart.
- 6) Begin reading **One Well: The Story of Water on Earth.**
- 7) As you read, students should be actively engaged and formulating questions while you read. Encourage the students to write their questions down. You can have them stick them on your chart after each section or after several sections. This is a good way to check comprehension along the way (Especially if you are working on Questioning as a reading comprehension strategy.)
- 8) This story is quite long, so you may need to break the book up with a stretch or another activity.
- 9) Facilitate discussion along the way. You can use the sticky notes to assist in this process.
- 10) Upon completion of the book, have students offer some answers to the "W" questions aloud.
- 11) Excuse students back to their desks and have them add something new they have learned to a sticky note.
- 12) Add these to the KWL chart.

Explain

- 1) Explain that in order to help conserve water during this drought, each one of us needs to play a part.
- 2) Pass out supplies and have students write down a water wise pledge(s) on what they will do to help conserve water. (Suggested sentence starters:
I promise to _____ to reduce my water use.

I'm waterwise so I will _____.

I'll conserve water by _____.)

Elaborate

- 1) Explain that students will be making an art project to display their Water Wise pledges.

- 2) Pass out art activity supplies.
- 3) Explain the activity.
- 4) Allow students to complete activity.
- 5) Have them attach their pledges.
- 6) Students should share their pledge with the class.
- 7) Display the art and pledges around the room.
- 8) Encourage students to share what they learned with their families.

Extend

- Project Learning Tree Activity 38 (pg 163 Every Drop Counts) ● Water Cycle Interactive Website:
http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
- EPA Just for Kids and Teachers:
<http://water.epa.gov/learn/kids/drinkingwater/index.cfm>

Teacher Resources (Separate Document)

Climate Visual Aides

Observations vs. Inferences

Plant Identification Cards

Vernal Pools

Vocabulary Picture Cards

Student Worksheets (Separate Document)

[Pre-Survey](#)

[Post-Survey](#)

[Plant Identification](#)

Plant Identification Answer Key

Cause and Effect

Cause and Effect Answer Key

Superhero Saga

Superhero Saga Rubric

Plant Project

Plant Project Rubric

Plant Presentation Rubric