CLIMATE: PAST & PRESENT

PRESENT DAY CLIMATE

The climate of the Great Basin is characterized by extremes: hot, dry summers and cold, snowy winters; frigid alpine ridges and warm, windy valleys; days over 90F followed by nights near 40F; the unrelenting sun giving way to a star-studded moonless night. This is the climate of the high desert.

Regional climate is created by many factors including topography, average elevation, latitude, and proximity to large bodies of water. The climate of a region is also tied to the global climate, though not all regions will be affected in the same way by general warming or cooling trends over the earth.

The Great Basin climate begins with the Sierra Nevada in eastern California. Rising 14,000 feet above sea level, this mountain range casts a large rain shadow over the Great Basin. Weather coming in from the Pacific Ocean quickly loses its moisture as rain and snow as it is forced up and over the steep mountains. By the time it reaches the east side of the mountains, little moisture is left to bring to the Great Basin. The rain shadow effect is more pronounced closer to the Sierra Nevada, with yearly precipitation in the Great Basin averaging 9 inches in the west and 12 inches in the east. Nevada is the driest of the fifty states.

On any given day the weather across the Great Basin is variable. The region is extremely mountainous, and you can expect the temperature to vary depending on the elevation. In general, temperature decreases 3.6 degrees F for every 1000 feet gained in elevation. This translates to as much as a 30 degree difference between mountain tops and valley floors on the same day at the same time. In the heat of summer this difference can be even more pronounced.

With some exceptions, wind generally increases with elevation or altitude, and thus strong winds are often encountered on mountain tops and ridges. The combination of low air temperature and wind creates physiological hazards of frostbite and hypothermia; at higher elevations this is possible any time of the year. Always be prepared with extra clothing and food when heading into the hills!

NOTES:

CLIMATE: PAST & PRESENT

BREATHING DEEPLY

Low humidity and low levels of airborne particle concentrations (such as pollutants) combine to give the Great Basin the best visibility in North America (Osmond et al. 1990). Vistas can extend for 130 miles (200km) and the night sky is second to none. However, the superior air quality of the region is vulnerable to air pollution due to a phenomenon known as inversion. An inversion is created when cold air (which is heavier than warm air) settles into a valley bottom and is subsequently trapped by the surrounding hills and mountains. Under normal conditions, air pollutants will rise, leaving the lower atmosphere, but during an inversion the pollutants remain in valleys, degrading air quality and fogging visibility. For now, we enjoy some of the best air quality in the world, but our air is not immune to threats from pollutants. We must do our part to protect our air if we want to continue breathing deeply and looking out over our incredible vistas!

LIVING IN A DESERT

All environments have limiting factors, which determine what can and cannot survive in that area. In the desert, the limiting factor is water. Anything that requires abundant water simply will not survive in the desert, unless it finds a perennial mountain stream or valley spring to cling to. The plants and animals of the Great Basin are well adapted to the climatic limitations, but as humans we are not so fortunate. We need water to survive, and we have developed numerous ways of obtaining it. Many of us tap into the ground water by drilling wells; some of us have surface water available to us as streams or creeks; but the majority of us may not know exactly where our water comes from. As creatures living in the desert, where water is scarce, it is important for us to be aware of where our water comes from and how we use it. Water is the limiting factor and needs to be taken care of!

LOOKING AT THE PAST

In an age of global warming, scientists are looking closely at past climate to determine what is “normal” climate change versus “accelerated” climate change brought on by human activity. Generating models of past climates and ecosystems helps scientists predict the affects climate change will have on the present day environment. There are many methods for looking into the past such as analyzing air bubbles in Antarctic ice cores, mapping glacial retreat in the Alps, and looking at fossils to determine what types of creatures lived in an area at the time in question.

One method that is relative to the Great Basin is looking at tree rings. The study of tree rings as a clue to past environments is called dendrochronology. The cross-section of a tree reveals concentric rings, with each ring representing one growing season (in temperate climates there is one growing season per calender year). Good growing seasons (plenty of water, mild winter) produce relatively wide rings. Bad growing seasons (drought, late spring frosts) produce relatively narrow rings. Other factors such as fire, insect damage, and disease will also be evident in the tree’s rings.

Rings of very old trees reveal data about long ago climates and weather patterns. Bristlecone pines are ideal for this because of their longevity, living as long as 5000 years. In addition, they are sensitive to climatic changes and so their growth rings reflect years of drought and heavy rain. Their rings can also be affected by temperature, but rainfall is the primary variable effecting growth rings.

Scientists use **cross-dating** to see far back into climatic history. The technique compares the growth rings from one tree to those of another tree and matches ring patterns for the years when both trees lived. Scientists core a living tree (this does not harm the tree) and count the rings from the outside (the current year) to determine its age. Then they take a core or cross-section of an older tree (could be long dead) and compare the rings to the younger tree. The two trees must be the same species, be from the same area, and have overlapped part of their lives. The outer rings of the older tree are compared with the inner rings of the younger tree. By matching correlating ring patterns, the age of the older tree can be determined. It is possible to go back several generations using this method. Dendrochronologists have pieced together a climatic history dating back 10,000 years. Bristlecone pines in Great Basin National Park and in the White Mountains of California have been a key in this process because of their tremendous age.

CLIMATE: PAST & PRESENT

FUN FACTS

Nearly 80% of the earth's surface is covered with water. This is the same amount of water that was here, on earth billions of years ago. Water cannot be created or destroyed.

97% of all water on earth is salt water.

3% of all water on earth is fresh water.

2% of the earth's water is glacial ice at the north and south poles.

Only 1% of the world's water is fresh water available for human use.

The Great Lakes contain 20% of the earth's fresh water.

A person's body is about 70% water.

A person can only live 2 to 3 days without water.

An average person in the United States uses 77 gallons of water each day.

Groundwater supplies 50% of the drinking water in the United States.

About half of the fresh water used in the United States is used for irrigation.

60% of domestic water is used to water gardens and lawns.

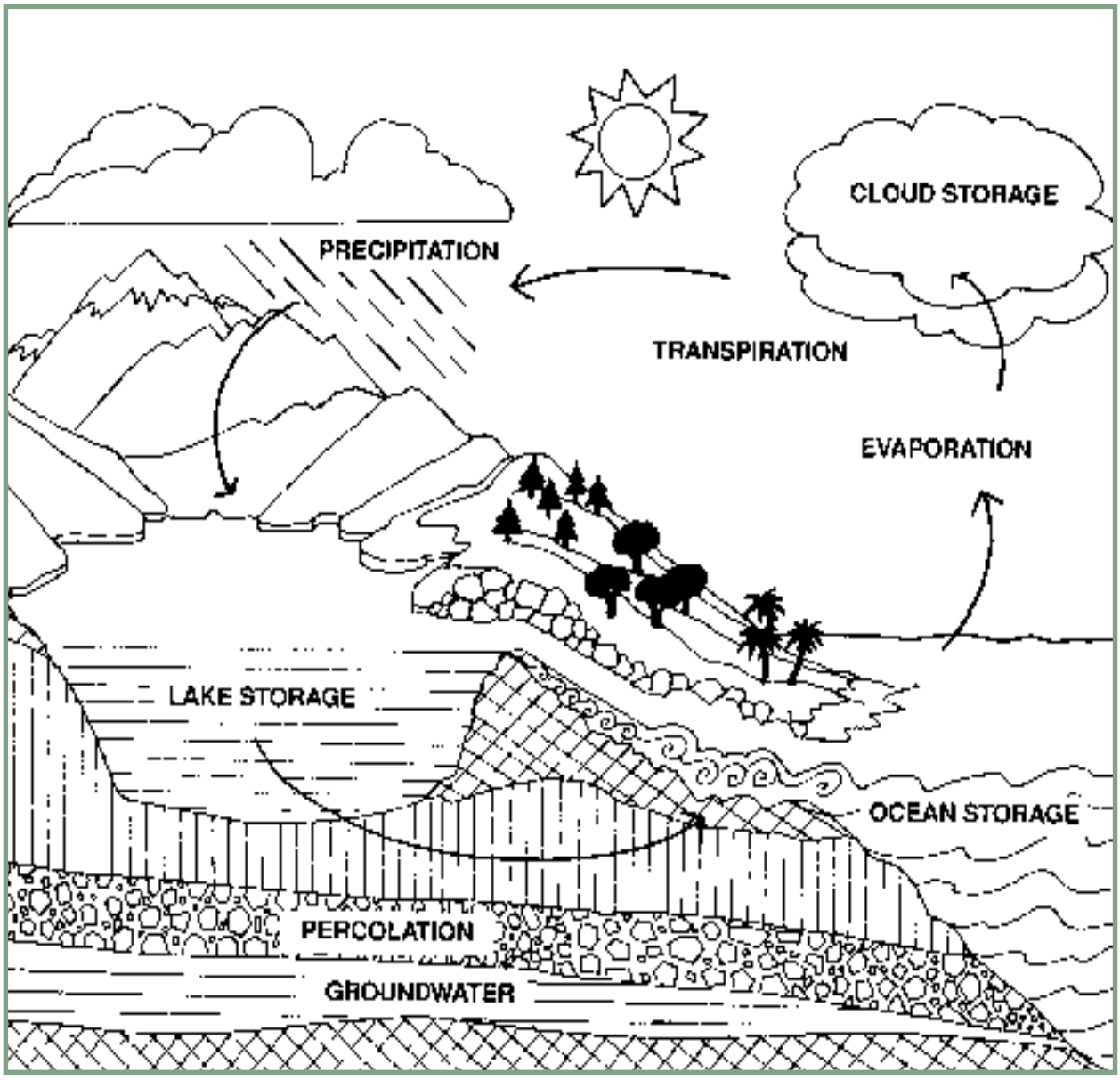
A gallon of water weighs 8.34 pounds.

It takes about 120 gallons of water to produce an egg. This includes water to grow the grain to feed the chicken. It takes 100 times more water to produce a pound of meat than to produce a pound of wheat.

CLIMATE: PAST & PRESENT

THE WATER CYCLE

The earth is the ultimate recycler, and no where is this more evident than in the water cycle. New water is not created - it just changes forms from solid to liquid to gas, moving around the planet as part of one big system, traveling through a never ending cycle; from rainfall to rivers, lakes, oceans, and then stored as ground water or returned to the atmosphere by evaporation or transpiration. The water we drink today has been around for billions of years, and there is no where to get more. Although 3/4 of the planet is covered by water, only 1% is available as fresh water for human use. We must be careful to protect the quality of this water as it can be contaminated easily. All life depends on water to survive.



CLIMATE: PAST & PRESENT

SAFETY

The extremes of Great Basin weather make it very important that an outdoor adventurer be prepared for almost anything! Great Basin weather can be very unpredictable, and depending on what elevation you travel through, a traveler will need many different items:

WATER

Always carry plenty of water in your backpack and car. Take periodic drinks whether you are thirsty or not. The usual recommendation is 1 liter per person a day. This increases to 2 to 3 liters during strenuous activity in the summer.

CLOTHING

Wherever you hike, be sure to wear sturdy hiking shoes. Long sleeves and long pants are recommended for protection from sun, rocks and scratchy plants. Also wear a hat, sunscreen, and sunglasses. Layers of clothing are important. Remember, temperatures can change quickly and dramatically. For high elevations, bring a wind breaker and some warm layers; cold wind, low temperatures and even snow can occur at any time of the year at higher elevations.

EMERGENCY SUPPLIES

In your backpack, always carry a first aid kit, a flashlight, extra water and food. Carry high energy snacks such as granola bars, dried fruit, or crackers. Also include matches (to start a fire); a tarp, string, a knife (to build a shelter); and a signal mirror or whistle (to help rescuers find you).

RAIN

Bring a raincoat if traveling through higher elevations. Severe storms can hit at any time! Heavy rainfall may produce flash flooding; stay out of washes and creeks during heavy rainstorms. Stay off high, open ridges during lightning storms.

DIRECTIONS

Carry a map and a compass in your backpack. Learn how to read and use both of these items. Always tell someone your plans. If your plans change, you should update them with a telephone call or leave an obvious note along the trail. If you are hiking in an area where there is a visitor center, such as in a national or state park, leave an itinerary with a ranger.

COMMON SENSE

Hike realistically. Plan your route according to your abilities. Distances are often deceiving. Pick a route that is appropriate for the time of year; lower elevations in winter, higher elevations in the summer. If you are not used to hiking at higher elevations, it could prove extremely tiring for you. Plan your high elevation hike accordingly.

CLIMATE: PAST & PRESENT

HIKING CHECKLIST:

- ☐ WATER (1 LITER PER PERSON PER DAY; TWO LITERS PER PERSON PER DAY DURING SUMMER OR WARMER WEATHER).
- ☐ CLOTHING:
  STURDY HIKING SHOES;
  LONG SLEEVE SHIRT AND PANTS; WINDBREAKER AND FOR HIGHER ELEVATIONS, WARM LAYERS OF CLOTHING AND RAINCOAT.
- ☐ HAT, SUNSCREEN, SUN GLASSES, BINOCULARS
- ☐ EMERGENCY SUPPLIES:
  FIRST AID KIT, FLASHLIGHT,
  EXTRA FOOD AND WATER,
  GRANOLA BARS, AND/OR DRIED FRUIT, CRACKERS;
  MATCHES; TARP, STRING, AND KNIFE; SIGNALING MIRROR OR WHISTLE.
- ☐ MAP AND COMPASS; PAPER AND PENCIL.
- ☐ FIELD IDENTIFICATION GUIDES (FOR PLANTS, ANIMALS, ETC.)

OTHER ITEMS:

_____

_____

_____

_____

_____

CREATE A CLIMATE TABLE

SUBJECT:
Science

LOCATION:
Class room and outside the classroom

DURATION:
A week, month or school year, depending on the time frame the class chooses.

OBJECTIVE:
Name three weather variables that people measure. How do these different variables affect you and the area where you live? How are they different depending on where you live.

BACKGROUND:
Several different weather factors are often measured: precipitation, temperature highs and lows, wind speed and direction, and air pressure. See text for more information.

KEY VOCABULARY:
Temperature, barometer, and precipitation

MATERIALS:
See below

METHOD:
Follow the directions below for measuring temperature, rainfall, snowfall, and air pressure. Make charts or graphs for recording the information.

TEMPERATURE:
Set up an outdoor thermometer somewhere easily accessible to children. Have a schedule where the temperature is read first thing in the morning and right before going home, every day, once a week, or once a month (depending on how long you plan to do this project). These will be your low and high temperature readings. Have the students record this data on a chart for a period of time (a month or all the school year).

RAINFALL:
Make a rain gauge using a 2 liter plastic bottle with a five inch diameter bottom, a large pot or bucket, and a little tape. Follow these simple instructions:

1) Cut the neck off the plastic bottle. Turn the top half upside down and put inside the bottom half. Tape in place.
2) Measure from the bottom and mark every 1 inch measurement with a tape. Every 1/2 inch of water equals 1/2 inch of precipitation. Fill the bottle up to the first tape line.
3) Put the gauge in a heavy pot or bucket so it doesn't blow away when you put it outside. After placing it outside, have the students measure every week or month, depending on how long you want to run the project.

SNOWFALL:
Once a week, or on a daily basis, have the students use a yard stick and measure the depth of the snow. Record the data on a table and create a graph at the end of the exercise.

CREATE A CLIMATE TABLE

ACTIVITY 1

AIR PRESSURE:
Build a barometer! Follow these simple directions:
1) Put a long necked bottle upside down in a glass jar.
2) Pour enough colored water (use food coloring) into the jar so that it just covers the neck of the bottle when it is in place.
3) Mark the level of the water on the bottle. Put it where the temperature is fairly constant. Mark any change in water level.

When the water is high in the bottle, the pressure is high and the weather should be nice.
When the water is low in the bottle, pressure is low and the weather should be stormy.

SUNSHINE:
Every day, week, or month at the same time of day, have the students go outside and determine whether the day is sunny (10% or less cloud cover), partly cloudy (30-70% of the sky is cloud covered) or cloudy (70% or more of the sky is covered with clouds). At the end of the exercise, have the students figure out the percentages of sunny days, partly cloudy days and cloudy days. Create a graph with this information.

OPTIONAL: Mount a six-way weather station to a post and follow directions on measuring wind speed and direction.

EXTENSION:
Contact another school in a different area and have them collect the same weather information. Compare your data at the end of the year.

NOTES:

BE A DENDROCHRONOLOGIST

ACTIVITY 2

SUBJECTS:
Science, math, art

LOCATION:
Classroom

DURATION:
45-60 minutes

OBJECTIVES:
The student will:
1) Age a tree by counting its growth rings.
2) See that tree rings correlate with actual calendar years.
3) Compare rings on different trees.
4) Understand that even dead trees (standing or fallen) can serve an important function in research.

BACKGROUND:
Scientists study past climate by looking at tree rings (long-lived, climate-sensitive trees like Bristle-cone pines are especially useful). Thicker rings represent wet, mild years while thinner rings represent drier, harsher years. Living trees can be aged using bore samples. Dead trees can be dated by cross-referencing the rings of living trees; this is called cross-dating.

KEY VOCABULARY:
Tree rings, dendrochronology, cross-dating.

MATERIALS:
A cross section and bore sample from a couple of trees, copies of the activity sheets on the following pages.

METHOD:
1) Discuss tree rings and tree ring dating with the students.
2) Show students the bore sample and cross section you have.
3) Pass out the activity sheets and have students answer the questions.
4) Discuss the answers.

EXTENSION:
Have students draw tree cross sections to represent their lives. The inner most ring will be the year the student was born. The outer most ring will represent this year. Students can label the rings on their trees with events they remember at different times in their lives or they can draw pictures within the rings representing different memories. Students could also draw tree rings representing the life of an older relative, such as a grandparent and interview that relative to find out about significant events in his or her life.

BE A DENDROCHRONOLOGIST

ACTIVITY 2

THE STUMP

NAME_____

THIS TREE WAS CUT THREE YEARS AGO. WRITE THAT YEAR:_____

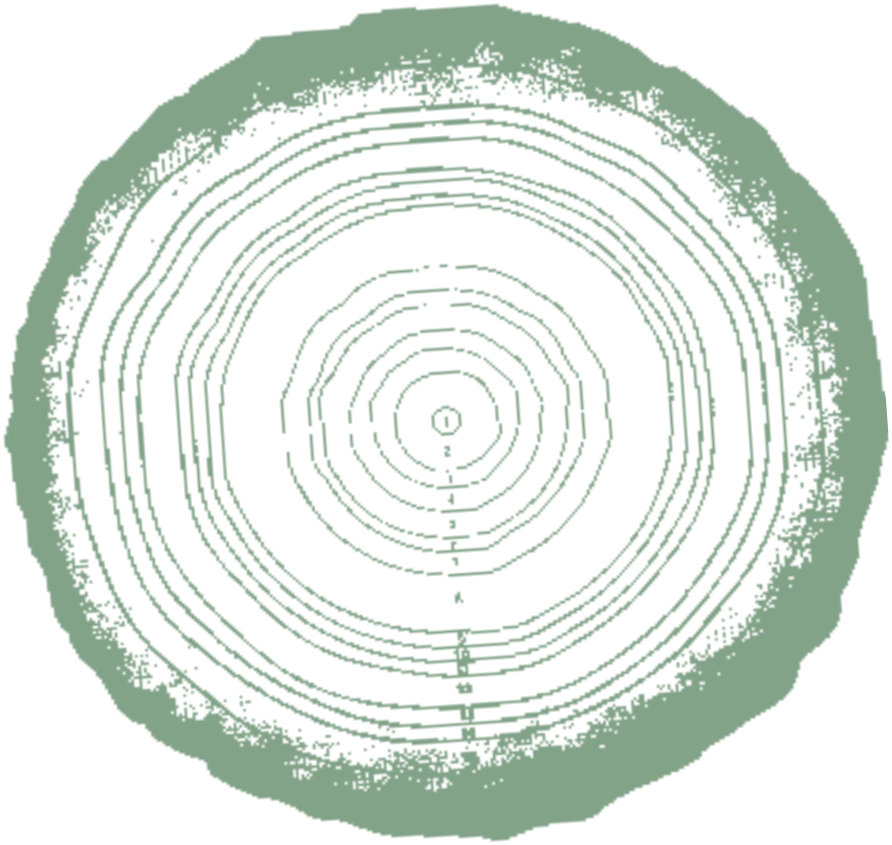
HOW OLD IS THE TREE? _____

WHAT YEAR DID THE TREE START GROWING?_____

FIND THE RING THAT GREW THE YEAR YOU WERE BORN.
WAS IT A WET OR DRY YEAR?_____

IN WHAT YEAR OF GROWTH WAS THERE THE LEAST RAINFALL?
_____

IN WHAT YEAR WAS THERE THE MOST RAINFALL? _____



BE A DENDROCHRONOLOGIST

ACTIVITY 2

TREE “A”

TREE “B”

MASTER SEQUENCE

1,000 years ago

968 years ago

BE A DENDROCHRONOLOGIST

ACTIVITY 2

NAME_____

1) WHAT CAN A TREE TELL US?

2) REFER TO THE TREE STUMP DRAWING ON THE PREVIOUS ACTIVITY SHEET.

WHICH TREE IS OLDER?

HOW OLD WAS "TREE A" WHEN IT WAS CUT? _____ "TREE B"? _____

HOW MANY YEARS AGO DID "TREE A" START GROWING? _____ "TREE B"?_____

HOW MANY YEARS AGO WAS "TREE A" CUT? _____ "TREE B"?_____

3) WHAT CAN YOU SAY ABOUT THE CLIMATE WHERE THE TREES GREW?

"TREE A":

LIST THE NUMBER OF DRY CYCLES (2 OR MORE DRY YEARS):

LIST THE NUMBER OF WET CYCLES (2 OR MORE WET YEARS):

4) HOW MIGHT CLIMATIC CHANGES HAVE AFFECTED THE WILD ANIMALS IN THE AREA?

HOW MIGHT IT HAVE AFFECTED THE PEOPLE OF THE AREA?

WATER POETRY

ACTIVITY 3

SUBJECTS:
Science, creative writing, art

LOCATION:
Classroom

DURATION:
60 minutes

OBJECTIVES:
The student will be able to:
1) Describe the components and function of the water cycle as it pertains to his/her everyday life.
2) List ways to conserve water.
3) Create an original poem relating to water.

BACKGROUND:
Water is essential to all life. It covers more than three quarters of the earth's surface and is responsible for over 75% of the human body weight. Yet, in its pure form, this colorless calorie-free "wonder fluid" is so readily available (at the turn of the tap) that we have taken it very much for granted. It is as if by magic that we watch water appear from the faucet and then disappear down the drain, with very little knowledge of where it comes from or where it is going. All over the West water is an extremely important issue. Nevada is the driest state in the United States and also has one of the fastest growing populations. This will lead to severe water shortages in the future. 83% of all water used in Nevada each year is used for agricultural irrigation.

KEY VOCABULARY:
Water cycle, transpiration, precipitation, ground water

MATERIALS:
Activity pages "The Water Cycle", "Water Use", and "What is Water?'

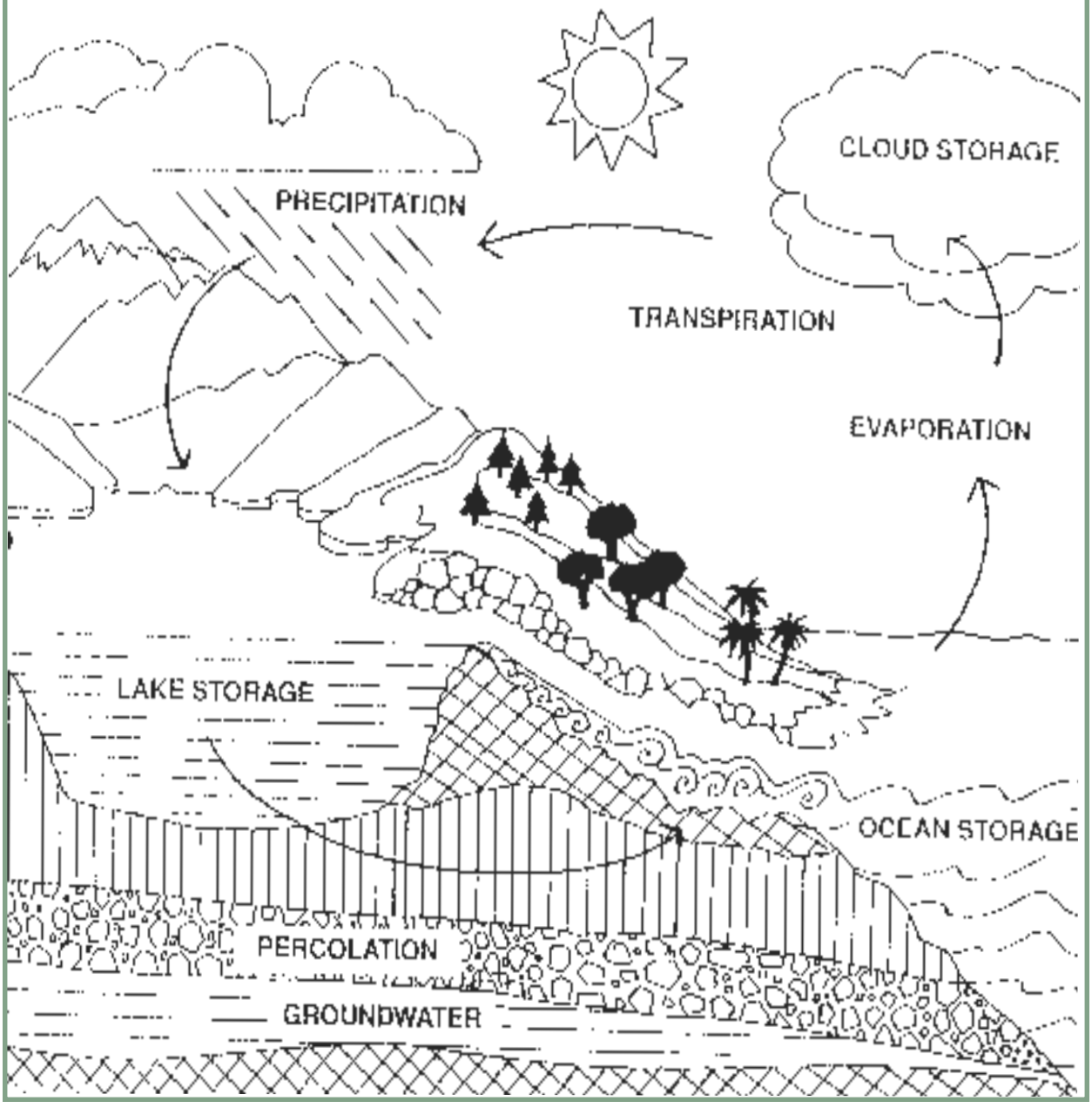
METHOD:
1) Distribute the following page, titled "The Water Cycle" to each student. Explain the cycle to the students. It may be helpful to make a transparency of the page to use with an overhead projector. Ask the students to color their cycle and explain the cycle in a few sentences.
2) Have the students complete "Ways I Use Water and Ways I Intend To Save Water" on the following pages.
3) Discuss the questions concerning water use in your class. Brainstorm the various ideas, writing them on the chalkboard. Brainstorm proposed ways of saving water as well.
4) Distribute copies of the page titled "What Is Water?" to each student. Tell the students to brainstorm ten ideas about water and write their ideas in the space at the top of the page. Have the students write their poems from this list. Follow the simple directions on the page. If you want, you can have the students share their poems with the class or have them draw a picture with the poem written on the art piece and display the pictures in the hall for the whole school!

EXTENSION:
Research where your drinking water comes from. Does your water come from a well or from a central delivery system? Visit your local water treatment plant and learn step-by-step how water gets to your area. Using a map of your local water system, trace the water to its source.

WATER POETRY

ACTIVITY 3

THE WATER CYCLE



WATER POETRY

ACTIVITY 3

WATER USE

WAYS I USE WATER:

1)_____

2)_____

3)_____

4)_____

5)_____

6)_____

7)_____

8)_____

9)_____

10)_____

WAYS I INTEND TO SAVE WATER:

1)_____

2)_____

3)_____

4)_____

5)_____

6)_____

7)_____

8)_____

9)_____

10)_____

WATER POETRY

ACTIVITY 3

WHAT IS WATER?

In the space below, list ten nouns that deal with water and/or water use:

1)_____ **6)**_____

2)_____ **7)**_____

3)_____ **8)**_____ -

4)_____ **9)**_____

5)_____ **10)**_____

From your list, pick your favorite word. (This will be the subject of your poem):

_____

Now, use any two adjectives you can think of
to describe the noun you listed above:

_____ _____

Pick any three words which express the noun's action (Past, present, or future):

_____ _____ _____

Pick four words which describe your feelings about the subject:

_____ _____

_____ _____

Pick a word that is a synonym to the subject:

_____

You have written a poem called a cinquain! Put all your words shown in the style shown below and read it to yourself a couple of times.

Ocean
Gray, rough
Smashing, crashing, roaring
I'm half afraid, you
Sea

TRY WRITING ANOTHER CINQUAIN!

WATER, WATER EVERYWHERE

SUBJECTS:
Language arts, math, science, social studies

LOCATION:
Classroom

DURATION:
45 to 60 minutes

OBJECTIVES:
Students will be able to:
1) Explain why water is a limited resource.
2) Name at least three ways you can conserve water in your daily life.
3) Recite some simple statistics regarding water consumption in a typical household.

BACKGROUND:
There is a limited amount of usable water in the world. Therefore, it is important for people to conserve water in their daily lives. This activity demonstrates that our water resources are limited, how much water can be wasted by a typical family, and presents ways students and their families can save water. This is a two part activity, consisting of a class discussion and demonstration.

KEY VOCABULARY:
Conservation, groundwater, and desalination

MATERIALS:
Drinking glass with water, eye dropper, five-gallon aquarium or clear plastic container, 4 jars of equal size (at least 2.5 cups), map of the world, measuring cup, paper, salt, and tape.

METHOD/DISCUSSION:
1) Begin the activity with a discussion of the ways we use water each day, including how we use water to make the foods we eat.
2) Ask: “How many of you think there is a lot of water in the world?” Explain: “You are all correct. There is a lot of water in the world. However, there is not a lot of water that we can actually use.”
3) Display a world map. Have students read the names of the oceans from the map. Ask: “Are our oceans salt water or fresh water?” Point out there is a lot more salt water than fresh water in the world. Ask students to locate ice caps and glaciers.
4) Is salt water available to use to drink? Place a tablespoon of salt in a cup of water and have a student take a sip. Explain that if we drink much salt water, we lose our water in our body. Salts draw water from body tissues, preventing the body from functioning normally. Explain that desalination of sea water is possible, but in most cases prohibitively expensive.
5) Explain that fresh water is our main source of water for household uses and drinking.

DEMONSTRATION:
1) Fill the aquarium with 5 gallons of water. Explain to the students that this will represent the total amount of water in our ecosystem. Label this container “TOTAL WATER ON THE EARTH”.
2) Remove 2 1/4 cups from the large container. Tell the students that this represents the total supply in the system. Put this water into one of the jars next to the aquarium. Label the jar “TOTAL FRESH WATER ON THE EARTH”.

WATER, WATER EVERYWHERE

ACTIVITY 4

WATER USE CHART

HOW MUCH WATER DO WE USE?

BRUSHING TEETH - 5 GALLONS PER MINUTE (RUNNING WATER)
DRIPPING FAUCET - 10 TO 20 GALLONS PER DAY
FLUSHING TOILET - 5 TO 7 GALLONS PER FLUSH
TAKING A BATH - 30 TO 40 GALLONS
TAKING A SHOWER - 5 TO 7 GALLONS PER MINUTE
USING A DISHWASHER - 15 TO 25 GALLONS PER LOAD
WASHING A CAR - 30 TO 40 GALLONS
WASHING LAUNDRY - 20 TO 40 GALLONS PER LOAD
WATERING THE LAWN - 5 TO 10 GALLONS PER MINUTE

3) Ask the students to define or describe a glacier. Ask the students to predict the amount of fresh water locked up in glaciers on our planet. Take 1 1/2 cups of water from the "TOTAL FRESH WATER" jar. Pour this water into another jar labeled "FRESH WATER IN POLAR ICE CAPS AND GLACIERS". Advise the class that this water is not available for use.

4) Briefly discuss how the atmosphere also contains moisture. The moisture can sometimes be seen in the form of clouds and can fall to the earth as precipitation. Ask the students to describe what happens to rain after it reaches the ground. Remind students that water runs into streams, lakes, ponds and oceans, and that it is used by animals and plants and evaporates back into the atmosphere. Be sure to discuss the fact that some water falls on soil, penetrating through to become groundwater. Take 1/4 cup of water from the "TOTAL FRESH WATER" JAR. Put this in another jar labeled "ATMOSPHERIC AND GROUND WATER". Discuss why most of this fresh water is not available for use - because it is in the clouds or under a thick rock layer.

5) There should be 1/2 cup of water remaining in thE "TOTAL FRESH WATER " JAR. Take 5 drops out with an eyedropper. These 5 drops represent the amount of fresh water available for human use. The 1/2 cup, less 5 drops, represents the surface or groundwater that is either technologically or economically unfeasible to make available for human use - including groundwater. Put the 5 drops of water in another jar and label it "FRESH WATER AVAILABLE TO HUMANS". (You may wish to add a few drops of food coloring, so the amount of "water" will be easier for the students to see.) Relabel the "TOTAL FRESH WATER" jar "POLLUTED OR TOO COSTLY TO USE".

6) Conclude this activity by discussing how we can ensure that this limited amount of fresh water is not polluted or wasted in some way. Discuss the ways we can conserve water. After the discussion, give each student a copy of the water conservation list on the following page.

EXTENSION:
Reproduce the water use chart in a larger format. Have the students keep track of how much water they use in one week. Multiply this by the number of people in their family. Add the amount of water used for watering the lawn and garden, washing the car, etc. How could some of the water be conserved?

WATER USE

WATER CONSERVATION CHECK LIST

- ☐ PLANT WATER EFFICIENT LANDSCAPING.
- ☐ TURN OFF WATER WHILE BRUSHING TEETH.
- ☐ INSTALL WATER FIXTURES IN YOUR HOME.
- ☐ FIX ALL FAUCET DRIPS.
- ☐ REDUCE TOILET TANK VOLUME BY INSTALLING WATER DISPLACEMENT DEVICE.
- ☐ TAKE SHORTER SHOWERS AND FEWER BATHS.
- ☐ WASH ONLY FULL LOADS IN THE DISHWASHER.
- ☐ TURN OFF SHOWER WATER WHILE SOAPING OR SHAMPOOING.
- ☐ AVOID UNNECESSARY RINSING OF DISHES GOING INTO THE DISHWASHER. WASH DISHES BY HAND, USING A PAN OR SINK FILLED WITH WATER INSTEAD OF RUNNING WATER.
- ☐ USE CAR WASHES THAT RECYCLE WATER.
- ☐ WHEN WASHING THE CAR BY HAND, USE AN ON/OFF NOZZLE TO RINSE.
- ☐ INSTEAD OF USING A HOSE AND WATER, USE A BROOM TO SWEEP THE GARAGE, DRIVEWAY AND SIDEWALKS.
- ☐ INSTALL MULCH AROUND TREES AND OTHER PLANTS TO REDUCE MOISTURE LOSS FROM SOIL.
- ☐ INSTALL DRIP OR TRICKLE IRRIGATION SYSTEM IN OUTDOOR GARDENS.
- ☐ AVOID LAWN WATERING DURING WINDY OR HOT PARTS OF THE DAY. DON'T ALLOW WATER TO RUN OFF INTO THE GUTTER.
- ☐ INSTALL LO-FLOW SHOWERHEADS.
- ☐ INSTALL LOW VOLUME TOILETS.
- ☐ INSTALL LOW WATER USE WASHING MACHINES AND DISHWASHERS.
- ☐ OTHER:

_____

IS THIS HIKER READY?

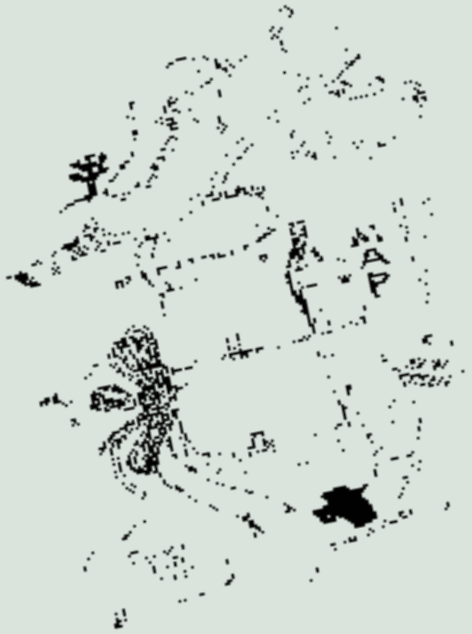
ACTIVITY 5

SUBJECTS:
Art, health, and language arts

LOCATION:
Classroom

DURATION:
45-60 minutes

OBJECTIVE:
Students will learn the importance of planning well for outdoor activities.



MATERIALS:
Backpack, clothes to layer, first aid kit, hat, map, high energy snacks, sturdy shoes, sunblock, sunglasses, water bottle, crayons or colored markers, and unnecessary items such as: a radio, bikini, gum, toys, etc. Also include the following activity page.

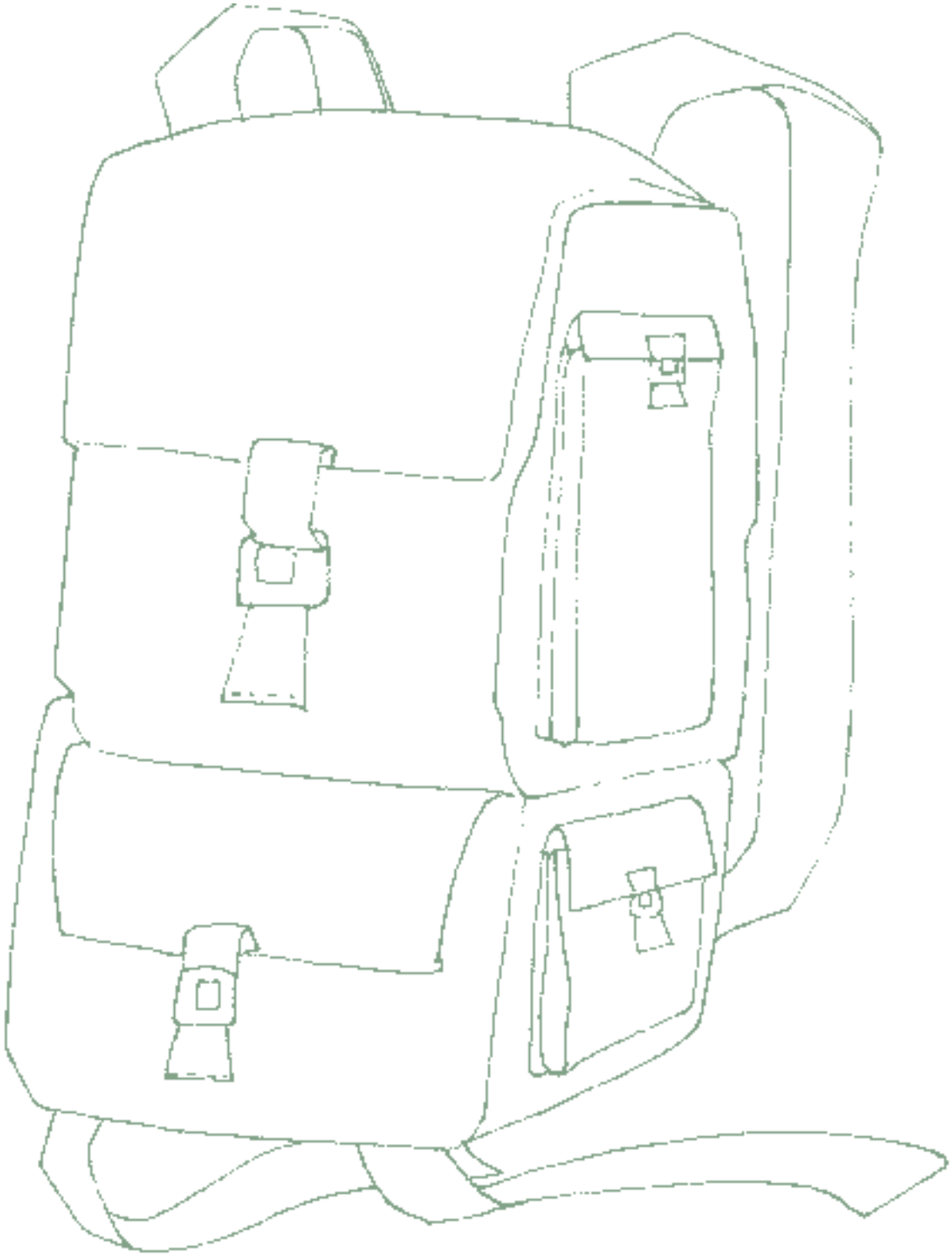
METHOD:
In this activity your group will prepare one hiker for a day in the Great Basin. They will gather the necessary items to ensure this hiker's safety and well-being.

1) Choose one student from your group to be the "hiker". Set all the materials on a table (both necessary and unnecessary); call volunteers, one at a time, to give an item to the hiker. Have the volunteer explain why they think the item they have chosen is necessary. The volunteer can help dress the hiker with pieces of clothing, rub on sunscreen, or pack the item in the hiker's backpack.
2) When the group feels that the hiker is prepared, talk about the items left on the table and why they are unnecessary. What other items might be unnecessary? Has the hiker forgotten anything? Discuss what the variations of these items that the hiker might want to take along depending on what elevation of the Great Basin he/she might be hiking in. (For some variation, as you discuss hiking safety with the group, have another hiker wander into the classroom. This hiker should appear obviously unprepared -sandals, shorts, a tiny fanny pack, one water bottle, etc. Ask the students if the hiker looks prepared. As students name the items they think the hiker needs, bring them out of a hidden location and "prepare" the hiker. Discuss why each item is important. Have fun with this activity by adding oversized sunglasses, a sombrero, etc.)
3) Pass out copies of the activity page. Have your students draw items they will need for a hike in the outline of the backpack.
4) When all the students have finished their drawings, allow volunteers to bring up their "backpacks" and discuss what they have drawn. After doing this with several students, decide, as a group, if anyone has forgotten anything.

EXTENSION:
Ask the students to bring in newspaper articles about actual back country rescues and/or emergencies in the Great Basin desert or high country. Local newspaper offices and libraries might be good sources for clippings. In each scenario, discuss what went wrong and what might have been done to prevent the situation from occurring or to cause a different outcome.

IS THIS HIKER READY?

ACTIVITY 5



DESERT PUZZLER

ACTIVITY 6

SUBJECTS:
Science, Geography

LOCATION:
Classroom

DURATION:
30 minutes

OBJECTIVES:
Explain the creation of a rain shadow desert.

BACKGROUND:
Atmospheric and geophysical conditions work together to create deserts. Understanding the rain shadow effect will help explain how the Great Basin desert was formed. To the west of the Great Basin desert lies the Sierra Nevada, running parallel to the coast of the Pacific Ocean. These mountains create the rain shadow effect.

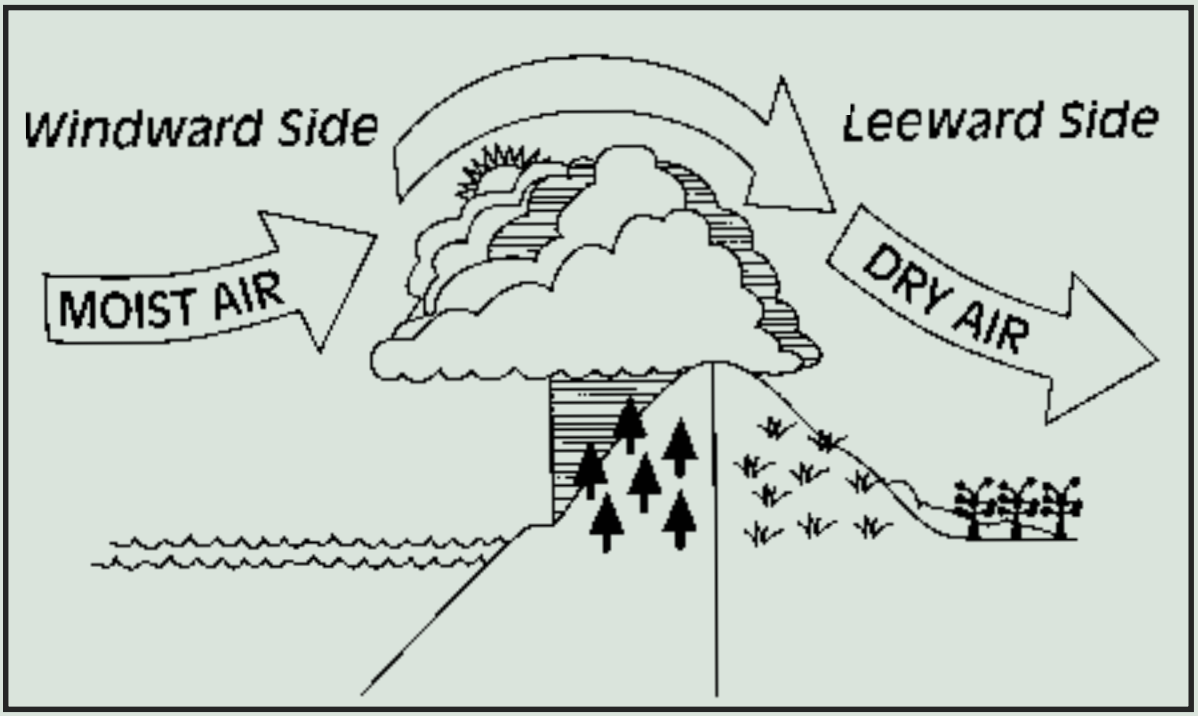
KEY VOCABULARY:
Rain shadow, desert

MATERIALS:
Activity page, graph paper, poster board, puzzle made from enlargement of activity page.

METHOD:
1) Enlarge the rain shadow diagram (on the following page) on a piece of poster board. Cut it into pieces to create a puzzle. If you have a large group, you may want to make more than one puzzle. Laminating or covering the pieces with clear contact paper will extend their life.
2) Give each student a copy of the activity page. Use the diagram to explain rain shadow deserts.
3) Putting their activity sheets aside, have the students stand in a circle, surrounding the area where the puzzle will be assembled. Give puzzle pieces to members in your group. Ask participants to step in one at a time. Each may either attempt to place the puzzle piece in the right location or move a piece already placed. After the puzzle is completed, have a volunteer explain how the rain shadow effect creates dry places.
4) Contact areas on both sides of the mountain ranges and in the mountains to collect rainfall totals for the past three years. Graph the data you collect and discuss it with the students.

DESERT PUZZLER

ACTIVITY 6



RAIN SHADOW DESERTS

Rain shadow deserts are created when mountain ranges lie parallel to moist, coastal areas. Winds moving inland cool as air is forced to rise over the mountains. Clouds form and carried moisture falls on slopes facing the winds. When winds move over the crest and down the far side, they are very dry. Descending air also makes it hard for additional clouds and precipitation to form. Without another source of moisture, rainshadow deserts are formed on the far sides of these mountain ranges.

NOTES