

The
New
Stuff

THE ANSWER MAY NOT BE "CLEAR"

Focus	To demonstrate the differences between two methods of logging: clearcut and selective.
Group Size	20 or more (<i>most effective</i>)
Time Required	1.5 hours
Materials	20, or more, students and their imaginations
Physical Setting	Large open space Outdoors--Cispus Field (if weather permits)
Process	Divide students into following role-playing groups: -stand of uneven-aged trees (<i>half of the class or more</i>) -moss -lichen -bear -deer -elk -owl -bat -field mouse -flying squirrel -red shafted flicker -pileated woodpecker Use students' imaginations for other possibilities.

Activity 1

1. Present to students the economic benefits of a clearcut:
 - a) Enables foresters to create even-aged forests of a desirable tree species that will be capable of producing crop after crop of valuable timber.
 - b) Provides the most complete preparation for manipulated regrowth.
 - c) Provides for large timber yields.
 - d) Cheap
2. Begin student role-playing in large, open area.
Trees: students should stand tall with arms reaching above their heads.
Moss and lichen: cling to a tree or lie below it
Animals: encourage creativity in role-playing.
Encourage sound and movement for all roles.
3. After a few minutes of experiencing the workings of a living forest, tell the students that this forest is going to be clearcut.
4. Trees should squat to ground-level and become stumps.
There are now no trees left standing.
5. Encourage discussion.

Activity 2

1. Begin student role-playing in large, open area. (same as activity 1.)
2. After a few minutes of experiencing the workings of a living forest, tell students that this forest is going to be selectively logged.
3. Randomly tap one-third of trees on the shoulder. These trees should squat into the "stump" position.
4. Encourage discussion.

Activity 3

Develop an open discussion around the following questions.

1. What are your feelings about the clearcut?
2. After a clearcut, seedlings are often planted. With selective logging, the surrounding trees will take care of reforestation. Have students discuss their feelings around the differences.
3. How did the clearcut affect the diversity of life within the forest? Selective logging?

CLASSROOM ECOSYSTEM

Interdependence and Population

- Focus** To create a controlled grassland ecosystem, manipulate elements within it, and make observations and predictions of what has, and will, occur.
- Group Size** Entire class
- Time Required** Daily observation over a several week period (*or indefinitely*)
- Materials**
- | | |
|---|-----------------------------------|
| Vegetable peelings | Gravel, humus and/or potting soil |
| Chameleons | Male and female crickets |
| Dead branch | Jar lid filled with wet sand |
| Shallow water dish | Fast growing grass seed |
| 10 gallon or larger aquarium w/tight-fitting screen cover | |
- Physical Setting** Classroom
- Process**
1. Prepare aquarium with a shallow layer of gravel and a few inches of soil, sprinkle thickly with grass seed, water frequently, and keep in sunlit window.
 2. Students or teacher creates a chart or book for students to make daily observations for watering, and germination.
 3. When grass crop is thick and healthy add a few crickets and the jar lid filled with wet sand (for laying their eggs). Move the container out of direct sunlight, but continue watering the grass.
 4. Make daily recordings on the chart, or in the book, of cricket population and changes in the grass environment. Also, begin to make predictions about the grass and crickets based on what is happening in the environment
 5. If the cricket and grass populations remain in balance, choose one of the following steps. In all cases, record daily changes in plant and animal populations, and continue to make predictions.
Step 1: Add more crickets. Increase the cricket population artificially without providing extra food. Is the grass crop an adequate food source?
Step 2: Add more crickets and supplement their food with fresh fruit and vegetable scraps.
 6. If the cricket and grass populations do not remain in balance, i.e. the crickets destroy the grass crop, the experiment is over and the students should work on evaluating their research. If a balance is maintained with the student's help, alter the environment slightly by adding dead branches, and a rock or two. Add one chameleon (insectivore) to the aquarium. Observe what happens to the cricket population.
 8. Allow the experiment to end naturally or keep the chameleon and crickets alive as classroom pets.

Carrying Capacity and Overpopulation questions

Name/Date _____

1. Describe the grass crop at the beginning of the experiment. At the end of the experiment.
2. How many crickets were living in the manmade environment and surviving in a healthy condition?
3. If you followed Step 1, when did the cricket population become too large for the food supply?
4. If you followed Step 2, did the inclusion of the chameleon alter the cricket population?
5. Speculate as to what might happen if you added several chameleons to the container.
6. Draw conclusions as to the carrying capacity of your grassland community. For crickets. For chameleons.

COMPASS COURSE EXTENSION

Focus	An extension to compass course lessons found in the Cispus Experience.
Group Size	Small group of 2-3 students
Time Required	30 minutes
Materials	A meter or yard stick (<i>optional, 100 foot tape measure</i>) <i>Handout: Compass Course Key</i>
Physical Setting	School yard or other outdoors area with tall trees
Process	Cispus already has a compass course laid out. On the south side of the parking lot by the auditorium, numbers 1 to 20 are marked three feet apart by the curb. On the following page are twenty courses that will lead students from one number to another.

Compass Course Key

Starting Point No. 1

Go 60 degrees for 45 feet
Then 346 degrees for 60 feet
Then 211 degrees for 83 feet

Destination Point No. 6

Starting Point No. 2

Go 6 degrees for 60 feet
Then 126 degrees for 45 feet
Then 245 degrees for 61 feet

Destination Point No. 7

Starting Point No. 3

Go 333 degrees for 60 feet
Then 154 degrees for 30 feet
Then 204 degrees for 17 feet

Destination Point No. 10

Starting Point No. 4

Go 78 degrees for 45 feet
Then 352 degrees for 42 feet
Then 210 degrees for 63 feet

Destination Point No. 1

Starting Point No. 5

Go 53 degrees for 54 feet
Then 272 degrees for 36 feet
Then 180 degrees for 38 feet

Destination Point No. 2

Starting Point No. 6

Go 357 degrees for 45 feet
Then 90 degrees for 30 feet
Then 216 degrees for 53 feet

Destination Point No. 4

Starting Point No. 7

Go 72 degrees for 45 feet
Then 320 degrees for 30 feet
Then 195 degrees for 45 feet

Destination Point No. 3

Starting Point No. 8

Go 7 degrees for 60 feet
Then 114 degrees for 48 feet
Then 217 degrees for 60 feet

Destination Point No. 2

Starting Point No. 9

Go 85 degrees for 75 feet
Then 287 degrees for 60 feet
Then 200 degrees for 29 feet

Destination Point No. 6

Starting Point No. 10

Go 69 degrees for 45 feet
Then 317 degrees for 60 feet
Then 178 degrees for 63 feet

Destination Point No. 9

Starting Point No. 11

Go 60 degrees for 45 feet
Then 346 degrees for 60 feet
Then 211 degrees for 83 feet

Destination Point No. 16

Starting Point No. 12

Go 6 degrees for 60 feet
Then 126 degrees for 45 feet
Then 245 degrees for 61 feet

Destination Point No. 17

Starting Point No. 13

Go 333 degrees for 60 feet
Then 154 degrees for 30 feet
Then 204 degrees for 17 feet

Destination Point No. 20

Starting Point No. 14

Go 78 degrees for 45 feet
Then 352 degrees for 42 feet
Then 210 degrees for 63 feet

Destination Point No. 11

Starting Point No. 15

Go 53 degrees for 54 feet
Then 272 degrees for 36 feet
Then 180 degrees for 38 feet

Destination Point No. 12

Starting Point No. 16

Go 357 degrees for 45 feet
Then 90 degrees for 30 feet
Then 216 degrees for 53 feet

Destination Point No. 14

Starting Point No. 17

Go 72 degrees for 45 feet
Then 320 degrees for 30 feet
Then 195 degrees for 45 feet

Destination Point No. 13

Starting Point No. 18

Go 7 degrees for 60 feet
Then 114 degrees for 48 feet
Then 217 degrees for 60 feet
Destination Point No. 12

Starting Point No. 19

Go 85 degrees for 75 feet
Then 287 degrees for 60 feet
Then 200 degrees for 29 feet

Destination Point No. 16

Starting Point No. 20

Go 69 degrees for 45 feet
Then 317 degrees for 60 feet
Then 178 degrees for 63 feet
Destination Point No. 19

CRUISING THE CLEARCUT

- Focus** To use the skills from Activity “Tall Timber” and other mathematical operations to determine the number of marketable board feet in a particular tree
- Group Size** Small groups of 2-4
- Time Required** 30 minutes
- Materials** Tape measure and worksheet with board feet volume table
- Physical Setting** Any outdoors area with trees whose diameter at the base is at least 12 inches. Larger diameter trees are better.
- Process**
1. Measure the circumference of the tree and divide that measure by approximately 3 to get the diameter of the tree at breast height.
 2. Take a sighting up a tree to where you think the tree narrows to an 8 inch diameter.
 3. The student needs to determine height of the tree from breast height above the ground, to where the tree narrows to an 8 inch diameter.
 4. Use the method from the activity “Tall Trees” to determine the number of feet from breast height to the 8 inch diameter. This activity uses a similar triangle and a stick that is the same length as the student’s arm.
 5. Once you know the height of the tree from breast height to a point where it is 8 inches in diameter, divide that height by 16 to get the number of sawmill log lengths.
 6. Using the adapted Board Foot Volume Table (approximately 1965) (USDA) for second growth D>F.-Bul. 201, Table 13, determine the number of marketable board feet in the tree.

BOARD FOOT VOLUME TABLE
Height of merchantable tree number of 16 foot logs

Diameter in inches	1	2	3	4	5	6	7	8
12	62	80	133	183	235	286		
14	64	88	147	210	274	338		
16	67	96	163	242	320	399		
18	71	109	190	280	370	459	550	701
20	75	123	221	330	435	543	651	758
22			258	383	509	633	760	884
24				438	584	728	882	1035
26					666	832	1013	1190
28					750	941	1114	1346
30					850	1062	1291	1518
32						1195	1449	1700
34						1333	1614	1898
36						1494	1782	2095
38							1955	2305
40							2150	2523

When logs are sawed into boards, they are measured in board feet. A board foot is a board that is 12 inches wide by 12 inches long by 1 inch thick. To use the table above you need to find how tall a tree is from breast height to where you estimate the diameter narrows to 8 inches. Use the activity "Tall Trees" to help you find this number. You also need the diameter of the tree. The work sheet below will help you get these figures.

WORKSHEET:

Height of tree to 8 inch level: Number of steps x length of step = height of tree

_____ x _____ = _____

Number of Saw Logs: Height divided by sixteen = number of sawlogs

_____ / _____ 16 = _____

Diameter of tree: Measure around tree divided by 3 = diameter of tree

_____ / _____ 3 = _____

Board Feet: Find the diameter of your tree in the left column of the chart.
Find the number of sawlogs reading across the top of the chart.
Where the column and the row cross you will find the number of board feet in your tree.

Marketable board feet in my tree is: _____

IF each board foot of finished lumber is worth 45¢ at the lumber store, how much is your tree worth?

My tree is worth \$ _____.

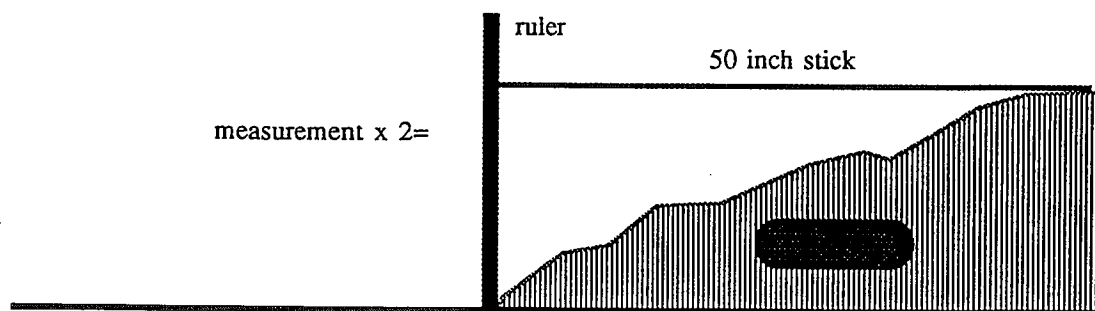
A DIFFERENT SLANT ON SLOPE

Focus	To determine the slope of different soil areas and what factors affect erosion on a sloped surface.	
Group Size	Small groups of 3-4	
Time Required	Depends upon the amount of land to be covered; in a school yard 15-20 minutes should be adequate	
Materials	Recording sheet	50 inch stick
	Yard stick	Level or a protractor
Physical Setting	School yard or outdoor school	
Process	<i>Students will determine the slope of a soil surface using a 50 inch stick with either a small carpenter's level or a protractor attached.</i>	

1. Rest one end of the stick on the uphill slope, position the stick so that it is level horizontally either with a level or by hanging a weight down on a string at a 90 degree angle to the stick.

2. Measure the distance from the downhill end of the stick to the ground in inches. Multiply that number by 2 (you are using a 50 inch stick instead of a 100 inch stick) and express your result as a percent (%).

Example: a 21 inch drop from the downhill end of the stick to the ground equals 41% slope. $21 \times 2 = 41$



DIVERSE DIVERSITY

Focus	To develop an understanding of the importance of biodiversity and the three different branches within it.
Group Size	Entire class
Time Required	1 to 1.5 hours
Materials	Definition sheet (<i>3 copies</i>) Question sheet (<i>teacher's use</i>)
Physical Setting	Indoors or outdoors
Process	1. Divide the students into three groups. Pass out one definition sheet to each group. Go over the definitions with the students, making sure they understand the differences in the terms. Assign each group to one term, and have them develop a unique presentation consisting of: characteristics that fit into their category, importance of diversity within it, and the relationship to the other categories. ENCOURAGE CREATIVITY!!! Fifteen minutes for preparation should be allowed and five minutes for each presentation. After all three presentations are completed, refer to the question sheet and encourage discussion.

Definitions of Diversity

BIODIVERSITY- the variety of living organisms and the ecosystems and ecological processes of which they are parts.

GENETIC DIVERSITY- refers to the variety of genes within a species. Example: difference of tree size within a species.

SPECIES DIVERSITY- refers to variety of species within a region.

ECOSYSTEM DIVERSITY- refers to the variety of habitats, biotic communities, and ecological processes within a biosphere.

QUESTIONS FOR DISCUSSION

For instructor's use

1. What is the importance of biodiversity for humans?

possible answers: food, medicines, industrial products, water purification, nutrient cycling, pollination

2. What is the importance of biodiversity for other species?

possible answers: Many species depend on each other for survival. The absence of one species has great impact within the "web of life."

3. How do you think the loss of ecosystem diversity affects the species diversity and genetic diversity?

possible answers: Habitat provides space for the diversity of species and genetics to exist in a natural way.

4. What do you think some causes of biodiversity loss are?

possible answers: deforestation, population growth, habitat fragmentation, pollution, invasion of introduced species, overexploitation, climate change

5. What can you do to have a positive impact within biodiversity?

FEDEX THAT PACKING MATERIAL BACK TO NATURE

Focus	Investigating whether the so-called biodegradable packing materials is truly biodegradable and environmentally friendly.
Group Size	Entire class
Time Required	Several weeks
Materials	Biodegradable packing material: "styrofoam" made from corn starch or potato starch. (<i>Many technological industries use this "popcorn" packing material in shipping their products.</i>)
Physical Setting	Classroom window sill or greenhouse, if available
Process	<ol style="list-style-type: none">1. Dissolve the cornstarch "styrofoam" in water. Plant some bean seeds or other seeds in 6 different pots with potting soil.2. Record the date and how many seeds were planted in each pot.3. Water 3 of these pots with tap water and the other 3 with the "styro-water."

Keep a record :

1. Did all of the seeds planted in all of the pots germinate?
2. Did all of the pots have the same number of seeds germinate?
3. Did all of the pots have seeds germinate on the same date; both those with regular water and those with "styro-water"?
4. Did all of the plants grow to be the same height when you compare different pots that were watered the same?
6. Did all of the plants grow to be the same height when you compare different pots that were watered with regular water vs. "styro-water"?

Conclusions: Is the new "biodegradable styrofoam" eco-friendly? Your reasons for your answer need to be given.

HEART TO HEART

- Focus** To help students learn more about their circulatory system and how it relates to daily activity.
- Group Size** Entire class
- Time Required** 30-45 minutes
- Materials** A watch with a second hand.
Heart worksheet
Writing utensil
- Physical Setting** Angel Falls or Covell Creek Trails
- Process**
1. Facilitator leads discussion about the heart and its role during everyday activities. Discuss its functions and jobs.(Oxygen and Carbon Dioxide transport) Talk about when and why the heart speeds up and pumps faster and when the heart slows down and beats slower.
 2. Teach students what their pulse is and how to find it.(both neck and wrist) Have students take pulse for six seconds and then multiply that number by ten. This is their beats per minute (bpm). Explain to them if they want to find their resting heart rate they need to take their heart rate immediately after waking up.
 3. Have students lie down and take pulse after a few minutes. Discuss with students why their hearts have slowed down.
 4. Go for a short hike, one with incline. Angel Falls or Covell Creek work best. After five or ten minutes of heavy hiking, take pulse once again. Discuss why their hearts have sped up.

Discussion

1. What are other effects hiking has on the body?
2. What is the importance of exercise to maintaining good health?
3. Name three forms of aerobic exercise.

Extension

Investigate other important systems used when hiking- -the skeletal system, the muscular system.

HEART WORKSHEET

Figuring Your Heart Rate

1. What's the largest muscle in your body? _____
2. Your heart transports _____ to the cells in your body and transports _____ away from your cells.
3. Diagram this picture of the heart

Finding Your Pulse

To find your pulse place both your index and middle finger on your wrist. Do not use your thumb because it has its own pulse which will be indistinguishable. If you cannot feel your pulse in your wrist, place fingers on the carotid artery on the side of your neck.

*bpm is short for **B**eats **P**er **M**inute

Pulse at rest (6 seconds) _____ x10 _____ = bpm
Pulse lying down (6 seconds) _____ x10 _____ = bpm
Pulse when hiking (6 seconds) _____ x10 _____ = bpm

3. Why is it important to raise your heartbeat and to increase physical activity?
4. Name three forms of exercise.
5. When one hikes or performs strenuous activity, the body shows physical or visual effects, name some.

Instructor's Discussion Information

The Heart

The heart is a cone shaped pump which is the primary element of the circulatory system. The cardiovascular system efficiently transports oxygen and nutrients to body tissues and transports accumulated waste substances away from the tissues. The large muscle contracts over 100,000 times a day. Each heartbeat pumps about two ounces of blood resulting in the pumping of 13,000 quarts a day. The harder the heart works, the more efficient it becomes. That is why exercise gets easier the more you do while additionally increasing your cardiovascular capacity. Cardiovascular capacity is defined as the efficiency that your heart works at to provide oxygen to tissues.

One way to measure one's cardiac capacity is to monitor one's pulse or heart rate. To get a basis of measurement, take your resting heart rate. This is the number of heart beats you have in a minute right after waking-up. The lower your resting heart rate, the healthier your heart is. To decrease your resting heart rate, you need to know your maximum training heart rate. Your training heart rate is the ideal number of B.P.M. to maximize exercise benefits based on your current physical fitness and age. Below is the formula to calculate it.

$$220 - \text{Age} = \text{Maximum Heart Rate}$$

$$(220 - \text{Age}) \times 75\% = \text{Training Heart Rate}$$

When you continue to exercise at your calculated training rate, you will see your resting heart rate decrease over time.

Discussion

Visible effects of Strenuous Cardiovascular Activity

1. Sore Muscles

Sore muscles are due to the build-up of lactic acid in the muscles as a product of anaerobic respiration. Respiration is defined as the cellular process by which energy is released from nutrients. Anaerobic respiration results when the body can no longer carry on aerobic respiration because the circulatory system cannot supply oxygen efficiently enough to meet the needs of aerobic respiration. Aerobic respiration is defined as the phase of cellular respiration that requires the presence of oxygen where anaerobic respiration is the phase of cellular respiration that occurs in the absence of oxygen.

2. Sweat

Sweat, a liquid composed mostly of water and small quantities of salts and certain wastes (urea and uric waste), is produced by the eccrine glands. They respond primarily to elevated body temperature, especially due to physical activity. Sweating helps the body maintain a constant body temperature of 98.7 F (37 C). As sweat evaporates from the body, it carries heat away from the surface.

3. Energy Consumption

Energy spent on a hike can be measured by calculated caloric expenditure. A calorie is a measurement of energy. The amount of potential energy in food can be expressed in calories.

Here are the caloric contents of some common foods eaten by kids. Try to figure out how long certain activities need to be done to "burn off" certain foods.

<u>Food used/hr.</u>	<u>Calories</u>	<u>Activity</u>	<u>Calories used/hr.</u>
Candy Bar	250	Angel Falls hike	450
Coke	144	Covel Creek hike	200
1 c. pudding	322	Sitting at Rest	100
1 slice pizza	157		
1 c. peanuts	838		

HOT OR COLD WET OR DRY

- Focus** To use the daily and averaged temperature and precipitation recordings displayed on graphs in the hall of the education building to assist groups making their own weather predictions and to study local patterns.
- Group Size** Up to 20 students
- Time Required** 20 minutes, plus time for individual calculations, if desired
- Materials** Paper and pencil, or calculators
- Physical Setting** In the hallway of the Cispus Education building
- Process**
1. Informally assess the group's familiarity with reading bar and line graphs. Instruct and pair students as necessary.
 2. Study and extract information from the posted monthly graphs: highest and lowest monthly TEMPERATURES, largest and smallest daily spans, how many days above, below or at a given temperature--or within a range of 10 degrees. How many days with no measurable PRECIPITATION? Wettest days? How many at or under .50 inches? Between .50 and one inch? Etc.
 3. Study the ten year temperature graph noting the curve, high-low ranges, etc.
 4. Study the ten year precipitation graph. Discuss its construction of color-coded bars and dots for averages. Extract information from it similar to that listed above.
 5. Focus on the month of your attendance at Cispus noting patterns and exceptions. Make a list of probable weather conditions for your stay or compare how the weather during your stay has been typical or different than what you expected.
 6. Incorporate this information into further studies and records you may keep if you use the weather station.

HOT WORDS FOR KOOL KIDS

- Focus** To give students the understanding they need of geologic terms, time and a connection to the sites of concern, before they go to an interpretive site such as Mt. St. Helens Interpretive Center at Silver Lake or Coldwater Lake and before they travel from Cispus to Mt. St. Helens Volcanic Monument.
- Group Size** Entire class
- Time Required** 20 minutes
- Materials** Duplicated word puzzle (crossword, word find, etc.)
Handout: *Volcanic Vocabulary Definitions*
(modification of a USGS "Glossary of Volcanic and Related Terms" obtained from the Interpretive Center at Silver Lake.)
Crossword Key
Crossword Layout
- Physical Setting** Classroom at school
- Process** Students will use references (such as science text, environmental guide, Glossary of volcanic and related terms, and other) to match the clues with the terms.

Volcanic Vocabulary Definitions

Active Volcano	A volcano that is erupting, or has erupted within the last 10,000 years, and is likely to erupt again.
Ash	Fine particles of powdered rock shot out from a volcano when it erupts.
Basalt	A type of lava which is very dark, almost black in color.
Caldera	A basin-shaped depression that usually is caused by the subsiding of a volcano's top and is usually filled with water.
Cinder cone	A volcanic cone built entirely of loose fragments of lava, pumice and ash.
Crater	A steep-sided circular depression formed when a volcano's top explodes or collapses.
Dome	A steep-sided mass of thick lava pushed up in the middle of a crater. It is usually circular with a rounded or flat top.
Dormant volcano	A volcano which is not currently active, but may be in the future.
Extinct volcano	A volcano that is not presently erupting and is not likely to erupt in the future.
Eruption	The process where ash, gases, and liquid rock are shot up into the air or spilled out on the surface of the Earth.
Fault	A crack in the Earth's surface, especially where two or more plates come together.

Fissure	A long crack on the slope of a volcano. Often gases and lava can come out of these cracks as well as out of the crater
Fumarole	A vent or opening where steam, and other gases come out of a volcano (active or dormant).
Lahar	A huge mud flow from a combination of ash, water, and other volcanic materials.
Lava	Magma that has reached the surface.
Magma	Melted rock beneath the surface of the Earth
Magnitude	A number that expresses the size of an earthquake. Each number is 10 times stronger than the number below it. Example a 4 is 10 stronger than a 3.
Pumice	Light- colored, frothy volcanic rock that floats.
Pyroclastic flow	A mixture of rock, ash and hot gases which flow very rapidly (50 to 100 miles per hour) down a volcano's sides during an eruption
Shield Volcano	A broad, very gently sloping volcano bulge created almost entirely of lava flows. It is named for the shape: like a warrior's shield laid flat.
Stratovolcano	A volcano composed of both lava flows and loose pyroclastic rocks.
Vulcan	The Roman god of fire and the forge, after whom volcanos are named.

Crossword Key

Across

1. A volcanic cone built entirely of loose, fragmented material

8. A large, basin-shaped volcanic depression caused when a volcano subsides, usually filled with water

9. Fine particles of pulverized rock blown from an exploding volcano

10. A steep-sided, usually circular, depression formed by either an explosion or a collapse of the top of the volcano

14. A volcano composed of both lava flows and pyroclastic materials

22. A mixture of rock, ash and hot gases that move rapidly down the volcano's slopes

23. The Roman god of fire and the forge

24. A type of lava that is almost black

25. A broad, gently shield-shaped volcano

26. A steep-sided mass of thick lava pushed up in the middle of a crater, usually round with rounded or flat top.

27. A crack in the Earth's surface, especially near the plate borders

29. A volcano which is erupting, or has erupted in the past 10,000 years, and will erupt in the future

30. A mud flow down the slopes of a volcano made up of water, ash and lava fragments

31. A volcano which is not erupting and is not expected to erupt in the future

32. Melted rock which has come out on the surface of the Earth

33. A large crack in the slope of a volcano; lava and gases come out of these cracks

35. Melted rock below the surface of the Earth

36. Light, frothy rock that can float on water

38. The process of ash, gases and liquid rock being shot out of a volcano

41. A volcano that is not erupting now, but is expected to in the future

43. A number that stands for the strength of an earthquake

44. A vent or opening in an active or dormant volcano that has steam and other gases escaping

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Down

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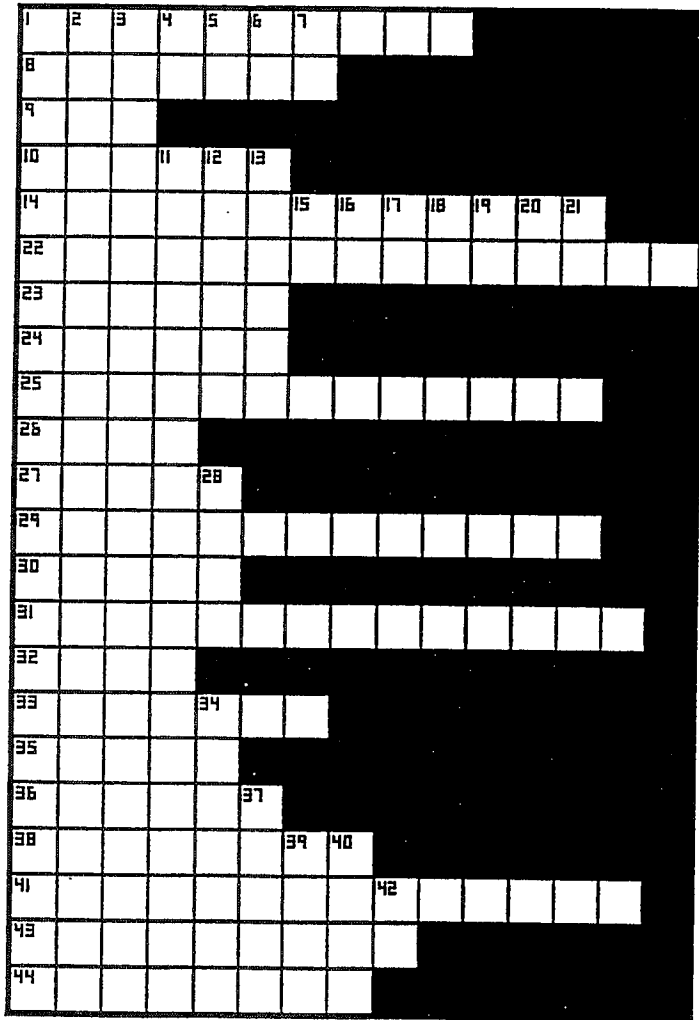
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Crossword Layout



LOOKING OUT YOUR WINDOW

(Urban/non-urban environments part 1)

- Focus** To define an urban environment using observation and sketches of their environment, and journal writing with a field study emphasis.
- Group Size** Entire class
- Time Required** 1 hour
- Materials** Pencil Journal Clipboard
Paper Markers Chart paper
- Physical Setting** Classroom and outside of classroom or school building
- Process**
1. While the students are sitting at their desks, have them look out the classroom window and draw or sketch what they see. (10 minutes)
 2. After the sketching, have the students write what they observed into their journals. (5-10 minutes)
 3. After the students have completed the journal writing, have the students get with a partner and share what they observed - show their sketching and share their journal entries. (5 minutes)
 4. Have students share with the entire class the types of things they observed (teacher will write down on chart paper all ideas that have been shared and keep the chart paper posted in the classroom).
 5. After filling the chart, ask the class the following questions:
 - a). Did you feel like you observed as many things as you should have?
 - b). Are their specific skills needed for observations or field studies? If so, what skills?
 - c). If we were to do this activity again, do you think you could improve your sketching or journals by being more detailed?
 6. The chart and class discussion should take approximately 15 minutes.
- VP24

7. Have the students take out another sheet of paper and as a class go outside of the classroom or school building to find a place where the students can sit down to sketch and write in their journals about what type of environment they see.
8. After this observation, repeat steps 2, 3, and 4.
9. After filling the chart, ask the following questions:
 - a). Were your sketches or writing more detailed this time?
 - b). Did you feel that you had improved on your observation skills (how/why)?
 - c). What is an environment?

Closure:

1. After the discussion, the teacher will explain that our environment is basically our surroundings - anything around us is considered our environment.
2. Students will then give examples of environments (school, home, work, are all examples of types of environments that we as humans live in).

LEARNING ABOUT YOUR HABITAT

(Urban/non-urban environments part 2)

- Focus** To learn the similarities and differences between a habitat and an environment. To be able to explain the key components of human habitats and their survival needs.
- Group Size** Entire class
- Time Required** 1 hour
- Materials** Chart paper Field study journals Paper
Pencils Markers
- Physical Setting** Home (*inside & outside of bedroom*), and classroom
- Process**
1. Assign the following lesson as homework:
Have students look out their bedroom window and sketch what type of environment they see.
 2. After the sketching, have the students write what they observed into their field study journals. Have students repeat steps 2 and 3, observing the inside of their bedroom.
 3. Have students bring all home observation data to school the next day.
 4. The next day, have students partner up and share their observational data (sketchings & field study journals).
 5. Have students share with the entire class the types of things they observed. Teacher will write down on chart paper all ideas that have been shared and keep the chart paper posted in the classroom.
 6. After the chart, ask the class the following questions:
 - a). What were some of the similarities between your school and home environments?
 - b). What were some of the differences?
 - c). Are they both considered environments?
 7. The teacher will again emphasize that an environment is your surroundings, but a habitat is where you actually live.

8. The teacher will have the students divide into cooperative groups of 4, give each group chart paper, and have each group draw a concept map showing what humans need in their habitat

in order to survive (example: air, water, transportation, shelter, food, etc.) Refer to lesson part 4 for an example of a concept map.

Closure:

1. Have each group present and display their concept maps.
2. The teacher will question each group about the major components that humans need in their habitats to survive, especially if a group is missing one of the key components - food, water, air , shelter, transportation, etc.)

PHOTOGRAPHIC FIELD OBSERVATIONS

(Urban/non-urban environments part 3)

- Focus** To create a photographic record of field observations in an urban habitat and review the meaning of habitats and environments.
- Group Size** Entire class
- Time Required** 30 minutes, class time
20 minutes, homework
- Materials** *Per student:*
One, 24 exposure, disposable camera with flash
Student observation sheets Field study journals
Sketches Concept map from part 2
- Physical Setting** Classroom and students' homes
- Process**
1. Review definitions of an urban environment and human habitat, referring to previously collected data: field studies, sketches, and students' concept maps of human survival needs (air, water, food, etc.).
 2. On chart paper, students and teacher will generate a master list of human survival needs (air, water, food, etc.), and elements of a human habitat. Teacher should emphasize the diverse human homes across cultures, yet they serve the same purpose - providing shelter.
 3. Distribute cameras and observation sheets.
 4. Demonstrate how to use the camera and role play the process of choosing an item to photograph, writing a description of the item, and explaining how and/or why humans use the item for survival.
 5. Students will go home and photograph 12 different items from their habitat that they feel are most important for human survival, writing the necessary information on the observation sheet.
 6. The next morning, teacher will collect observation sheets and cameras (make sure all are labeled with students' names). Class will hold a brief discussion about their observations.

STUDENT OBSERVATION SHEET
Human Habitat

photo #1

Description of the item:

Explain how and/or why humans use the item for survival:

photo #2

Description of the item:

Explain how and/or why humans use the item for survival:

photo #3

Description of the item:

Explain how and/or why humans use the item for survival:

photo #4

Description of the item:

Explain how and/or why humans use the item for survival:

photo #5

Description of the item:

Explain how and/or why humans use the item for survival:

photo #6

Description of the item:

Explain how and/or why humans use the item for survival:

photo #7

Description of the item:

Explain how and/or why humans use the item for survival:

photo #8

Description of the item:

Explain how and/or why humans use the item for survival:

photo #9

Description of the item:

Explain how and/or why humans use the item for survival:

photo #10

Description of the item:

Explain how and/or why humans use the item for survival:

photo #11

Description of the item:

Explain how and/or why humans use the item for survival:

photo #12

Description of the item:

Explain how and/or why humans use the item for survival:

AT PEACE WITH NATURE

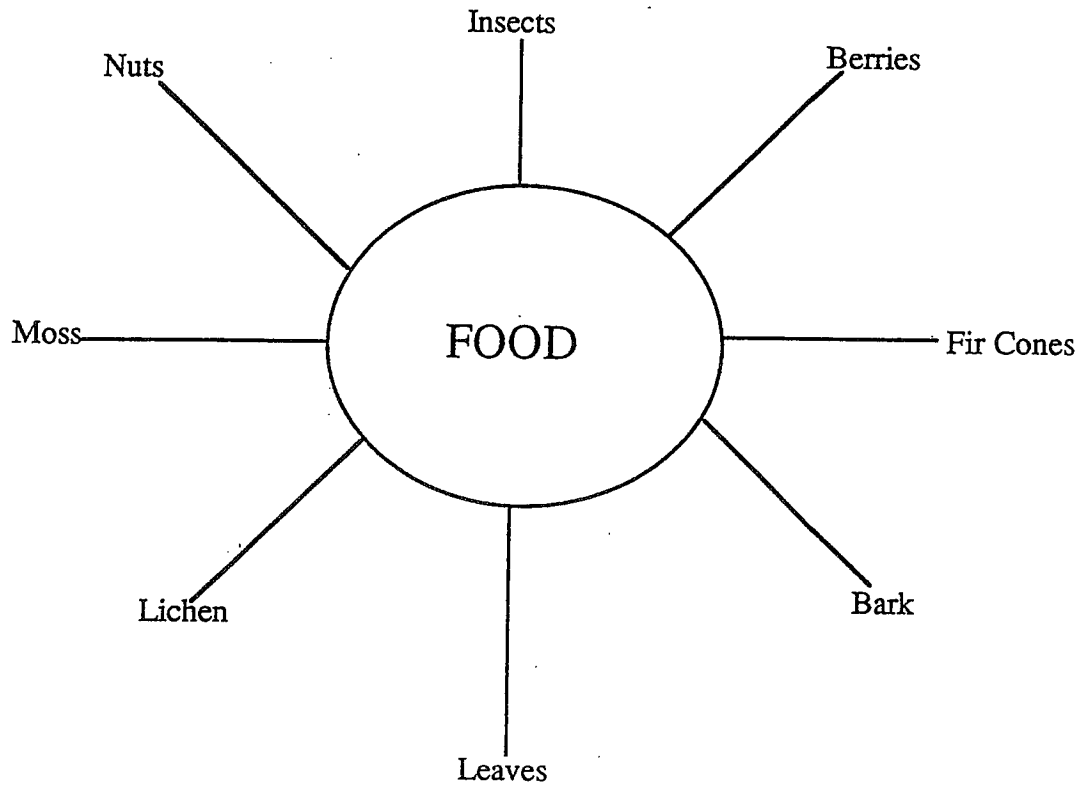
(Urban/non-urban environments part 4)

Focus	To learn how to observe the forest environment and wildlife habitats using sketches and field study journals.		
Group Size	Entire class		
Time Required	1 hour		
Materials	Paper Chart paper	Pencils Markers	Clipboards Field study journals
Physical Setting	In the forest setting at Cispus.		
Process	<ol style="list-style-type: none">1. Review with the students the types of skills needed to collect valuable data during observations and field experiences. The Native Americans call these techniques "being at peace with nature," which means fitting in and not disturbing the environment with voices or movement.2. Have students demonstrate around the campground area what the "sit and squat" method of observation looks like before going out in the woods to doing the field study (the "sit and squat" method is when students sit or squat next to a tree and pretend that they are a part of that environment or habitat).3. After all students have a clear understanding of the "sit and squat" method of observation, the teacher, with the help of other supervision, will take the students into the forest environment.4. The students will find a place in the forests to sit or squat down against a tree (trying to fit in or be at peace with nature) and make sketches and field study notes in their journal about their observations.5. The actual "sit and squat" observation should be a minimum of 15-20 minutes in order for the students to truly feel like they have become a part of the forest, or feel at peace with nature.6. After the "sit and squat" observation the students will return to the campground or classroom to discuss the experience.7. Have the students divide into cooperative groups of 4 and brainstorm a concept map which demonstrates one of the key components needed for wildlife survival within a habitat (air, water, shelter, transportation, food, etc.)8. Each group will pick one key component and give examples from their observations that demonstrate how they met the wildlife survival needs.		

Closure:

Each group will give an oral presentation on their concept map and specifically cite data from their field study observation to support their findings.

Concept map example



PHOTOGRAPHIC FIELD OBSERVATION

(Urban/non-urban environments part 5)

- Focus** To create a photographic record of field observations in a non-urban habitat and review the meaning of habitats and environments.
- Group Size** Entire class
- Time Required** 1 hour
- Materials** Disposable student cameras from part 3 Markers
Student observation sheets Chart paper
- Physical Setting** Classroom and forest environment
- Process**
1. Review definitions of a non-urban (forest) environment and forest habitats, referring to field study journal, sketches, and students' concept map of wildlife survival needs (air, water, food, etc.) from part 4.
 2. Distribute cameras and observation sheets.
 3. Review how to use the camera and role play the process of choosing an item to photograph, writing a description of the item, explaining how it is a part of the forest habitat, and how wildlife uses the item for survival.
 4. Students will go into the forest and photograph 12 different items from the habitat that they feel are used for wildlife survival, writing the necessary information on their observation sheets.
- Closure:**
1. Students return from forest and turn in cameras.
 2. On chart paper teacher will write what students share about their photographs and descriptions.
 3. Collect observation sheets.

STUDENT OBSERVATION SHEET
Forest Habitat

photo #13

Description of the item:

Explain how wildlife uses the item for survival:

photo #14

Description of the item:

Explain how wildlife uses the item for survival:

photo #15

Description of the item:

Explain how wildlife uses the item for survival:

photo #16

Description of the item:

Explain how wildlife uses the item for survival:

photo #17

Description of the item:

Explain how wildlife uses the item for survival:

photo #18

Description of the item:

Explain how wildlife uses the item for survival:

photo #19

Description of the item:

Explain how wildlife uses the item for survival:

photo #20

Description of the item:

Explain how wildlife uses the item for survival:

photo #21

Description of the item:

Explain how wildlife uses the item for survival:

photo #22

Description of the item:

Explain how wildlife uses the item for survival:

photo #23

Description of the item:

Explain how wildlife uses the item for survival:

photo #24

Description of the item:

Explain how wildlife uses the item for survival:

PHOTOGRAPHIC FIELD OBSERVATIONS REPORT

(Urban/non-urban environments part 6)

Focus	To create a photographic record for field observations of urban and non-urban environments. Students will write a report demonstrating their understanding of the concept of environments and habitats, and how survival needs are met within them.
Group Size	Entire class
Time Required	1 hour
Materials	Writing paper Construction paper Pencils Glue <i>Per student:</i> Students' processed photographs Completed observation sheets All charts and concept maps Student journals and sketches from previous assignments 3-ring binder
Physical Setting	Classroom
Process	<ol style="list-style-type: none">1. Students arrange photographs in book formation construction paper, with a written description of each item from the observation sheets. 2. Using all collected data (journals, sketches, observation sheets, photographs, concept maps, and charts) students will write a report containing the following information:<ol style="list-style-type: none">a) Describe in detail your environment and your habitat. How does it meet your human survival needs?b) Describe in detail the forest environment and some of the habitats you observed. How does the forest environment meet the survival needs of wildlife?c) How are these two environments similar? How are they different?d) How have humans changed the natural environment (like the forest) to make it a suitable habitat for their survival? 3. Place the report, photographs, journal entries, and sketches in a 3-ring binder and turn in for evaluation.

MAKE MONEY, MAKE CARDS!

(This lesson could be used as a fundraiser for camp)

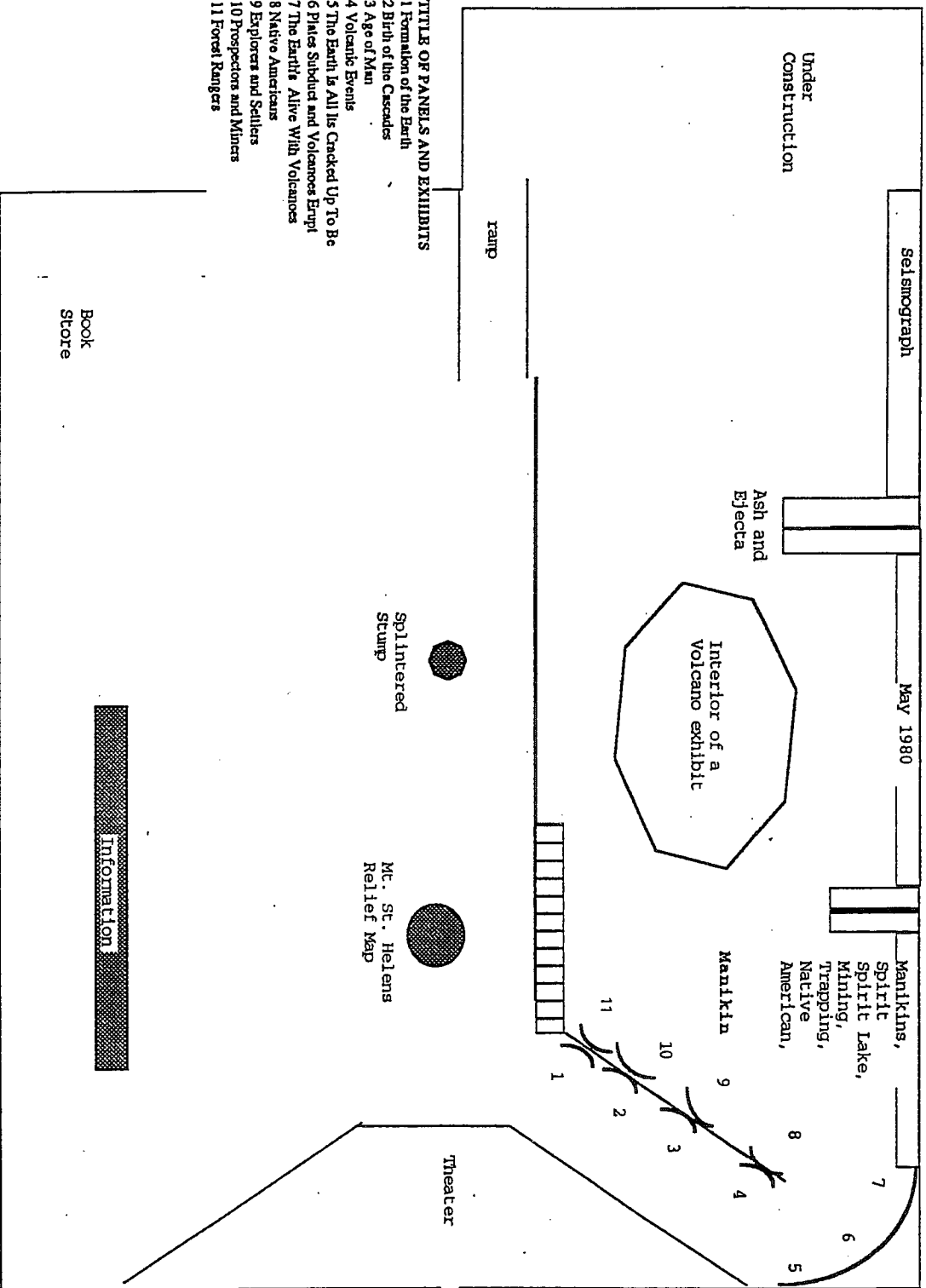
- Focus** To research and report on Northwest Wildlife, and use facts and illustrations from their research to make gift cards on stationary paper.
- Group Size** Entire class
- Time Required** 1 hour , or more
- Materials** Quality or stationery paper Lead and colored pencils
Envelopes Pens
Cispus Teachers' Guide to Northwest Mammals (*available at the Cispus office*, or other resource materials)
- Physical Setting** Classroom
- Process**
1. This project should be completed at school before students go to camp.
 2. The teacher will discuss with class the following questions:
 - a). What are the major components of a mini-report?
 - b). What types of facts about wildlife would be important to include in a mini-report (their habitat, food, description or characteristics, etc.)?
 3. Have students refer to the Cispus Teachers' Guide to Northwest Mammals and turn to page 1. Have the students read and discuss what would be 3 to 4 important or interesting facts to include in a mini-report about the Black Bear.
 4. After the class discussion, the teacher would demonstrate what their final project (gift cards) would look like (the teacher would show completed gift card on the Black Bear). This card would have an illustration on the front cover of a Black Bear and four interesting facts handwritten under the illustration.
 5. The teacher would then have students divide into cooperative groups of four and assign each group a specific mammal from the guide. Each member of the group would be responsible for picking and writing one interesting or important fact about their mammal.

6. After each member in each group has completed this task, each member of the group would share their fact with the other members of the group. Each member would be responsible for writing down all other facts.
7. Teacher would consult with each group about their facts, and if satisfied, would give each member the quality stationery paper to start making their card. (The teacher would demonstrate how to make the card: fold paper in half, write toward the bottom of the front cover your four facts, use the rest of the front cover to make an illustration of the animal, and on the back cover of the card write handmade by : NAME; include your name, grade, and school).
8. After each group has completed their cards, have the groups present them to the class.
9. After the groups have presented their cards to the class, assign each individual to complete four additional cards. Each card should have an illustration with 3-4 facts handwritten below the illustration. The students will also be responsible for choosing and completing four different mammals.
10. After each individual has completed their five cards, have the students stack the five cards and envelopes together and use nice ribbon to tie a bow around the stack to make it look like nice stationery or gift cards.
11. This stationery could be sold as a fundraiser to support the students' environmental camp experience, or be used at camp to write a letter home to parents, grandparents, friends, etc.

MAPPING MT. ST. HELENS INTERPRETIVE CENTER

- Focus** To be used a directional assistance for students answering the questions to "*There's A Lot Of Shaking Going On!*"
- Group Size** 1-30 students
- Time Required** 5-20 minutes
- Materials** Handout: *Mapped Guide to Mt. St. Helens Interpretive Center*
- Physical Setting** Mt. St. Helens Interpretive Center or classroom
- Process** This map may be used as a simple help for doing the questions associated with the Activity: "There's A Lot of Shaking Going On!" or you could write map study questions to go directly with the map.

Guide to Mt. St. Helens Interpretive Center



- TITLE OF PANELS AND EXHIBITS**
- 1 Formation of the Earth
 - 2 Birth of the Cascades
 - 3 Age of Man
 - 4 Volcanic Events
 - 5 The Earth Is All Its Cracked Up To Be
 - 6 Plates Subduct and Volcanoes Erupt
 - 7 The Earth's Alive With Volcanoes
 - 8 Native Americans
 - 9 Explorers and Settlers
 - 10 Prospectors and Miners
 - 11 Forest Rangers

MT. ST. HELENS FOLLOW-UP

Focus	To follow-up and apply the concepts that the students learned at camp Cispus about Mt. St. Helens and geology. <i>To be applied after the students have taken an all day field trip to Mt. St. Helens to learn more about its history and the eruption.</i>		
Group Size	Entire class		
Time Required	10-12 hour trip (<i>The trip begins and ends in Tacoma</i>)		
Materials	Sack lunch Paper	Snacks Pencils	Approx. \$3.50 for dinner Clipboards
	Field Study Journals, or other reference materials that were used with the students at camp in regards to Mt. St. Helens (students' camp book, journal, handouts, etc.).		
Physical Setting	Mount St. Helens Visitor Center (near Castle Rock, WA.), Yale Reservoir, Lahar, Lava Canyon, The Ape Caves, and The Trail of Two Forests.		
Process	<ol style="list-style-type: none">1. Teacher would need to reserve a bus for the entire trip.2. Students would meet at school on a Friday morning at 7:30 a.m. Depart school by 7:45 a.m.3. The bus would arrive at the Mount St. Helens Visitor Center at approximately 9:30-9:45 a.m. Students would unload the bus and have approximately 1/2 hour to wander around and observe the visitors center until the first movie or presentation would begin.4. Students would then go into the theater to watch the movies about the May 18th eruption in 1980 and the history of Mt. St. Helens. This takes approximately 45 minutes.5. After the presentation, the students will divide into cooperative groups of four and, with their questionnaire and map, go around to the different exhibits to try to find the questionnaire answers. (Refer to the following lessons in <u>The Cispus Experience Encore</u>: "There is a lot of Shaking Going On," and "Mapping Mt. St. Helen's Interpretive Center.") Give students approximately 30 minutes to work on questions.6. Have students load bus and head to the Yale Reservoir for a picnic lunch from approximately 11:45 -12:30 p.m. (This is a great place to let your students spread out and enjoy nature and the scenic views.7. After lunch, load bus and depart for the Lahar and Lava Canyon. After arriving have the students hike down to view the spectacular waterfalls that were created from ancient lava flows. At the end of the trail is a place where students can safely sit to observe the canyon. Have students sketch or write in their field		

study journal what they are observing and what questions they have about this area. (This is a great way to lead into mini-reports back at school.)

8. Load bus and depart for the Ape Caves. Give the students approximately 1 hour to go into the Ape Caves in small groups of 4-5 with an adult. After exploring the cave, discuss with the group what the experience was like. Then, it's back to the bus to write what they observed into their field study journals.

9. Last stop is The Trail of Two Forest. Before entering the trail have the same cooperative groups meet with their leader and discuss the following questions:

- a). Why do you think the trail is called The Trail of Two Forests?
- b). Do you really think there are two separate forests? Why or why not?
- c). We know that some lava did flow through this area, so what kinds of things do you think we will be observing?

10. After group discussions, start groups one at a time on the trail, leaving some time in between each group (approximately 1-2 minutes). Make sure that groups stay together and with their leader to observe things together. At the end of the trail, have all groups wait until the entire class is at the famous Lava Tube Crawl. At this time each group will share how accurate their answers were to the questions before entering the trail.

11. Allow students one at a time (with plenty of space in between them) to crawl through the underground lava tube. Do not allow any students to go through the crawl without wearing long pants, because it is very rough, hard, solid rock inside the crawl. (This activity is approximately 1 hour)

12. After The Trail of Two Forests, have students load the bus and on the way home write down in their field study journals what they observed at this site.

13. Depart for home at approximately 4:00 pm. (A good place to consider stopping for dinner is MacDonald's in Chehalis, because this gives the students an opportunity to have a break and enjoy eating at a restaurant with their classmates.)

Closure:

1. When students return to school on Monday, have them compile all of their notes and write a report about Mt. St. Helens including at least two sites that were visited.

2. One extension to this field trip is to give each group one disposable camera and have each member of the group responsible for taking 6 out of the 24 pictures. After the film is developed have the group put together a portfolio of their field trip. Each student would be responsible for mounting their pictures on construction paper and writing underneath of the picture the name of the place the picture was taken, name of the student, and 3-4 interesting facts about that place the picture was taken.

SEEING THE WEATHER SCENE

- Focus** To observe the results of weather along the trails and in open areas
- Group Size** Small group to entire class
- Time Required** 30 minutes to one hour or more
- Materials** *Optional:*
Paper and pencil for notes
Drawing paper and supplies for follow-up activity
- Physical Setting** Begin indoors, or outside in an open area:
Outdoor hiking trails
River and stream banks along trails
Meadow and low open areas
- Process**
1. Start with a discussion of visible results of weather: tree limbs blown down, whole trees uprooted by rain, streambanks showing signs of erosion, trees growing with branches to one side, etc.
 2. Take a "weather scenes" hike or incorporate seeing weather signs into a hike up to Angel Falls, Yellow Jacket Ponds, etc. Stop to discuss and speculate on the weather conditions that caused the "scene".
- Follow-up:**
At an area large enough to accommodate the group, like the benches along the Forest Loop Trail, where evidence of weather activity can be seen or speculated upon, do a split-paper drawing of before and afters. What was this area like before the flooding, and what is it like now? What was it like before and after heavy rains, windstorm, drought, or snow melt? How would a particular portion of the scene look before and after any of these events?

TALL TIMBER

Focus To use mathematics in determining the height of a tree.

Group Size Small group of 2-3 students

Time Required 30 minutes

Materials A meter or yard stick (optional, 100 foot tape measure)

Physical Setting School yard or other outdoors area with tall trees

Process Each group needs a stick that is the same length as the distance from the student's hand to their eye.

- Student 1:** Hold the stick at a point so that the length above your hand is equal to the distance to your eye.
- Then, hold the stick so that it makes a right angle (90 degrees) with your arm.
- Now, sight with your eye to line up the top of the stick with the top of the tree. You will need to backup or walk forward until the top of the stick is even with the top of the tree. Mark that spot on the ground with a stake or piece of paper.
- Students 2 and 3:** meanwhile, will pace off, counting their steps, for the length of a 100 foot tape. If you end up with about 66 steps your steps are 1.5 feet long

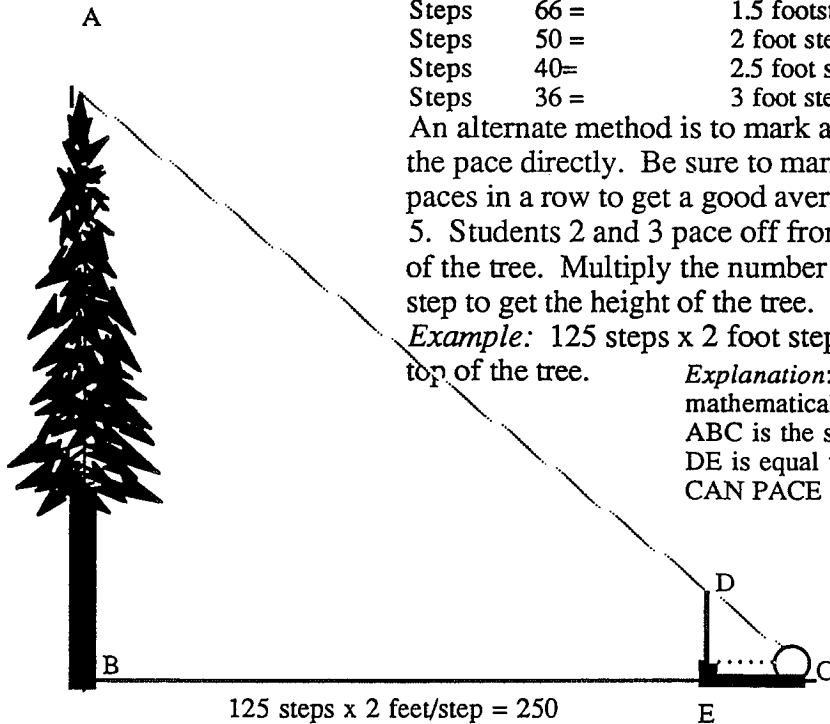
Steps	66 =	1.5 footsteps
Steps	50 =	2 foot steps
Steps	40 =	2.5 foot steps
Steps	36 =	3 foot steps.

An alternate method is to mark a student's paces and measure the pace directly. Be sure to mark and then measure several paces in a row to get a good average measure.

- Students 2 and 3 pace off from student 1's mark to the base of the tree. Multiply the number of steps times the length of the step to get the height of the tree.

Example: 125 steps x 2 foot step = 250 feet from the base to the top of the tree.

Explanation: The students are to use the mathematical concept of similar triangles. Triangle ABC is the same shape as DEC. This means that if DE is equal to EC, then AB is equal to BC. IF WE CAN PACE OFF BC, THEN WE ALSO KNOW



THERE'S A LOT OF SHAKING GOING ON!

- Focus** To give students questions to use during their visit to Mt. St. Helens Interpretive Center. These questions will help students get the most out of their time at the center and turn it into a learning experience, not just a sight-seeing trip.
- Group Size** Entire Classroom, or larger
- Time Required** 1-2 hours (*including the slide show or movie at Silver Lake*)
- Materials** Handout: *Mt. St. Helens Interpretive Center Questions*
- Physical Setting** Mt. St. Helens Intrepretive Center at Silver Lake. The lesson could be modified to fit another center such as Coldwater Ridge Interpretive Center.
- Process** Students arrive at the Mt. St. Helens Intrepretive Center. They work in groups of 4-5 students with an adult and circulate through the center. The questions are tied to panel displays or exhibits; all of which have titles. The students are to write answers to the questions. Not all students will finish all of the questions; so it is important that answers are shared within their classroom when they return to school.

The slide show is 10 minutes and the movie is less than 30 minutes in length. A school may elect to have the students view one or the other but not both. This affords students enough time to answer most of the questions.

NAME _____

Mt. St. Helens Interpretive Center Questions:

Instructions: Use the map of the Mt. St. Helens Interpretive Center to locate the panels that go with each question. Example: The answers to the questions in the section "FORMATION OF THE EARTH" will be found on Panel 1: "FORMATION OF THE EARTH"

1 . MT. ST. HELENS RELIEF MAP (*across from the information desk*):

1a. Find these locations on the Mt. St. Helens Relief Map:

- | | | |
|----------------|-------------------|-----------------|
| a) Spirit Lake | d) Ape Caves | g) Merrill Lake |
| b) Lahar | e) Coldwater Lake | h) Green River |
| c) Meta Lake | f) Windy Ridge | i) Toutle River |

2 . MT. ST. HELENS FACTS: (*on the outside wall of the theater*)

2a. Mt. St. Helens was _____ feet high before the eruption in 1980. It was _____ feet high after the eruption.

2b. How much of the mountain's elevation was lost from the explosion during the 1980 eruption?
Show your work here.

3. FORMATION OF THE EARTH

3a. Using this panel, what is the date span shown?

From _____ B.C. to _____ A.D. or B.C.

3b. What fact on the panel was most interesting to you?

4. AGES OF MAN

4a. How long ago did the first humans cross the Bering Straits to North America?

4b. On the AGES OF MAN panel which two NW volcanoes are shown erupting. What date did they erupt?

Name _____ Date _____

Name _____ Date _____

4c. Could there have been any people there to have seen the eruption?

NAME _____

5. THE EARTH IS ALL IT'S CRACK UP TO BE Exhibit

5a. In THE EARTH IS ALL IT'S CRACK UP TO BE Exhibit, when plates are in motion, what is happening?

Plates are _____

5b. From the information in this exhibit, how thick is the crust and how many miles is it from the crust to the center of the Earth?

Crust _____ miles
Crust to Core _____ miles

6. PLATES SUBDUCT AND VOLCANOES ERUPT

6 a. In this exhibit answer each of the 4 questions when you press each button.

Where do rocks melt?

What feeds the eruption?

Why do volcanoes erupt?

How do plates grow?

7. THE EARTH IS ALIVE WITH VOLCANOES exhibit

7a. Name 3 kinds of volcanoes.

7b. What is an active volcano?

7c. Along what do volcanoes form and erupt ?

NAME _____

8. NATIVE AMERICANS

8a. On this panel, find the names of three Indian groups which lived around Mt. St. Helens.

9. PROSPECTORS AND MINERS

9a. On this panel, what three (3) minerals were the prospectors and miners after?

9b. What minerals were mined from the Sweden Mine?

10. EXPLORERS AND SETTLERS

10a. On this panel, who named Mt. St. Helens?

10b. What year did the explorer get to the Northwest?

10c. From what country did he come?

10d. Mt. St. Helens was named after _____

a friend of _____.

NAME _____

11. FOREST RANGERS

- 11a. What year was the 1st Forest Service Guard Station built?
- 11b. What does CCC stand for?
- 11c. What year was the CCC started in the Mt. St. Helens area?
- 11d. What did the CCC do?

12. 1980 MT. ST. HELENS: DURING AND AFTER THE ERUPTION

- 12a. When was the 1st earthquake on Mt. St. Helens in 1980? Give the day and month.
- 12b. When was the 1st eruption in 1980? Give the day and month.
- 12c. When was the big eruption in 1980? Give the day and month.

13 SPIRIT LAKE VIEWPOINT PHOTOS

- 13a. Compare the 2 Spirit Lake Viewpoint photos that are on the side of the underground volcano exhibit. What is the most amazing thing that you see?

14. TREE RING DATES: (*inside the Underground Volcano exhibit*)

- 14a. There are 4 pictures of tree rings from trees from Lava beds, Smith Creek, Bear Meadow, and Spirit Lake areas. What do the narrow rings in the early 1480's tell us about growing conditions then?

- 14b. What does 14a suggest happened in this area in 1480's?

NAME _____

15. ASHFALL, MAY 18, 1980

15a. How many cubic kilometers of ejecta came out of Mount Mazama in 4850 B.C.?

15b. How many cubic kilometers of ejecta came out of Mt. St. Helens on May 18, 1980?

15c. What do you think the long term benefits to the N.W. from the Mt. St. Helens ashfall are?

16. SEISMOGRAPH

16a. Which seismograph is hooked up to the floor? Try stamping your foot, (NOT TOO HARD) on the floor.

Left one

Right one

16b. Which seismograph is hooked up to Mt. St. Helens?

Left one

Right one

16c. Are there any recorded earthquakes on the seismograph today? Look at the Mt. St. Helens seismograph.

17. OTHER INTERESTING THINGS YOU FOUND AT MT. ST. HELENS INTERPRETIVE CENTER?

TIE DYE CAMP T-SHIRTS

- Focus** To tie dye a T-shirt to wear at camp.
- Group Size** 10 students with 2 adults/teachers
- Time Required** 1 hour (*plus set up, clean up, and next day rinsing*)
- Materials**
- | | | | |
|------------------------------|----------------------|----------|---------------|
| Rubber bands | String | Scissors | Rubber gloves |
| Old towels | Buckets | Salt | Fabric dyes |
| Plastic bags | | | |
| Fine tipped permanent marker | Needle-less syringes | | |
- Per student:*
Home washing directions
One prewashed T-shirt
- Physical Setting** Outdoors or inside, with the floor or ground covered with a large tarp. Two work stations - tying, and dyeing.
- Process**
- Preparation:**
1. Prepare 2 work stations on tarp: one for soaking and folding clean shirts, and one with dye buckets, rubber gloves, syringes, and old towels for dyeing.
 2. Fill one bucket with 1 or 2 gallons of warm water and add 1/4 cup of salt.
 3. Prepare dyes in buckets according to package directions (RIT liquid works well). 4 buckets with 1/2 gallon of water each will dye 10-15 shirts. Make more if you plan on running more than one group through the activity.
 4. Lay out towels around each dye bucket with one or two syringes and some rubber gloves.
- Folding and tying the shirts:**
1. Write student's name in shirt with permanent marker.
 2. Students dip shirts in salt water and wring out. They then find a place on the tarp to spread out their shirt and begin to fold or twist. It works well for students to work with a partner on one shirt at a time.
 3. One popular method is to make a 2 in. fold, back and forth, accordion/fan style, on a diagonal across the shirt. Begin by folding a lower corner over about 2 in. to make a little triangle, then pick up the folded corner and lay it further up the shirt to create the diagonal accordion effect. Do not flip it over. Continue to pick up the ever increasing folded section of the shirt (this may require two people), and lay it on the next section up the shirt, without flipping it over. When it is finished, the student has

a long, skinny folded shirt. Tie pieces of string tightly at 2-5 in. intervals along the shirt.

4. Another method is to pinch and pull up the center of the shirt (front and back stuck together or just the front) and begin to tightly twist the shirt in one direction. Stop and put a rubber band or piece of string tightly around the twist every few inches until you reach the end of the shirt. You may vary this method by pinching and pulling from more than one place on the shirt, twisting and tying for a while in one place, then moving to another.

Dyeing the shirts:

1. Students put on rubber gloves to work in dye area and lay shirt on a towel by the dye bucket.
2. Students use the syringe to gently squirt dye in desired places on the shirt. Avoid overlapping the colors too much as some dyes turn a muddy color when mixed together.
3. When finished, gently squeeze shirt as it lays on the towel. Excess dye will soak into towel.
4. Place the shirt in a plastic bag labeled with the student's name on masking tape and let sit overnight.

Next day rinsing:

1. The next day, students or adults rinse each shirt under cool water until water runs clear.
2. Continue to follow the included care instructions for the shirt in class, or put the shirt back in the plastic bag and send the following care instructions home with students:

CARE OF YOUR TIE-DYE SHIRT

This shirt has been dyed with fabric dye. A check next to each item number below indicates a step in the shirt-making process that has already been done. The steps not marked need to be completed at home. Enjoy your tie-dyed shirt!

1. Twist, fold or knot wet shirt into pattern desired, apply dye.
2. Place shirt in plastic bag for 24 hours, as is.
3. Rinse shirt under cool tap water, until water runs clear.
4. Soak shirt in white vinegar and water solution (1 cup vinegar to 1/2 gallon water) for at least 2 hours.
5. Rinse again and unfold, or unknot, shirt.
6. Machine wash with soap in cold water by itself and dry in dryer on high heat by itself (first time only).

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WHEN I AM 21

- Focus** To observe evidence of plant and animal life on Windy Ridge, the effect of animals and plants on soil and water and predict the changes that can be expected over the next 10-year period.
- Group Size** Small group to entire class
- Time Required** 30-60 minutes for the climb and observations and an additional 10-30 minutes for the prediction phase
- Materials** Handout: *Windy Ridge Observations*
- Physical Setting** Mt. St. Helens Volcanic Monument and perhaps a classroom at a later date.
- Process**
1. Have students climb the 300+ steps to the top of Windy Ridge.
 2. Make observations and record them on the attached sheet.
 3. Then, or later in a classroom, have them consider the changes that they perceived and predict what they think will happen within the next 10 years.

Windy Ridge Observation

WINDY RIDGE HABITAT: You have just climbed up over 300 steps from the parking lot to the top of Windy Ridge. As you catch your breath look around at the ground beneath your feet, Spirit Lake, down the sides of Windy Ridge, and across the volcanic plains to the crater. In the grid below fill in any observations that you make.

What plants, animals, soil and water do you see?

PLANTS:

DEAD, list them	LIVE, list them	DO you think that they are survivors of the 1980 blast? Why do you think that?

ANIMALS:

Dead, list them	Live, List them	Do you think that they are survivors of the 1980 blast? Why do you think that?

SOIL:

WHAT do you observe about the soil where you are standing? About all the soil visible from where you are standing?

WATER:

HOW much, or any, is located where you are? Where is water visible? Other

Now that you have gathered your observations together and have an idea what plants, animals, soil and water are here; keeping in mind that the eruption that created what you see happened May 18, 1980, and judging from what you see and remembering that the eruption wiped this ridge clean; what do you think this area will look like when you are 21 years old? Why do you think that these changes will take place?

Changes:

Why:

WILD WINDS AND RAINY RHYMES

- Focus** To observe current weather conditions and then make weather predictions using the Beaufort (BO fert) Scale and folk wisdom.
- Group Size** Small group to entire class
- Time Required** 30 minutes to 1 hour
- Materials** Compasses Weather rhymes
Writing materials (*for individuals or group*)
Handouts: ***Beaufort Scale***
Weather Rhymes
- Physical Setting** Outside in an open area (*weather permitting*)
- Process** **GROUP SHARING**
Observations may be recorded and categorized later, or they may be discussed.
1. Describing today's weather, what do you see, hear, and feel? (feel the soft breeze/sharp wind on my face, see the wispy/billowing/white/dark clouds moving, hear the wind singing/whistling/roaring in trees)
 2. Expand on ideas and brainstorm to create vivid descriptions.
 3. STUDY BEAUFORT'S SCALE, label today's wind and discuss how it feels/felt to experience the wind in a variety of circumstances--weather during storms, in the outdoors when hiking, while boating or canoeing etc.
READ, RECITE, AND 'RITE weather rhymes.
WRITE a weather prediction rhyme to share at dinner.
- FOLLOW-UP**
1. Go to the weather station and read the instruments. Using the lesson "Weather Watching by the Chart", make a second prediction.

The Beaufort Scale

Scale Number	Name of Wind	MPH	What the Wind Does
0	Calm	0-1	Smoke goes straight up
1	Light air	1-3	Smoke is slightly bent
2	Light Breeze	4-7	Leaves rustle; wind vane moves
3	Gentle Breeze	8-12	Leaves and twigs in constant motion
4	Moderate Breeze	13-18	Raises dust and paper; moves small branches
5	Fresh Breeze	19-24	Small trees begin to sway
6	Strong Breeze	25-31	Large branches in motion
7	Moderate Gale	32-38	Whole trees sway; walking is difficult
8	Fresh Gale	39-46	Breaks twigs off trees
9	Strong Gale	47-54	Damages chimneys and roofs
10	Whole Gale	55-63	Trees uprooted (rare inland)
11	Storm	64-75	Widespread damage (very rare inland)
12	Hurricane	75 Above	Most destructive of all winds

RHYMES from WEATHER WISDOM
by Albert Lee, Doubleday and Company

Evening red, morning gray
Sets the traveler on his way;
Evening gray and morning red,
Brings down rain upon his head.

Red sky in the morning,
Sailors take warning;
Red sky at night,
Sailors delight.

Evening red and weather fine,
Morning red, of rain's a sign.

If the sun goes pale to bed,
T'll rain tomorrow, it is said.

If the sky beyond the clouds is blue,
Be glad, there is a picnic for you.

When clouds appear like rocks and towers
The earth's refreshed with frequent showers.

If wooly fleeces spread the heavenly way,
Be sure no rain disturbs the summer's day

A rainbow in the morning
Is the shepherd's warning;
A rainbow at night
Is the shepherd's delight.

Rainbow in the eastern sky,
The morrow will be dry.
Rainbow in the west that gleams.
Rain falls in streams.

Rainbow to the windward,
Foul fairs the day.
Rainbow to the leeward,
Damp runs away.

When the mist creeps up the hill
Fisher, out and try your skill;
When mist begins to nod,
Fisher then put up your rod.

A summer fog for fair,
A winter fog for rain;
A fact most everywhere,
In valley and on plain.

When the forest murmurs and the mountain roars,
Then close your windows and shut your doors.

When the wind is from the east,
Neither good for man nor beast.

When the dew is on the grass,
Rain will never come to pass.
When the grass is dry at morning light,
Look for rain before the night.

If the rains come before the wind,
Lower your topsails and take them in;
If the wind comes before the rain,
Lower your topsails and hoist them again.

Sound traveling far and wide
A stormy day will betide.

A wind from the south,
Has rain in her mouth.

If wind rises at night,
It will fall at daylight.

Winds that swing against the sun,
And winds that bring the rain are one.
Winds that swing round with the sun,
Keep the rainstorms on the run.

Wind in the west,
Suits everyone best.

The winds of the daytime wrestle and fight
Longer and stronger than those of the night.

A southerly wind with showers of rain,
Will bring the wind from the west again.

WORDS OF A FEATHER

- Focus** To create a story or poem from a student generated sensory or topical list.
- Group Size** Individual student to entire class
- Time Required** 30 minutes
- Materials** paper and pencil
- Physical Setting** Classroom, outdoor school or school yard
- Process**
1. Students generate a list of 10 or more words on a topic(s) designated by the teacher. Example: topic(s) scary words, noise words, plant words.
 1. Students then write a story or a poem using 10 of their words.
- NOTE:** Students soon start seeing words which go together.
Example: noise words = bang, clang, rang, (rhyming words)
crash, screech, roar (traffic noises)