CAVOC 7th grade Fall Math Curriculum

(Cedric A. Vig Outdoor Classroom)

Suggested Schedule- Fall

Time/Period	ROPES	MATH	SCIENCE	HEALTH	ENGLISH	FACE
8:30 - 9:30	History- Guest Speaker					
9:30 - 10:05	1	2	3	4	5	6
10:10 - 10:45	6	1	2	3	4	5
10:50- 11:00	Snack Break	Snack Break	Snack Break	Snack Break	Snack Break	Snack Break
11:05 - 11:40	5	6	1	2	3	4
11:45 - 12:20	4	5	6	1	2	3
12:20 -12:50	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
12:50- 1:25	3	4	5	6	1	2
1:30 - 2:05	2	3	4	5	6	1
2:05 - 2:15	Clean / Up	Clean / Up	Clean / Up	Clean / Up	Clean / Up	Clean / Up

How Big is Your Tree?

(~ 35 minutes)

Objective for Unit

Students are to create right triangle clinometers to check tree height.
Students check work with real clinometers using Pythagorean theorem.
Students will become familiar with volume formulas and their applications.
Students will learn to work within a cooperative group.
Students will develop an awareness of forestry applications.

DPI Standards for Environmental Education

C.8.1, D.8.1, D.8.2, D.8.3, D.8.4, E.8.1, E.8.4, F.8.2- Mathematics Standards
B.8.3, B.8.4, C.8.1, C.8.4, C.8.5, C.8.6, C.8.7- Science Standards

Materials

Sturdy Right Triangles
Straws
String
Pencils
Calculators
Masking Tape
Clipboards
Worksheets
Clinometers
Small rocks to use as weights on the clinometers

Desired Location

Shelter

Resource

Project Learning Tree

Background Information

Take a walk through your neighborhood to look closely at the trees. You may have notice an assortment of sizes, shapes, colors, and textures. Some tree species such as firs tend to be tall and straight with relatively short branches. Other species such as Japanese maples tend to be shorter with long broad branches.

An experienced forester or arborist may be able to judge the age of a tree simply by looking at its diameter and location. The growth rate of trees depends on the species and the environmental conditions.

The world's most massive (not necessarily tallest) tree is the giant Sequoia (*Sequoiadendron giganteum*), which lives in scattered groves in Central California. This species can grow more than 250 ft. (76 m) tall and more than 20 ft. (6 m) in diameter. It is also among the world's oldest trees: some Sequoias are more than 3,000 years old!

Foresters measure trees to plan harvesting and to make other forest management decisions. To determine the approximate timber yield of a stand of trees, foresters do a "timber cruise" in which they calculate the volume of lumber in a given area, examine the health of a forest, and survey the species found there. This information is used to determine how the forest should be cared for and what the economic feasibility of a harvest should be. Volume of wood can be measured in board feet (a piece of lumber 12 inches square <77sq cm> and 1 inch <2.5 cm> thick), cords (a stack of logs 4 ft. x 4ft. x 8ft. or 1.2 m x 1.2 m x 2.4 m), cubic feet or cubic meters. One giant Sequoia could yield more than 500,000 board feet enough to make 33 houses!

Activity

1. Teacher instructs students to break into groups of two or three.
2. Pass out materials.
3. Teacher and students work together to find the volume of "Tree # 1."
4. Teacher instructs students to walk away 33 huge paces from designated tree (about 100 feet).
5. Teacher demonstrates how to "aim" the Clinometers.
6. Teacher instructs students to do the same.
7. All participants check the angle and conversion.
    a. We all agree on the angle/foot conversion.
    b. We record this height next to "Tree # 1."

8. Teacher demonstrates how to measure the circumference of "Tree # 1."
    a. Teacher asks for student volunteer to do the same.
    b. The distance is recorded and converted from inches to feet by dividing that amount by 12.

9. The circumference is recorded in the formula next to "Tree # 1:"

$C = \pi \bullet d$

$d/2 = r$

$V = \pi \bullet r^2 \bullet h$

$C/\pi = d$

    a. Students find the diameter.
    b. Students take the diameter and divide by 2 (center formula).
    c. Students take the radius and apply it to the volume formula (third formula).
    d. Label the answer in feet cubed

10. Once everyone is done – review the procedure.
11. Release students to find the volume of the other three trees as working groups.
12. Discuss results at the end.
13. Teacher questions students as to whether there actually is that many cubic feet in each tree.
14. Teacher makes sure to mention, if students do not point it out, that a tree is actually an elongated cone.
15. Teacher asks students if the whole tree is usable.