Age of Trees

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Agency: St. Anne Wetland Education Outreach Project

Grade levels: 4th, 5th, 6th , 7th grade

Science Topic: Secondary Succession time line derived though mathematical data.

Core Content: SC-04-4.7.1, SC-05-3.4.1, MA-04-4.1.3, MA-05-4.1.3, MA-04-3.1.2, MA-05-3.1.2 MA-06-1.1.1 MA-07-1.1.1 MA-07-1.2.1 MA-06-1.2.1

Summary: Students measure the circumference and using a formula calculate radius. This information is then used to determine a growth rate and then to determine the age of the tree.

Objective: To determine how long ago the final stage of Secondary Succession began, and how old the trees are in each ecosystem leading to an idea of how long this has been a stable ecosystem.

Materials: Measuring tape (or a long piece of string and yard stick), scratch paper, writing utensil, calculator.
Time: 1 hour

Procedure:

1. Students go to either to station 2 (Sycamore and white oak), station 3 (pin oaks) or station 5 (beach trees).
2. Each student measures the circumference of the trunk of the tree at 4.5 ft., records it, and then records the type of tree. This is standard chest height for measuring a tree.
3. The circumference is used to determine the radius of the tree using the following formula:

   $(C/\pi)/2=r$ (this is derived from this equation $C = \pi * 2r$, students can just be given this and they can figure out how to determine the radius) All math work must also be written down.

   Steps to take with the calculator:
   1- Divide circumference by pi or by 3.14 if pi is not available on calculator
   2- Optional-Take this result and record it as the diameter -
   3- Divide diameter by 2 to calculate radius
4. Record the radius of the tree.

Because there are so many factors and variables in how fast a tree may grow these will be only estimations placed between 5 year intervals. Trees tend to increase their radius by any where from .001 to .4 inches per year depending on many factors (rainfall, soil

type, elevation, species, etc.). For the purpose of this lab an average growth rate of .2 inches per year will be applied to all trees measured.

Steps to take with calculator:

1-divide radius by .2 in./year and the result is the estimated age of the tree measure in years.

2-record estimation of age

5. Students compare notes on trees they measured and answer the following questions.

Does one group of trees seam older than another?

What is average age of grown tree in the wetland in each ecosystem (station 3, station 5…)?

How long ago did the wetland become stable enough for the final stage of Secondary Succession?

6. Have an open discussion about factors that affect rate of tree growth, why this is an estimation, and how an exact number could be achieved.

Assessment Techniques: Check math work and how correct the charts are at conveying the data achieved.

Web references:
https://kb.osu.edu/dspace/bitstream/1811/4321/1/V56N01_017.pdf

http://www.nativetreesociety.org/index.html

http://www.scienceclarified.com/Sp-Th/Succession.html

Name:

Show work.

Circumference measured at standard chest height of 4.5 ft.	Radius (r) (C/Π)/2=r	r/ .2 cm/yr.=age

Find the average age of the trees at each station by collecting in formation for other students. Add up all the ages of the trees then divide by the number of trees mearsured. Show work.

Station 2:

Station 3:

Station 5:

What is the average age of the tress in the wetland?

CIRCUMFERENCE
Worksheet

Draw five circles of various sizes. Larger ones work better than smaller ones. Measure the circumference, diameter, and radius of each in centimeters. Then complete the chart below.

Circumference	Diameter	Radius	Circumference/Diameter

1. How does the diameter relate to the radius?

2. Is the circumference/diameter always close to the same?

3. How does the circumference relate to the diameter?

4. How does the circumference relate to the radius?

5. Can you complete the following?

CIRCUMFERENCE	DIAMETER	RADIUS	CIRCUMFERENCE/DIAMETER
_____	5 cm.	_____	_____
25 cm.	_____	_____	_____
_____	_____	8 cm.	_____

ANSWERS

1. The diameter is twice the radius.

2. yes, about 3.14

3. C = about 3.14 * d

4. C = about 3.14* 2 * r

5.

C	d	r	C/d
15.71	5 cm	2 1/2 cm.	3.14 or π
25 cm	7.96	3.99	π
50.265 cm	16 cm	8 cm	π