Toothpicks and Timber

Subject(s): Mathematics, Economics, Science

Grade Level: 6th-9th

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Time Required: Four to five class periods.

Materials Needed: Salt dough, colored toothpicks, watercolor paint and brushes, small styrofoam meat trays for model bases, protractors (one per student), string, plastic non-bending straws (one per student), penny or other weight for clinometer (one per student), calculators (one per student), scenario cards, tree cookies, Videos (available from the Idaho Forest Products Commission): *Circle of Life*, *Forestry Best Management Practices: A Clear Reflection* and *Amazing Machines of the Forest Products Industry*.

Lesson Objectives:
Students will (1) calculate the board feet of a given parcel of trees, (2) calculate the total return on the sale of said board feet, (3) calculate the difference between the sale of the timber and the costs for logging it, (4) determine the environmental impact of the logging operation and make it minimal, (5) determine the potential for future investments for the unit of land, (6) analyze the best management of the property to insure future investments, (7) construct a 3-dimensional model of before and after the logging operation, (8) gain an understanding of the many environmental factors involved in the logging of any type of lumber, (9) research regulations regarding the logging and maintaining of timber land.

Procedure:
This is a capstone activity to a two-week unit. Leading up to this activity we will:

-Identify products from trees
-Create a clinometer and measure height of trees
-Study diameter and age of trees.
-Learn to calculate number of board feet.
-Learn about market price of different woods.
-Study methods of logging.
-Distinguish renewable and non-renewable resources
-Define sustainability.
-Study soils, erosion, and Best Management Practices.

<u>Capstone activity:</u>
Give a sample scenario to the class to figure out how to log five acres. Provide landscape information, number, size and type of trees, and water information. Hand out charts. Problem-solve as a class, then as a homework assignment, have students figure out a similar scenario.

Discuss solutions to the homework assignment scenario, emphasizing that there may be more than one right answer. Have the class decide which may be the better way of doing things, and justify their opinions. In teams of two, have each team choose a scenario to work out. Teams will work on the paper and pencil aspects of their project and make a drawing of how their land will look before and after logging takes Coeur d'Alene.

Students will mix their salt dough and form it on a styrofoam meat tray. They should insert colored toothpicks to represent trees (a different color for each species). Toothpicks may be broken to represent shorter trees. Half of the model should represent the land before logging, and half after logging. Students will paint their models, showing water and other land forms, and applying other details as they desire.

Students will present and evaluate solutions to scenarios (two class periods).

Student Pages

Scenario #1

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: Small stream. No fish.
SLOPE: Slight
TREE TYPE #1: Douglas-fir. Quantity: 350. Average diameter: 12 inches. Average height: 40 feet.
SOIL: Gravel
TREE TYPE #2: Ponderosa pine. Quantity: 500. Average diameter: 20 inches. Average height: 100 feet.
ROAD: There is a dirt road bordering your property

Scenario #2

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: Land borders a lake.
SLOPE: Steep grade.
TREE TYPE #1: Ponderosa pine. Quantity: 450. Average diameter: 24 inches. Average height: 150 feet.
SOIL: Gravel
TREE TYPE #2: Douglas-fir. Quantity: 200. Average diameter: 10 inches. Average height: 40 feet.
ROAD: There is a dirt road bordering your property.

Scenario #3

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: Stream with fish.
SLOPE: Slight
TREE TYPE #1: Lodgepole pine. Quantity: 600. Average diameter: 10 inches. Average height: 80 feet.
SOIL: gravel
TREE TYPE #2: Western Larch. Quantity: 150. Average diameter: 8 inches. Average height: 25 feet.
ROAD: There is a dirt road bordering your property.

Scenario #4

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: River
SLOPE: Gradual
TREE TYPE #1: Western Larch Quantity: 500. Average diameter: 15 inches. Average height: 100 feet.
SOIL: Rich
TREE TYPE #2: Spruce. Quantity: 200. Average diameter: 12 inches. Average height: 40 feet.
ROAD: There is a dirt road bordering your property.

Scenario #5

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: Stream with fish.
SLOPE: Gradual
TREE TYPE #1: Ponderosa pine. Quantity: 400. Average diameter: 25 inches. Average height: 120 feet.
SOIL: Clay
TREE TYPE #2: Spruce. Quantity: 200. Average diameter: 15 inches. Average height: 45 feet.
ROAD: There is a dirt road bordering your property.

Scenario #6

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER: Stream with fish.
SLOPE: Steep
TREE TYPE #1: Western Larch. Quantity: 200. Average diameter: 15 inches. Average height: 90 feet.
SOIL: Gravel
TREE TYPE #2: Douglas-fir. Quantity: 550. Average diameter: 25 inches. Average height: 100 feet.
ROAD: There is a dirt road bordering your property.

Scenario #

Congratulations! You have just inherited 10 acres of forested land. In order to pay the estate taxes and avoid selling your property, you will need to log it. It is your job to log the property in such a manner that you will be able to log it again in approximately ten years. This means you will have to log selectively. The following is the information you have regarding your property. With this information, you should be able to answer all of the questions for this project. Good luck, and remember--timber is a renewable resource, but only if we manage it correctly!

AREA: 10 acres
WATER:
SLOPE:
TREE TYPE #1:_____. Quantity: _____. Average diameter: _____ inches. Average height: _____ feet.
SOIL:
TREE TYPE #2: _____. Quantity: _____. Average diameter: _____ inches. Average height: _____ feet.
ROAD: There is a dirt road bordering your property.