



OVERVIEW

Students play a fast-pace word classification game that helps them gain an appreciation for the variety of ways people use and benefit from trees.

BACKGROUND

Products from Wood Chips, Shavings, Sawdust, Bark and Wood Pulp

Particleboard

Particleboard is made of wood chips, shavings and/or sawdust that is reduced to individual fibers, mixed with special glue and formed into a mat. These boards can be made into hundreds of different products. For example, particleboard is used in place of solid wood for the cores in furniture and cabinetry, and then overlaid with veneer.

There are three different types of particleboard: hardboard, medium-density fiberboard and insulation board. Hardboard is also made from cartons and newspapers. Hardboard is used for furniture, wall paneling, doors, siding, signs and roofing. Molded hardboard is used for truck doors, roof panels, car rear-window decks and dashboards. Medium-density fiberboard is used for panels, doors and table tops. It is used in place of solid wood in furniture, cabinetry and wall paneling. Insulation board is used for acoustical ceiling tile.

Sawdust

In addition to being used to make particleboard, sawdust is also used as fuel to heat sawmills and heat lumber-drying kilns. Sawdust can also be used for animal bedding and as a fuel for various manufacturing processes including pellets for wood stoves.

Bark

Bark is also used for fuel at sawmills. More recently bark is in high demand for soil mulch in gardens. Bark is also a source for resins, waxes, plywood adhesives and lacquers.

Paper

Paper mills manufacture a variety of different materials including newsprint, magazine and book stock, writing paper, computer and copy paper, gift wrap, wax paper and milk carton stock. Some

building materials such as roofing felt and fiberboard are also made by the pulping process.

Specialty Pulp Products

In the 1800s, methods were developed to chemically separate wood cellulose from lignin, then to regenerate the cellulose back to its original composition for use as either a fiber (rayon) or a plastic (cellophane). Derivatives of cellulose were also developed. The most important compounds were cellulose nitrate and cellulose acetate.

Rayon is an artificial textile material used to manufacture clothing, drapes and rugs. High-strength rayon is made into tire cord for use in automobile tires, industrial belts and hoses.

Cellulose acetate is widely used in the automobile industry because of its strength, toughness, wear-resistance, transparency and ease of mobility. Its high resistance to impact also makes it a preferred material for protective goggles, football helmets and plastic tool handles and toys.

Chemical cellulose is also used in photographic film, scotch tape, solvents, paints, lacquers, printing inks, cement, diapers, cigarette filters, insulation, explosives, rocket propellants and fireworks.

Other products that use a derivative of cellulose include a variety of pharmaceuticals such as, active ingredients used in asthma medications and cough remedies, some cosmetics such as fingernail polish and some personal hygiene products like deodorants, shampoo and toothpaste. Cellulose is what makes shampoo thick and cellulose gum is what makes toothpaste a paste.

Even some food products contain cellulose. For example, cellulose powder keeps grated parmesan cheese from getting lumpy and cellulose is used in ice cream and salad dressings to make them thick. Torula yeast is a high protein product made as a byproduct of the pa-

GRADE LEVELS:

Grades 6–8

OBJECTIVES: Students will work in groups to (1) identify at least ten characteristics of trees, (2) categorize at least five sets of characteristics or uses of trees, (3) play a vocabulary-development game and (4) describe at least three benefits people receive from trees.

PENNSYLVANIA PROPOSED ENVIRONMENT & ECOLOGY STANDARDS ADDRESSED:

4.2.7

- A. Know that raw materials come from natural resources.
- B. Examine the renewability of the resources.
- D. Describe the role of recycling and waste management.

4.7.7

- A. Describe diversity of plants and animals in ecosystems.

4.8.7

- A. Describe how the development of civilization relates to the environment.

4.2.10

- A. Explain that renewable and nonrenewable resources supply energy and materials.
- B. Evaluate factors affecting availability of natural resources.
- D. Explain different management alternatives involved in recycling and solid waste management.

4.7.10

- A. Explain the significance of diversity in ecosystems.

4.8.10

- A. Analyze how society's needs relate to the sustainability of natural resources.

ESTIMATED DURATION: Session One – 45 minutes to one hour. Session Two – 30 to 45 minutes.

MATERIALS NEEDED: Stopwatch or watch with second hand, dictionaries, writing materials, photocopies of Student Page games cards.

CD-ROM: Use the section on "Wood you Buy that?"

permaking process. It is used in baby food, cereals and as feed supplement for cattle, fish and chickens.

PROCEDURE

Session One

1. Tell students they will have the opportunity to think about trees in new ways by playing the word game. Explain that the game involves team members giving each other short clues so teammates can guess words or phrases related to a given category on a game card. Demonstrate how to give clues. Choose a student to join you in modeling the giving and receiving of clues. Give an example such as, "The category for the card is "Why Trees are Important." Explain that the card shows eight words or phrases, each of which is a reason why trees are important. Say that two of a team's four members give clues and the other two team members receive clues in order to guess a word. Demonstrate by asking the chosen student to see if he/she can guess a way in which trees are important from the following clues: "summer (pause for a response)", "cool (pause for a response)", "leaves." By now the student has probably correctly identified "shade" as the word telling "Why Trees Are Important." Try another example giving the card category as "Wood Product and Byproducts." Choose a word (sawdust, for example) and demonstrate by giving other kinds of short clues: "Starts with 's', Two syllables, First part rhymes with paw, What you get when you saw wood." (sawdust) Explain that teammates can collaborate on clues to elicit the words on the category cards, always keeping in mind the category.
2. To play the game, divide the class into teams of even numbers of student players (four is ideal). On each team, half the players face the other half across a table or playing space. Teams divide each set of cards evenly between the two sides. One side of the team starts by holding one of the cards and giving clues (clue-giving players). The other side receives the clues and tries to guess the words (word-guessing players). Remind students to collaborate in clue-giving and in figuring out the words.
3. Have each team prepare a scoresheet and appoint a scorekeeper. The team giving the clues keeps score of the correct responses by the team receiving the clues. Students can use tally marks.
4. Explain to students that clue-giving players tell the category and give short clues for the first word on the card to the word-guessing players. When that word is correctly guessed, a clue-giving player checks the word off and the Scorekeeper puts a tally mark on the teams' score sheet. The team goes on to the next word. Play continues until all words have been guessed and checked off or until time is called. If a word is not guessed in approximately 30 seconds or sooner, players may say "pass," going on to another word and coming back to the passed word if time permits.
5. The Gamekeeper (you or an appointed student) will start the game by saying "GO." This person is also the timekeeper, calling out "STOP" at the end of the time limit set for each card and starting the game again with "GO" after teams select a new card. (Each team may have its own timekeeper if this works better for your class.)
6. Begin the game. When the timekeeper calls "STOP," teams turn the category cards face down.
7. Team members switch roles. The opposite side draws a card and gives the short clues. When the timekeeper calls "GO," play starts for the next category card. Again the card is turned face down when words have all been guessed and checked off or when time is called. Teams continue to switch roles until all cards have been played to the designated time limit.
8. At the end of the game, each team totals their tally marks to determine a winner. Have teams that have not completed all the words on their cards do so before pulling the class together.
9. To review concepts learned with the whole class, volunteers from the teams read the categories one at a time from the cards. As each category is named, the class calls out the words they recall from the game and adds new words of their own that fit

the category. Some of the stronger teams will have quick answers.

Summarize by asking:

- Which categories were the easiest? The hardest? The most fun?
- What are some other categories we could use to describe the characteristics and uses of trees?
- What is the most interesting thing you learned about trees and wood?
- What are at least five ways you benefit from and/or are dependent upon trees?
- Why is it important to grow trees?
- What kinds of careers depend on products from trees?
- In what new ways do you now think about trees?
- What do you appreciate or enjoy about trees?
- How can learning about trees help you in the future?

Session Two

Challenge students. Everyone has a tree story. What is yours? Invite them to write about a favorite tree and tell why it is special. In their stories, they are to use at least five words from the game. Encourage students to illustrate their trees.

EXTENSION

1. Reverse the game and play “What’s the Category?” Players are not told the category on the card. Clue-givers give one-word clues about the words on the card. The other half of the team tries to identify the category. For example, clue-givers might say, “Apples, nuts, oranges.” Receiving players try to answer, “Foods from Trees.”
2. Instead of students giving the clues verbally, have them pantomime or “charade” the clues.
3. Have students develop their own game cards about other tree categories such as specific trees, favorite trees and more. Create games about non-tree topics too!
4. Instruct students to investigate whether trees are a renewable or non-renewable natural resource. (They are renewable.) Ask them to list ways in which we use trees. Discuss how each is or is not a responsible use for this renewable resource. What would you need to consider for each use of trees?

5. Have students search reference books or interview local nursery or garden store workers to investigate how trees are propagated and grown. Invite a nursery person and/or tree farmer to explain how and why trees are raised.
6. Students can look into by-products of trees. For example, investigate how paint, rubber, gum and glue come from trees.
7. Put chewing gum to use in a creative, new way with gum sculptures! Explain that such sculpture started in the lands of the Mayans in the Yucatan and Guatemala. Here people made gums from chicle, a latex liquid that comes from sapodilla trees. The latex sap is boiled and kneaded to remove excess liquid and then vegetable colors and spices are added to this whitish substance to make colors and flavors. The gum is packaged and shipped all over the world. Start the sculptures by inviting the students to chew gum of different colors. When the gum is soft and pliable, have them work on wax paper to pull, roll, weave or shape the gum into miniature sculptures. The classic toy miniatures in Mexico and Central America are children riding atop a crocodile. Tiny burros and figures are popular, too. Caution students to handle only their own gum and to wash their hands when they are finished sculpting. Students will enjoy sharing knowledge about tree products and by-products when they take their sculptures home.

ASSESSMENT

1. Observe student’s participation in the game and responses to Session One, Procedure Nine.
2. Have students use Extension 1 to assess their categorizing skills.
3. Make mobiles! Have each student select a tree category from the game or create a new category. The mobile is constructed to illustrate the items in a category (things made from wood, food from trees and so on).
4. Ask students to write about or express in any creative form why trees are important to them.
5. Give students a set of at least 12 words pertaining to trees. Have them name three groups or categories about trees under which the words

could be listed. Have them list the words that are a part of each group or category. Words may be listed more than once.

Adapted from Project Food, Land and People, 1998, "Tree-mendous," p. 151.