Triangle Game

Student Objective
The student
  • will be able to explain in his or her own words the meaning of fundamental term and concepts of solar energy

Materials
• Triangle game board
• instructions
• playing pieces
• tape

Key Words:
(Key words depend on game vocabulary used. Below are the key words used in this solar energy version)
  alternative energy source
  alternative fuel vehicle
  conduction
  convection
  desalination
  electromagnetic spectrum
  energy system
  energy efficient
  evaporation
  hydrogen
  insulation
  kilowatt
  photon
  photovoltaic
  radiation
  renewable energy
  solar collector
  solar oven
  solar spectrum
  solar still
  solar thermal
  water cycle

Time:
1 hour

Internet Sites
http://www.wordcentral.com/
  Merriam Webster, Word Central student dictionary

Procedure (prior to class)
1. Cut out game pieces
2. Print out Key Words/Definitions page
3. Game board may be enlarged or laminated
Procedure (in class)
1. Assign students to small groups
2. Distribute a triangle game board, instruction sheet to each group
3. Place the terms at the front of the class for the teams to refer to if there are disputed answers
4. Discuss the rules of the game with the class and demonstrate a completed triangle using non-technical terms.
5. Allow 30-40 minutes for game time.
Triangle Game

Benchmarks will vary according to vocabulary used. Below are the benchmarks covered by using the solar energy key words included with this activity.

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**Benchmark SC.A.2.3.3** - The student knows that radiation, light, and heat are forms of energy used to cook food, treat diseases and provide energy.

**Grade Level Expectations**
The student:

*Sixth*
- knows forms of radiant energy and their applications to everyday life

*Seventh*
- knows uses of radiation, light, and thermal energy to improve the quality of life for human beings

*Eighth*
- extends and refines knowledge of uses of forms of energy to improve the quality of life.

**Benchmark SC.B.1.3.1** - The student identifies forms of energy and explains that they can be measured and compared.

**Grade Level Expectations**
The student:

*Sixth*
- knows different types of energy and the units used to quantify the energy
- understands that energy can be converted from one form to another

*Seventh*
- knows examples of uses of energy in the home and ways to measure its use

*Eighth*
- knows that energy can be transferred by radiation, conduction, and convection
• knows examples of natural and man-made systems in which energy is transferred from one form to another.

**Benchmark SC.B.1.3.2** - The student knows that energy cannot be created or destroyed, but only changed from one form to another.

**Grade Level Expectations**
The student:

- *Sixth*
  • understands that energy can be changed in form
  • uses examples to demonstrate common energy transformations

**Benchmark SC.B.1.3.3** - The student knows the various forms in which energy comes to Earth from the Sun

**Grade Level Expectations**
The student:

- *Sixth*
  • knows types of radiant energy that come to Earth from the Sun
- *Seventh*
  • knows the characteristics, effects, and common uses of ultraviolet, visible and infrared light

**Benchmark SC.B.1.3.5** - The student knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.

**Grade Level Expectations**
The student:

- *Eighth*
  • knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.

**Benchmark SC.G.1.3.5** - The student knows that life is maintained by a continuous input of energy from the sun and by the recycling of the atoms that make up the molecules of living organisms.

**Grade Level Expectations**
The student:

- *Seventh*
  • knows that life on earth is dependent upon a continuous supply of energy from the sun

**Benchmark SC.G.2.3.1** - The student knows that some resources are renewable and others are nonrenewable.

**Grade Level Expectations**
The student:

- *Sixth*
  • knows renewable and nonrenewable energy sources
- *Seventh*
  • understands the importance of informed use of natural resources
Eighth

- knows that some resources are renewable and others are nonrenewable.
Solar Matters III

Triangle Game

Key Words/Definitions

Key Words will vary depending on the vocabulary used. Below are the key words/definitions for the solar energy game pieces included in this unit.

**alternative energy source** - an energy source other than fossil fuels

**alternative fuel vehicle** - a vehicle that uses a fuel other than gasoline

**conduction** - the movement of heat or cold through materials that are solid

**convection** - the movement of heat through air or in liquids

**desalinization** - process of removing salt and other chemicals and minerals from water

**electromagnetic spectrum** - the radiant energy that is emitted from the sun which is made up of varying wavelengths. From longest to shortest, these are: radio waves, radar/microwave, infrared, visible light, ultraviolet, x-rays and gamma rays.

**energy system** - an interacting group of items forming a unified whole

**energy efficient** - not wasteful of energy, more of the energy goes to the desired work

**evaporation** - process of changing a liquid into vapor

**hydrogen** - the element composed of two hydrogen atoms. Hydrogen is useful as a combustible fuel, and can also be used with a fuel cell to generate electricity.

**insulation** - material used to reduce heat loss or gain

**kilowatt** - standard measure of electric usage

**photon** - the unit of energy emitted by the sun

**photovoltaic** - the effect of producing electric current using light

**radiation** - the way we receive heat from the sun each day. The energy is emitted in the form of waves/particles, and can move from one object to another without heating the area in between.

**renewable energy** - fuel sources that can be replenished
**solar collector** - a device that collects and traps solar energy

**solar oven** - a device that uses the heat from the sun to cook food

**solar spectrum** - the spectrum of colors in the visible light from the sun

**solar still** - a device that uses solar energy to evaporate a liquid

**solar thermal** - using the sun’s energy to heat something. Common uses include water heaters and pool heaters.

**water cycle** - the system of water recycling on our earth - water, evaporation, clouds, precipitation
Triangle Game

A game to demonstrate connections between vocabulary terms

**Individual Player Version**

The Object: To be the player with the most points at the end of the game.

The Set Up: Vocabulary terms are placed on small slips of paper and turned face down on the playing surface. Each player writes their name on the back of the triangle game board.

The Play:
1. The first player randomly chooses a term, defines that term, and uses it in a sentence.
2. The player then attaches (glue or tape) the term to any intersection point on the game board.
3. The next player randomly chooses a term, defines the term and uses it in a sentence. If the player is able to demonstrate a relationship between his/her term and another term, they place their term on another point of that same triangle. If the player can not demonstrate a relationship with any of the other terms on the game board they must attach their term to an intersection point on any open triangle.
4. Play continues with terms being attached to the game board.
5. When a player is able to explain a relationship between his/her term and the other two terms on the points of a triangle he/she initials the completed triangle and receives a game point.

The Winner: When the time allotted for play is complete, the player with the most game points (or completed triangles) wins.

**Team Version**

The Object: To be the team with the most completed triangles at the end of the game.

The Set Up: Same as Individual Player Version

The Play: The same as Individual Player Version, except that cooperation between team members is encouraged and players do not put their initials in completed triangles.

The Winner: When the time allotted for play is complete, the team with the most completed triangles wins.
Triangle Game

- electromagnetic spectrum
- radiation
- renewable energy
- evaporation
- conduction
- insulation
- alternative energy source
- energy efficient
- compact fluorescent
- energy system
- solar oven

Game Pieces

- photovoltaic
- solar thermal
- desalinization
- solar still
- convection
- solar collector
- alternative fuel vehicle
- hybrid
- kilowatt
- water cycle
- solar spectrum