Triangle Game

Student Objective
The student:
- will explain in their own words the meaning of fundamental terms and concepts of solar energy.

Materials (for each group):
- Triangle game board
- instructions
- playing pieces
- tape

Procedure (prior to class)
1. Cut out game pieces.
2. Print out Key Words/Definitions for student reference.
3. You may wish to laminate the game board for future use.

Procedure (in class)
1. Divide students into groups of 4 - 5 students per group.
2. Distribute a Triangle Game board and an instruction sheet to each group.
3. Place the Key Words/Definitions 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.

Key Words:
(Key words depend on game vocabulary used. Below are the key words used in this solar energy version)

alternative fuel vehicle
conduction
convection
desalinization
energy transfer
energy efficient
evaporation
insulation
irradiance
kilowatt
nonrenewable
photovoltaic
pollution
radiant energy
renewable energy
solar collector
solar oven
solar still
solar thermal
sundial
ultraviolet radiation
water cycle

Time:
1 hour

Key Words & Definitions

The vocabulary used in this game can vary depending on what concepts you wish to reinforce. The list included in this lesson reflects the vocabulary used in the Solar Matters II unit. The Triangle Game also adapts easily to other subjects. Blank playing pieces are included for you to customize the game to suit your particular classroom needs.

Further Research

1. Let the students decide on which words are important to include in the game and let the students make the game pieces.
2. Copy the game board and pieces onto transparency film. Use them to play a class-wide game with the students divided up into red and blue teams. Alternate play between teams and keep score on the board.

Internet Sites

http://www.wordcentral.com/

Merriam Webster, Word Central student dictionary

Triangle Game

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
energy transfer – the transfer of energy from one type to another: for example from sunlight to heat, or sunlight to electricity
energy efficient – not wasteful of energy, more of the energy goes to the desired work
evaporation – process of changing a liquid into vapor
insulation – material used to reduce heat loss or gain
irradiance – the intensity of sunlight
kilowatts – a measure of electrical power; one kilowatt is equal to 1,000 watts
nonrenewable – existing in a finite quantity, not able to be renewed or replenished
photovoltaic – the effect of producing electric current using light
pollution – the contamination of soil, water, or the atmosphere by the discharge of harmful substances
radiant energy – energy that transmits away from its source in all directions. Solar energy created by the sun is a form of radiant energy
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 still – a device that uses solar energy to evaporate a liquid
solar thermal – using the Sun's energy to heat something, for example water heaters and pool heaters.
sundial – an apparatus to tell time using the Sun
ultraviolet radiation – located beyond the visible spectrum at its violet end and having a wavelength shorter than those of visible light but longer than those of x-rays
water cycle – the system of water recycling on our earth: water, evaporation, clouds, precipitation

Triangle Game

Florida NGSS Standards & Related Subject Common Core

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

			.1	.2	.3	.4	.5	.6	.7	.8
Grade 3										
The Role of Theories	**Big Idea 3**	**SC.3.N.3**	**X**							
Earth Structures	**Big Idea 6**	**SC.3.E.6**	**X**							
Forms of Energy	**Big Idea 10**	**SC.3.P.10**	**X**							
Energy Transfer & Transformation	**Big Idea 11**	**SC.3.P.11**	**X**							
Grade 4										
Earth Structures	**Big Idea 6**	**SC.4.E.6**			**X**					
Forms of Energy	**Big Idea 10**	**SC.4.P.10**	**X**							
Energy Transfer & Transformations	**Big Idea 11**	**SC.4.P.11**	**X**							
Grade 5										
Earth Systems and Patterns	**Big Idea 7**	**SC.5.E.7**	**X**							
Forms of Energy	**Big Idea 10**	**SC.5.P.10**	**X**							

Third Grade Benchmarks

Science–Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models

- SC.3.N.3.1 - Recognize that words in science can have different or more specific meanings than their use in everyday language; for example, energy, cell, heat/cold, and evidence.

Science–Big Idea 5: Earth in Space and Time

- SC.3.E.5.2 - Identify the Sun as a star that emits energy; some of it in the form of light.

Science–Big Idea 6: Earth Structures

- SC.3.E.6.1 - Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.

Science–Big Idea 10: Forms of Energy

- SC.3.P.10.1 - Identify some basic forms of energy such as light, heat, sound, electrical,

and mechanical.

Science–Big Idea 11: Energy Transfer and Transformations

- SC.3.P.11.1 - Investigate, observe, and explain that things that give off light often also give off heat.

Fourth Grade Benchmarks

Science--Big Idea 6: Earth Structures

- SC.4.E.6.3 - Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.

Science–Big Idea 10: Forms of Energy

- SC.4.P.10.1 - Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.

Science–Big Idea 11: Energy Transfer and Transformations

- SC.4.P.11.1 - Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperatures.

Fifth Grade Benchmarks

Science–Big Idea 7: Earth Systems and Patterns

- SC.5.E.7.1 - Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.

Science–Big Idea 10: Forms of Energy

- SC.5.P.10.1 - Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical.

Triangle Game

Individual Player Version
Goal: To be the player with the most points at the end of the game.

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

How to Play:
1. The first player randomly chooses a term, defines that term, and uses it in a sentence.
2. The player then attaches (with tape) the term to any triangle side 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 describe, in an additional sentence, the relationship between his/her term and another term already on the board, they then place their term on a second side of that same triangle. If the player cannot describe a relationship with any of the other terms on the game board they must attach their term to a side on any open triangle.
4. Play continues with terms being attached to the game board.
5. When a player is able to complete a triangle by explaining a relationship between his/her term and the other two terms on the other sides of a triangle, he/she initials the completed triangle and receives a game point.

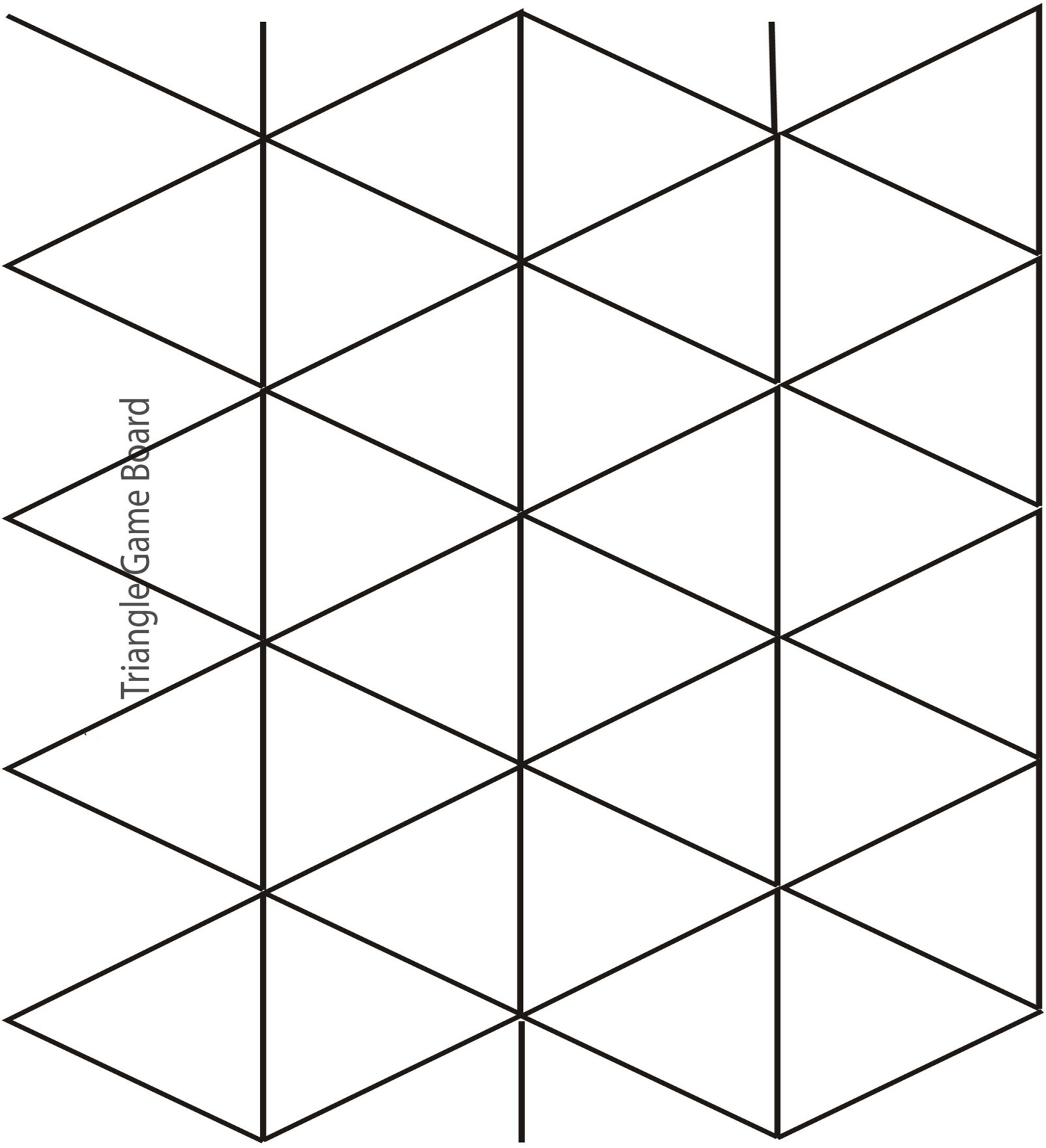
The Winner: When the time allotted for play is complete, the player with the most game points (completed triangles) wins.

Team Version
Goal: To be the team with the most completed triangles at the end of the game.

Set Up: Same as the individual player version

How to Play: The same as the individual player version, except that cooperation between team members is encouraged and players put their team name or designation in completed triangles.

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


Triangle Game Board

Triangle Game

irradiance

photovoltaic

radiant energy

solar thermal

renewable energy

desalinization

evaporation

solar still

conduction

convection

insulation

solar collector

alternative energy source

kilowatt

energy efficient

nonrenewable

energy transfer

sundial

pollution

water cycle

solar oven

ultraviolet radiation