

## 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 (1 per group)
- instructions (1 per group)
- playing pieces (1 per group)
- 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  
desalinization  
electrolysis  
energy transfer  
energy efficient  
evaporation  
hybrid vehicle  
insulation  
photovoltaic  
pollution  
radiant energy  
renewable energy  
solar collector  
solar oven  
solar still  
solar thermal  
sundial  
ultraviolet radiation  
water cycle

### Time:

1 hour

### 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 and an 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.

### **Related Research**

1. The Triangle Game may be used with other units and adapts well to other subjects.
2. Let the students decide on which words are important to include in the game and let them make the game pieces
3. Copy the gameboard 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

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

			.1	.2	.3	.4	.5	.6
<b>Energy</b>	<b>Standard 1</b>	<b>SC.B.1.2-</b>	X	X	X	X		X
	<b>Standard 2</b>	<b>SC.B.2.2-</b>						
<b>Force and Motion</b>	<b>Standard 1</b>	<b>SC.C.1.2-</b>						
	<b>Standard 2</b>	<b>SC.C.2.2-</b>		X				
<b>Earth and Space</b>	<b>Standard 1</b>	<b>SC.E.1.2-</b>			X			
	<b>Standard 2</b>	<b>SC.E.2.2-</b>						

**Benchmark SC.B.1.2.1** - The student knows how to trace the flow of energy in a system.

### Grade Level Expectations

The student:

*Fourth*

- knows that most living things use energy from the Sun to live and grow
- knows how to trace the flow of energy in a system

*Fifth*

- knows how to trace the flow of energy in a system.

**Benchmark SC.B.1.2.2** - The student recognizes various forms of energy.

### Grade Level Expectations

The student:

*Third*

- knows different forms of energy

*Fourth*

- knows that there are a variety of sources for electricity.

**Benchmark SC.B.1.2.3** - The student knows that most things that emit light also emit heat.

### Grade Level Expectations

The student:

*Third*

- knows that the Sun provides energy for the Earth in the form of heat and light.

**Benchmark SC.B.1.2.4** - the student knows that many ways in which energy can be transformed from one type to another.

**Grade Level Expectations**

The student:

*Fourth*

- knows ways that energy can be transformed.

**Benchmark SC.B.1.2.6** - The student knows ways that heat can move from one object to another.

**Grade Level Expectations**

The student:

*Fifth*

- understands that convection, radiation, and conduction are methods of heat transfer.

**Benchmark SC.B.2.2.2** - The student recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy.

**Grade Level Expectations**

The student:

*Third*

- classifies resources as renewable or nonrenewable.

**Benchmark SC.E.1.2.3** - The student knows that the Sun is a star and that its energy can be captured or concentrated to generate heat and light for work on Earth.

**Grade Level Expectations**

The student:

*Fourth*

- knows how the energy of the Sun can be captured as a source of heat and light on Earth.

## Triangle Game

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

**electrolysis** - chemical change, especially decomposition, produced in an electrolyte by an electric current

**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

**hybrid vehicle** - a vehicle that uses more than one energy source, as in the Toyota Prius which uses gasoline and electricity

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

**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. For example, 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. Common uses include 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

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.

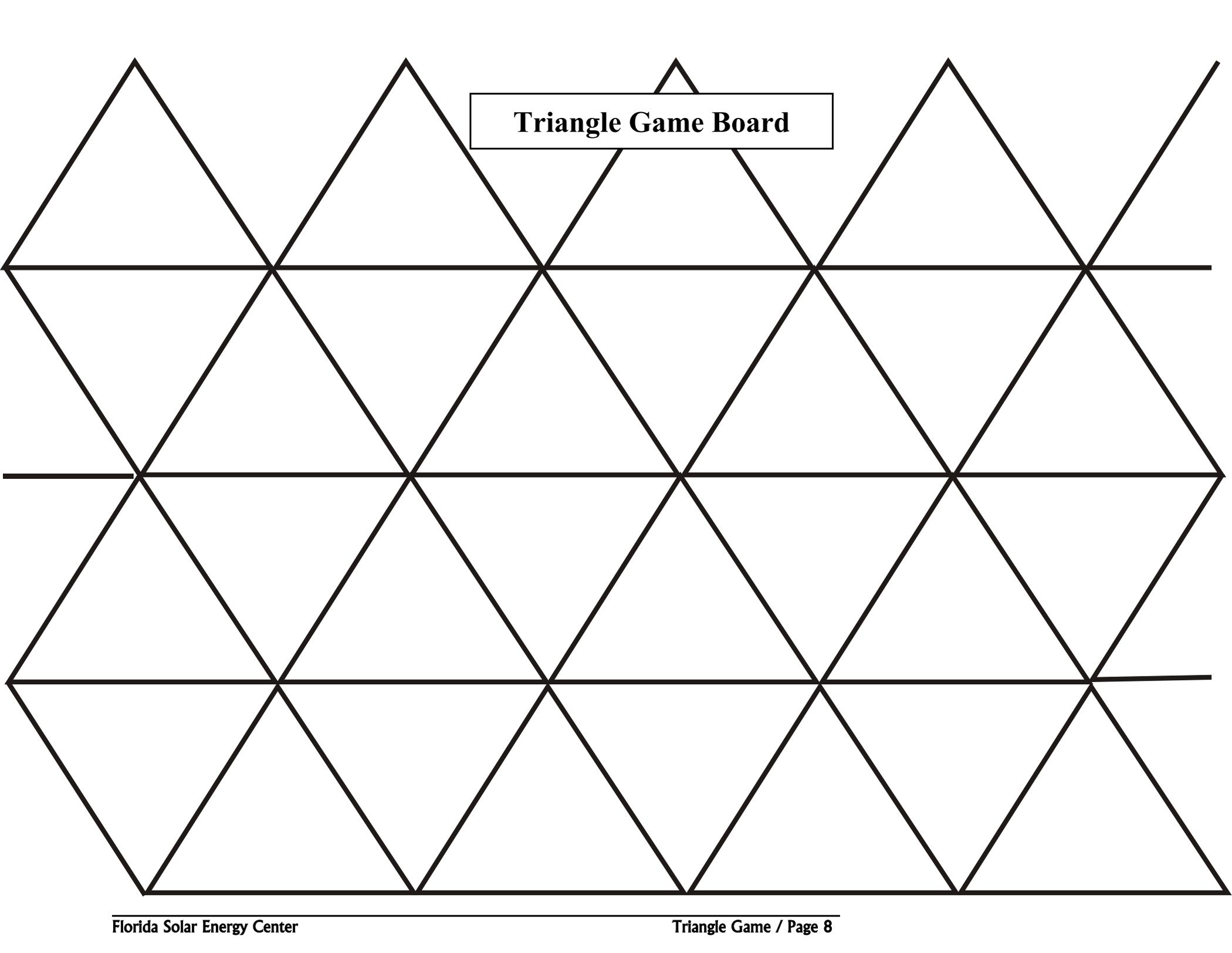
### Team Version

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.

A large triangular grid for a game board. It consists of four horizontal rows of triangles. The top row has four upward-pointing triangles. The second row has three downward-pointing triangles. The third row has four upward-pointing triangles. The bottom row has three downward-pointing triangles. A title box is centered at the top of the grid.

**Triangle Game Board**

Triangle Game

electrolysis

photovoltaic

radiant energy

solar thermal

renewable energy

desalinization

evaporation

solar still

conduction

convection

insulation

solar collector

alternative energy source

alternative fuel vehicle

energy efficient

hybrid vehicle

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sundial

pollution

water cycle

solar oven

ultraviolet radiation

