



## CUBS MEETING SCHEDULE : Week 4

### Theme: Renewable Energy

**Date:**

<i>Time</i>	<i>Activity</i>	<i>Program Details</i>	<i>Leader Responsible</i>
10 mins	Gathering Activity Climate Change Dodge Ball		
5 mins	Opening Ceremony		
10 mins	Theme Activity Solar Simulation		
10 mins	Game What Am I?		
15 mins	Theme Activity Build An Anemometer		
5 mins	Game Solar Code		
10 mins.	Theme Activity Anemometer Testing		
10 mins.	Six Meeting		
5 mins	Spiritual Fellowship		
5 mins	Closing Ceremony		
15 mins	Leader Discussion Time		

Meeting Notes:



## **CUB MEETING SCHEDULE CLIMATE CHANGE: WEEK 4**

### **Theme: Renewable Energy**

**Introduction:** Renewable energy sources are those that can be grown in a short amount of time (such as trees and plants) or are naturally occurring energy resources on the Earth. Some examples are water (hydro electric), sun (solar heating and photovoltaic), wind (wind turbines), the energy in plants (biomass), the energy from gas produced from waste (landfill gas) and the heat from the core of the Earth (geothermal energy). These resources do not deplete or disappear with time.

The major difference between renewable energy and non-renewable energy is how the energy is generated. Resources that can not be regenerated quickly are non-renewable. Fossil fuels, like oil and coal are examples of non-renewable energy sources because there is a limited quantity of fossil fuel in the world. Creating more of these fossil fuels in a natural process would take millions of years.

The process of generating non-renewable sources of energy such as oil and coal creates greenhouse gas emissions which contribute to climate change. Renewable sources of energy such as solar and wind energy produce comparatively few greenhouse gas emissions.

*Objective:* To introduce the Cubs to different types of renewable energy and relate energy to climate change.

### **GATHERING ACTIVITY**

#### ***Climate Change Dodge Ball***

*Objective:*

To explain the connection between non-renewable sources of energy and climate change.

*Background Information:*

The process of generating energy with non-renewable materials such as oil and coal creates greenhouse gases which contribute to climate change. Renewable sources of energy such as solar and wind energy, produce comparatively few greenhouse gas emissions.

Over the past one hundred years the amount of greenhouse gases in our atmosphere has risen exponentially compared to the 1000 years previous. Scientists are almost unanimously in agreement that this increase in greenhouse gas concentrations comes from human-generated causes. One of the most significant of these is the use of fossil fuels to create energy.

*Equipment:*

- 10 soft balls that can be used in a dodge ball type game
- A large playing space (about 20 x 10 m).

*Instructions:*

- The object of the game is for the team with the balls to try to hit all members of the team in the centre.
- Set the playing space with defined borders.



- Explain to the pack that many types of energy are produced with fossil fuels. The process of creating energy with these non-renewable materials creates greenhouse gases which cause climate change. The balls in this game represent greenhouse gases. The playing space represents the earth. Over time, humans have used more and more energy from fossil fuels and therefore produced more and more greenhouse gases. This game will simulate that process. Split the Cubs into two teams – Earth Team and Energy Team.
- The Earth Team stands inside the play area and the Energy Team stands along both long edges of the playing space. Give the Energy Team two balls, which represent greenhouse gas emissions. They try to tag the members of the Earth Team with the balls. If a member of the Earth team is hit they must stand outside the play area.
- Stop the game after two minutes, allow the Cubs who have been hit back into the play area. Give three more balls to the Energy Team explaining that there are more greenhouse gases in the atmosphere now.
- Stop the game again after two minutes and allow the tagged players back in. Give all the balls to the Energy Team. When all the players have been tagged, switch teams and repeat the process.
- Review with the Cubs how an increased concentration of greenhouse gases is not good for the atmosphere.

## **THEME ACTIVITY**

### **Solar Simulation**

#### *Objective:*

To create a simple model of how a solar panel works.

#### *Background Information:*

Solar Energy or photovoltaic (PV) energy is one of the most common forms of renewable energy. It is used in many applications such as providing electricity in remote locations, running lamps, flashlights and radios and even powering cars. Solar cells, which make up most PV panels, are made primarily of silicon. When photons or packets of energy from the sun strike the silicon, some of the photons will hit the electrons in the silicon. Each atom of silicon has four electrons that are available to be energized. The energy that the electron gets from the photon then bumps these electrons from the silicon atom into a circuit. The flow of electrons in the circuit is what creates an electrical circuit.

#### *Equipment:*

- Chalk
- Tape
- Five very large hula hoops (if available) possibly more or less depending on the number of Cubs
- A bell or sound making device
- Six or seven soft balls
- A solar powered calculator or small PV panel to show before the game (optional).

#### *Instructions:*

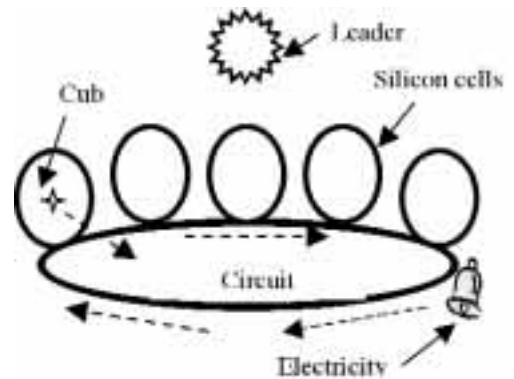
- Before the meeting, create five round circles on the floor with hula hoops, chalk or tape. Create one large circle that touches the sides of all the other circles (see diagram below). Place a bell along the edge of the large circle.
- Explain to the Cubs that solar panels work because the sun gives off protons or “packets of energy” which, when they reach the surface of the solar panels, push electrons into an electric current which runs through the solar panels. This current is what is used to create electricity.
- Have four Cubs stand in each of the five circles. Appoint one leader or Cub to be the “sun”. Give the leader the balls and direct him/her to gently throw the ball to one of the “electrons” in one of the silicon atoms or circle. The electron that catches the ‘packet of energy” or ball then runs with it out of his/her circle and around the circuit ringing the bell when he/she gets to it on the circuit. When he/she returns to his/her



atom he/she rolls the ball back to the leader. It might help to appoint some assistants to gather the balls. The leader continues to throw balls or “energy packets” to the electrons in the other atoms until there are several electrons running at once and the bell is ringing constantly.

- If there are extra Cubs who don't fit in the small circles then stop the game by pretending the sun has set for the night. Stop the running and have the new Cubs switch places with the Cubs that have not participated yet.
- After the game is over, review how solar energy is a renewable energy source and therefore does not cause climate change.

Adapted from *Solar Simulation. Teaching about Climate Change. Green Teacher*, New Society Publishers, 2001



## GAME

### What Am I?

#### Objective:

To familiarize the Cubs with types of renewable energy.

#### Background Information:

The following are simple explanations of how each of these energy sources work:

Solar Heating – warms spaces and water from the heat from the sun

Photovoltaic – uses the sun's energy to create electricity

Wind Energy – uses the wind to push the blades of a wind turbine to create electricity

Biomass – burns forestry, plant and agricultural waste so that the gas produced creates electricity

Landfill Gas – burning waste so that the steam produced creates electricity

Hydro Electric – falling or moving water is used to turn a turbine which creates electricity

Geothermal – uses the heat from the earth's core to create electricity.

#### Equipment:

- Photocopies of the key words, cut up – one for each Cub (see page 7).
- Tape.

#### Instructions:

- The object of the game is for each Cub to figure out what type of energy source is taped on their backs.
- Explain to the Cubs that there are many ways of making energy. List off the following energy sources: Solar Heating, Photovoltaic, Wind Energy, Biomass, Landfill Gas electricity, Hydro Electric, Geothermal and how these energy sources work.
- Line the Cubs up in a long row. With the help of another leader, tape the energy words to their backs.
- Upon “Go” the Cubs need to ask others who they are by asking a question to which the answer is either yes or no. The other Cubs (or leaders) can only answer yes or no. Once the Cubs have figured the energy source out they must go to the leader and tell them. Then they can take off their word and go back to help the other Cubs figure out their energy sources.



## **THEME ACTIVITY**

### **Build An Anemometer**

#### **Objective:**

The Cubs make a model that can help them realize the potential of wind energy.

#### **Background Information:**

Renewable energy comes from resources that are naturally occurring in our world. The sun is the largest renewable energy source that we use. When the sun warms the Earth, winds are created by the flow of hot air and cool air. Wind power is a renewable energy because it can be used over and over again. The wind has the potential to push a propeller to produce electricity. Wind turbines are fast becoming very popular for electricity production. In order to determine where a wind turbine should be placed it is necessary to test how much wind there is in that location over the period of a year. An anemometer is used to measure the frequency and speed of wind.

#### **Equipment:**

- Diagram
- Corrugated cardboard strips of 2.5 cm x 25 cm. – two for each Cub already cut and stapled together. It is important that the pieces are stapled evenly and at right angles to each other. Do this before the meeting.
- Four small Dixie paper cups (with flat bottoms and preferably white) for each Cub – can be found in most grocery stores
- Staplers (at least one for each six)
- Markers (one for each Cub)
- Pins or tacks that have a long pin to fit through the cardboard – one for each Cub
- Plasticine or modeling clay (28 ml per Cub).
- One new unsharpened pencil per Cub with a new eraser
- Three of four fans unless it is a windy day and it is possible to go outside.

#### **Instructions:**

- Start a discussion on wind energy with the following joke: Q. Why is wind power so popular? A. Because it has lots of fans!
- Discuss wind energy with the Cubs – see Background Information.
- Group the Cubs in sixes with a leader and give each Cub their materials.
- Ask them to colour one of the cups and write their name on the cardboard strips.
- The leader will then staple the cups to the cardboard as indicated in the diagram. It is important that all the cups are facing the same way.
- The Cubs determine the exact centre spot of the two cardboard pieces and stick their pin through that spot and into the eraser on the pencil.
- Stick the unsharpened end of the pencil into the plasticine or clay so that the pencil is standing straight up.



Source: *Energy Quest* - Anemometer. Courtesy of the California Energy Commission, [www.energyquest.ca.gov](http://www.energyquest.ca.gov)



## **THEME ACTIVITY**

### **Solar Code**

#### *Objective:*

To introduce the concept of solar energy through a puzzle.

#### *Background Information:*

Solar energy is an important type of renewable energy. Our sun's radiant energy can be used to produce electricity. This method is called photovoltaic energy. The sun's rays are collected in a solar panel and converted into electricity. The most popular use of solar power is spacecraft and satellites, although many homes, cottages and boats are now being fitted with solar panels. The sun can also be used to heat up spaces or materials. Solar hot water heaters and solar cookers are two examples of this.

#### *Equipment:*

- The "Solar Code" template photocopied (see page 8)
- Pencils.

#### *Instructions:*

- The Cubs work on the puzzle while they are waiting for the other Cubs to finish their anemometers.

## **THEME ACTIVITY**

### **Anemometer Testing**

#### *Objective:*

To show the Cubs that the wind can make things move and that there are more and less efficient ways to capture the wind's energy.

#### *Background Information:*

In order to determine where a wind turbine should be placed, it is necessary to test how much wind there is in that location over the period of a year. An anemometer is used to measure the frequency and speed of wind. It is necessary to have at least 10 mph winds in order to create electricity in most wind turbines.

#### *Equipment:*

- One electric fan for every two sixes, or move outside if it is windy
- Watch with a second hand.

#### *Instructions:*

- Working in sixes, the Cubs stick their anemometers on the ground about a metre in front of the electric fan, or in the wind outside, so that they are not blocking each other. The Cubs count how many times they see the coloured cup come around the circle in thirty seconds and record this number.
- Discuss how the design of the anemometer improves its efficiency and allows the cups to spin better.
- Discuss how engineers use an anemometer to figure out the best places for wind turbines.



**What Am I? Key words Template**

**Solar Heating**

**Photovoltaic**

**Wind Energy**

**Biomass**

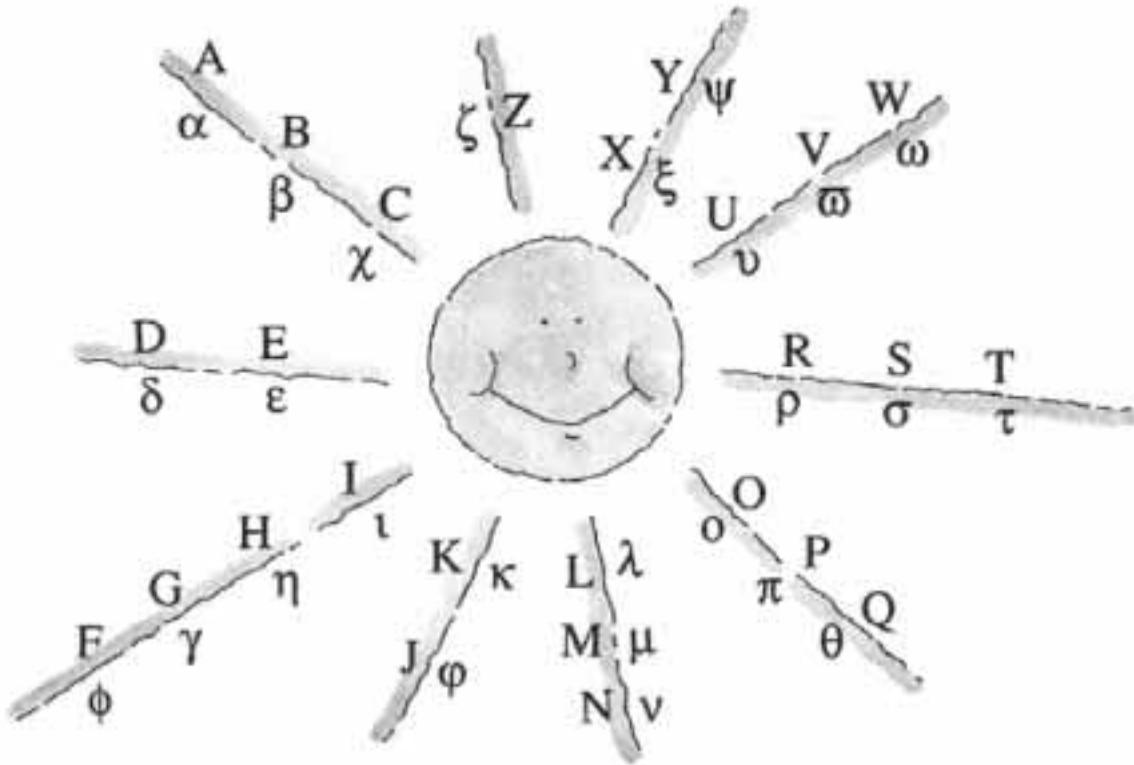
**Landfill Gas**

**Hydro Electric**

**Geothermal**



## Solar Code Template



Crack the solar code to learn about solar energy:

1. Sunshine is a φρεε source of energy.

2. Solar energy has little or no harmful effects on our ενδιονμεντ

3. Solar energy is useful in remote areas where it would be expensive to install

ποερλινεσ

4. Solar energy depends on the amount of συνλιγητ we receive and is therefore not always predictable.