

SC 111 Environmental Science

LESSON PLAN

Alternative Energy Sources for Chuuk Brochures Project

Created fall 2014 by Lynn Sipenuk, College of Micronesia – FSM, Chuuk Campus

Institutional Student Learning Objectives: Students will problem-solve; students will become life-long learners.

General Course Objective: Demonstrate understanding of energy resources and describe how they are used worldwide.

Specific Student Learning Outcome: 7.3 List and define the following renewable/alternative energy sources and their environmental advantages and disadvantages: hydroelectric, solar, wind, geothermal, tidal power, hydrogen fuel cells, and nuclear power.

Instructor: Lynn Sipenuk, College of Micronesia-FSM, Chuuk Campus

Objectives: The students will be able to produce brochures on energy resources that can possibly be used to replace the diesel /gas-based generators presently being used in Chuuk. This objective is broken down into several smaller steps as this class is mainly composed of beginning-level Chuukese college students, all of whom are ESL learners.

Standards: Student will be held accountable for the production of an energy resource brochure containing the following elements: Description of that energy source, Advantages, Disadvantages, and a Conclusion that states whether that energy source could/should be used in Chuuk, at least two (2) relevant illustrations, and at least three (3) sources of information.

Materials: textbook (*Environmental Science. A Study of Interrelationships*), computers with internet access, Student ID (for access to library materials and computers), working email address, color printer (teacher's or school's)

Duration: This lesson was ongoing for 4 weeks, though only parts of actual class time were used. Most of the actual research work was done on the students' own time, either in the computer lab or in the library. The teacher also set up tutorial times in the computer lab, during which the students had access to both the computers and the teacher's assistance.

Anticipatory Set:

1. Students will list all of the sources of energy they can in a 5-minute time period.
2. Students will share their lists in a whole-class group. (Most will list generators, solar panels, and perhaps wind power, though there is no working windmill in Chuuk at present.)
3. "Can Chuuk afford to use its current diesel generator to provide electricity on Weno?" "Is using diesel/gas generators a good economic choice in relation to the state of Chuuk's economy? Is this a good environmental choice for Chuuk?" What about

the other 47 island municipalities: “Is it fair to the islands other than Weno that almost \$10,000 a day of the state’s money is spent to run the generators on Weno, with no benefit to them at all?” “What are the environmental, economic, and social costs to the people on the other islands who must each run their own small generators if they wish to have electricity? Remember, minimum wage is \$0.75/hour and diesel costs \$5.80/gallon.”

4. “Are there other sources of energy, besides expensive solar panels, that all of the islands in Chuuk could use?” Let the students name as many as they can.
5. Each of the FSM states is to seek an alternative source of energy to reduce dependency on imported oil. Our research can help our state come up with ideas on what source or sources are best for Chuuk.
6. Let us find out what other sources of energy there are. Let us look into them and discover which could be useful to Chuuk, all of Chuuk, not just Weno. Then let’s share our new-found knowledge by making easy-to-understand brochures that talk about these resources.

Input: The teacher will pass out the three-page list of energy sources gathered from Wikipedia.com. (Though COM-FSM discourages the normal use of Wikipedia as a research source, they had the largest list of energy sources.) This list includes fossil-fuel, alternative, and a variety of generators in its list. The list is divided up and students choose the set of 5 sources from the list that they will begin working on. The teacher will also explain each of the steps, using an example from a leftover source as each step is reached.

Modeling: The teacher will model each step of the ‘researching and creating a brochure’ process as the students move through each of the steps. The teacher will demonstrate how to click on the Wikipedia link, and how to Google other sources of information as needed. The teacher will model on the board in class, in the computer lab, and individually as needed how to choose and use the brochure templates offered by Microsoft Word, the word program used by our school. The teacher will also model the basic information needed when the students list their reference sources.

Checking for Understanding: Since students will be working on different energy sources, individual and small group discussions will ensure that students know what to do during each step. The discussions will help those having trouble, as they will be able to see what others have done and ask how they did it. Turning in each step will help keep the students from being overwhelmed at the prospect of creating an entire brochure on their own.

Steps & Independent Practice:

1. Having chosen a group of energy sources from the Wikipedia list, students will look up the article entry on each of their sources and write a very short description of it, then stating whether that source would be useable in Chuuk. (Useable has been defined as economically feasible, environmentally friendly, and socially acceptable by Chuukese.)

2. After cutting down the large list of energy sources, and deleting those depending on the use of fossil fuels or other fuels not available in Chuuk, students choose one of the possible sources of renewable energy or alternative generating systems left.
3. Students will then find three (3) sources of information on their “brochure” energy source. They should look for books, articles, and internet sources.
4. Using these sources, and others, students will turn in a short description of that energy source and explain how it works. This step will also take class time, as each student will share his/her information and seek help on any vocabulary they do not understand. This was done in small groups, with the teacher moving around and assisting as needed.

This is followed by a roundtable very short presentation by each student that names his/her energy source and then gives a brief description of it. This “presentation” to their classmates is their first mini-practice for their final presentation.

5. The next step is to find a diagram and/or picture of the energy source that helps to explain that energy source.
6. Next the students will find both the advantages and disadvantages of their energy source. At least three (3) of each should be found.
7. Then the students will write a short conclusion. Is this energy source a good one for Chuuk to look into? Why or why not? Do the Advantages outweigh the Disadvantages or vice versa? What would you suggest to our Chuuk leadership?
8. Now you are ready to put all of your information together into a brochure.

Closure: Students print out draft copies of their brochure and get final editing help from the teacher. The teacher then prints out a color copy for the student, and a number of both color and black and white copies of each brochure. The students present their brochures and the information they have learned to interested COM-FSM student body, faculty, and staff.

Students still on campus were informed of the following events that took place after their presentations and the end of classes:

1. A second set of the brochures was seen by our local EPA officer and given to him upon request.
2. Another set will be printed in future copies of *Meseiset*, our campus newsletter that highlights student work.
3. A third set was presented to our national congressional representatives when they visited Chuuk campus at the semester’s end.