

**GEMASOLAR CENTRAL TOWER SOLAR PLANT**

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**DEMONSTRATION/DISCUSSION**

**This module is part of the World Of Wonder Series and is to be used in one session to fill gaps between other lines of instruction or when school schedules create voids in the mentor’s outline. It is stand-alone and can also be used as part of a larger curriculum path to educate students on engineering and architecture in other parts of the world.**

**Educational Goals**:

 Students will:

* Learn about a new solar technology which works when the sun is not shining
* See that there are more ways to use the sun to create electrical power
* Learn how critical-thinking, problem-solving methods solve existing problems with new ideas

Ov**erview**: This module consists of a simple Word document which introduces them to the Gemasolar Solar Power Plant in Seville, Spain and the Valle 1 and 2 Solar Power Plants nearby which both use thermal salt solutions to extend the power-creating ability of the plants and produce solar power at a low cost. These technologies are very eco-friendly as well.

This module, being part of the WOW Series and only one day, is mostly meant to be read aloud, and discussed from the pictures and the content.

**Content:** There is no power point for this module. It consists of just this Word Doc. The Mentor can ad-lib or add his or her own material to make it more robust. The goal here was to create wonder in the students’ minds and expose them to different ways of building things.

**Time**: Approximately 1-1.5 hours. Mentor can embellish with You-Tube videos or other material on the subject dealing with existing solar power plant technology, and other new breakthroughs in solar power generation.

**Materials Needed**:

* Computer and Projector

**Directions**: Very simple…run the Word Doc on the projector, read it, ask questions about what they are seeing, and inform them of how difficult it was. The main thing the student’s take away is to understand the way this thermal salt technology works and why it is a breakthrough for this point in time.

**Topics to Discuss**:

Discuss how the technology works---use the pdf brochure as an aid

 Discuss the fact that the actual electrical generation is nothing new…same technology used in nuclear, coal-fired, and oil-fired plants. The difference is that the steam is produced by clean, quiet, solar energy with no carbon footprint.

As a discussion point, ask if any of the students have ever used a magnifying glass in the sunlight to heat anything or start a fire. Discuss how reflected sunlight can be focused into a beam of intense light to heat up the salt solution.

If your class seems especially bright, perhaps do research on how the mirrors must orient to keep a beam of sunlight focused on the top of the tower. How they must adjust for the different times of day during different seasons of the year.

Ask questions for further research about how they keep the salts in the tank from freezing during the winter (salt water freezes at a much lower temperature) or how long it must take to get the plant operational again after a prolonged cold weather event such as snow. So, question: does it snow in Seville, Spain? Maybe that is why they located it there—check out the average annual weather for that area.

M**entor Notes**: This is really quite simple, but it is incumbent upon the Mentor to present an atmosphere of awe at the ways people come up with to make an existing technology better. The real problem with solar power farms has always been that they really are not all that effective, being subject to daily dark periods and cloud cover and bad weather. This technology is a step towards mitigating that issue, providing energy more in line with nuclear reactors than solar energy, in a really simple solution. Having said that, it can keep producing electricity for up to 15 hours, but if you had a week of bad weather, the plant will not be producing anything. That is why this module is categorized under the World Of Wonder Series, to expose the students to the critical-thinking, problem-solving process to encourage them to solve existing problems with new thought.