

## Green Conservation and Solar (Design Challenge) – LESSON SUMMARY

Everyone is going green, including the Tech Museum. Learn how scientists are harnessing the power of earth's most renewable energy source: the sun. Your students will explore the science behind solar panels and help design a solution to reduce the world's dependence on coal by using green energy!

**Grade Levels:** 3-8 (Design Challenge)

### **Educational Outcomes:**

- 1) Students will learn about green energy, renewable and non-renewable resources.
- 2) Students will learn simple circuits: series and parallel
- 3) Students will use solar panels to light up a “future city”

**Estimated Time:** 90 minutes

- Introductory Discussion: 5 minutes
- Demonstration: 5 minutes
- Activity: 10 minutes
- Follow-up Science Talk: 10 minutes
- Activity: 40 minutes
- Summary: 5 minutes

### **California Science Content Standards Connections:**

- **Grade 3** -1a, 1b, 2a, 2b
- **Grade 4** - 1, 1a
- **Grade 5** - 4
- **Grade 6** - 3d, 4a, 4b, 5a, 6, 6a, 6b, 6c, 7, 7a, 7b, 7e
- **Grade 7** - 6c, 6f, 6g
- **Grade 8** - 4d
- **All grades - Investigation and Experimentation:** Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.

### **Pre-Visit Vocabulary**

*These are words and concepts that we feel will help your visit to the Tech Museum's special presentation of Leonardo da Vinci. Your students' experience will be enhanced if they are familiar with these terms prior to your visit.*

- **Energy:**
- **Natural Resource:** Something from the natural environment (water, air, trees, fuels) that is used to meet one's needs and wants.
- **Renewable:** a resource that can be replaced in a relatively short time; examples are tides, wind, and solar energy
- **Non-renewable:** A natural resource such as coal or mineral ores that is not replaceable after its removal.
- **Energy Efficiency:** Energy efficiency refers to products or systems designed to use less energy for the same or higher performance than regular products or systems
- **Solar Energy:** The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.
- **Reflection:** the ability to reflect beams or rays
- **Refraction:** The bending of light as it enters a medium and slows down.
- **Circuit:** an electrical device that provides a path for electrical current to flow

### Tech Museum Gallery Connections:

- Green By Design Gallery-
  - Harnessing Energy  
Work as a group to Power the Tower using renewable resources such as wind, hydro and solar power.
- View From Space- Check out the NOAA Science on a Sphere and learn more about our Planets energy systems.
  - The Tech Museum Public Presentations staff has several Live Science Performances, check menu for times, or feel free to bring your class to that area and make one of your own using the Touch screen Kiosk.
- Life Tech Gallery – Learn how to design Human Powered Vehicles and help us loosen our dependence on fossil fuels.
- IMAX Theatre – Blue Planet- From the orbit of the U.S. space shuttle, where the curvature of the globe and the shape of its continents stand out sharply, Earth is revealed as a place of constant, even violent change. It is also delicate and fragile, unique in the solar system and possibly the entire universe.
- IMAX Theatre – Forces of Nature- There are nearly 500,000 earthquakes, over 1,000 tornadoes, and about 50 volcanoes erupting around the world each year.

### Teacher Resources

- **Emissions and Emission reduction Calculators Online:** Use these to plan a fun Math lesson plan. Do some Math and Start a Classroom Awareness Project around clean energy. Who knows you might inspire the whole school! Calculate how much pollution is caused by the energy used in your home or business. Just enter your monthly energy bill and answer a few questions, and the calculator displays emissions information including greenhouse gases, smog-forming gases and toxic materials.  
<http://www.cleanerandgreener.org/resources/calculators.htm>
- **Infinite Power.org:** This education page was set up to support interested educators who are willing to incorporate green ideas into their lessons. The lesson plans were created by a team of professional educators and renewable energy experts and include teacher resource guides, reading passages for students, student worksheets, and many other helpful improvements in an easy-to-download format. <http://www.infinitepower.org/lessonplans.htm>

### Post activity/handout:

- Solar Smores (Take-Home Activity): Building a simple solar cooker in the Classroom.
- Math Can Be Electrifying (Take-Home activity) Using ideas for Emissions and Emission reduction Calculators (See above notes)  
[http://www.educatorresourcecenter.org/view\\_lesson.aspx?lesson\\_plan\\_id=248](http://www.educatorresourcecenter.org/view_lesson.aspx?lesson_plan_id=248)