**Solar Energy**

**Main Science Idea:**

**Photovoltaic Cells**
*(say: FO-to-volt-AY-ik)*

Photo + volt = light + power = solar power!

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**Modern Solar Cells** were invented in early 1950s and have been used to power satellites since 1959. They began to be used on Earth in a big way in the 1970s, mostly for remote (far away) telecommunication and navigation (like radios & GPS). They have been powering roadside emergency phones, watches, calculators, lights & traffic signals since the mid 1980s. With prices dropping & technology improving, they are now becoming affordable for homes and businesses everywhere. For the 2 billion people in the world who live without any electricity, solar energy is good news. It will help solve the energy crisis, too. And once the cells or panels are built, it’s free & doesn’t pollute (except for the batteries which last a long time).

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**What Solar Cells are Good For**

*Solar energy powers a water pump in a rural African village where there is no electricity.*

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**We Use Solar Energy** for lots of things today. Here are some uses:

- Weather Monitoring Stations
- Disaster Lighting & Power Systems
- Emergency power for hospitals
- Floating lights at sea or in pools
- Irrigation systems (solar water & air pumps)
- Water Air Filter Systems
- Military Target Practice Ranges
- Railroad Switching and Signal Lights
- Street Lighting
- Schoolhouse Lighting
- Portable Electricity, Lighting or Power Security and Parking Lot Lighting Solar-powered Golf Buggy
- Lights, Frigs, Water Pumps, Battery Chargers, Communication & Entertainment Systems & Gate Openers
How Solar Cells Work is just like how a plant transforms sunlight into plant energy (called photosynthesis). Inside solar panels sunlight is captured by photovoltaic cells made of polysilicon, which has quartz & a little bit of boron in it. A PV cell can make about 0.6 volts of DC (direct current) power, but it depends on its size (surface area), intensity of sunlight, & how well made the cells & panels are.

Small Solar Energy Systems Look Like This:

<table>
<thead>
<tr>
<th>Electric Lamp Set</th>
<th>Luxury Home System</th>
</tr>
</thead>
<tbody>
<tr>
<td>for Rural Homes, Camping, or Back-up Lighting</td>
<td>for Rural Homes, Schools, Shops, Community Centers or Workshops</td>
</tr>
<tr>
<td>A complete portable electric lamp charged by solar panel with 6 volt battery &amp; a cable</td>
<td>An expanded complete system to power 2 lights, a B&amp;W TV, a radio, and a fan</td>
</tr>
</tbody>
</table>

Think of everything you could power with solar panels in your town or home!
NAME:          CLASS:

SOLAR ENERGY: REVIEW QUESTIONS

____/10 Points

1. Write the new words you learned in this reading here. Look up their meanings in a science textbook or a dictionary.  
   3 points
   a. __________ - ________________________________
   b. __________ - ________________________________
   c. __________ - ________________________________

2. Think of 3 things in your house, school or neighborhood that are powered by PV Cells.  
   3 points
   a. ___________________________________________
   b. ___________________________________________
   c. ___________________________________________

3. Explain what solar power is and why it is good for Hawai‘i.  
   2 points
   _______________________________________________
   _______________________________________________
   _______________________________________________

4. What could you do now and in the future to help Hawai‘i switch to using more solar power? Draw or write your answer.  
   2 points