Step 1: Read the following article from the National Education Association (http://www.nea.org/tools/lessons/clean-energy-education.html)

ARTICLE:

[1] **Clean energy** is defined as power created using renewable resources such as the wind, plants, water and the sun. Clean energy sources generate little to no pollution or emissions, compared to traditional fossil fuels such as oil and coal. In addition to using clean energy sources, the concept of clean energy also involves energy efficiency. This means that using less energy or using it more smartly also leads to less pollution.

*What are examples of clean energy?*

[2] Clean energy is important for many reasons. Using renewable energy resources at home offers job opportunities as existing and new technologies are developed. These efforts also lessen reliance on energy from abroad. Reducing pollution with the use of clean energy is also important to the health and safety of everyone, as well as to the preservation of natural resources. Concerned experts link the air and water pollution caused by coal and natural gas plants to breathing problems, cancer, heart attacks and damage to the neurological system. Coal is also the leading source of global warming pollution in the country, according to the Natural Resources Defense Council. Further, coal mining destroys land and pollutes waters.

*What are some benefits of clean energy?*

[3] Clean energy or renewable resources and technologies include:

- Solar collectors and panels used to convert the sun’s energy into electricity
- Wind turbines that turn air currents into power
- Biomass or plant material and animal waste, burned for use as energy
- Geothermal energy, using heat from the earth to create power
- Hydroelectric power, using dams to harness the movement of water to create electricity
- Hydrokinetic energy, capturing the power of rivers, tides and waves to create electricity
- Nuclear power can be considered clean energy in that there are no emissions, but an accident or disaster could be devastating to human health.

*What are some risks of clean energy?*

[4] Sometimes, clean energy sources multitask. For instance, oceans are a source of thermal energy, as they store heat from the sun, as well as mechanical energy from the power of waves. Scientists are also exploring geothermal resources such as hot water located a few miles beneath the earth’s surface. According to the U.S. Environmental Protection Agency, consumers today have more ability and interest in investing in clean energy. In fact, renewable energy use has the potential to strengthen the nation’s energy security on top of improving the environment. States vary in determining which energy sources and production methods are clean, so the rules and energy options differ depending on location. Yet a wide range of clean energy methods are being researched and implemented across the country. Clean energy education will empower students to understand how choices made at home, in school and within communities impact the environment. Addressing clean energy in the classroom can also introduce students to interesting innovations in the changing field of energy. Perhaps most importantly, studying clean energy will allow students to apply creative ideas to solve environmental challenges.

Assignment:
List six (6) key words (vocabulary) or concepts from the article.

1. __________________________________________________________

2. __________________________________________________________

3. __________________________________________________________

4. __________________________________________________________

5. __________________________________________________________

6. __________________________________________________________

Which of the examples of clean energy from the article do you think is the best option for the US? Explain your reasoning (Why is this the best option for the US?). [Paragraph 1 and Bulleted list in paragraph 3]

The best option of clean energy for the US is __________________________________________________________

This is the best option of clean energy for the US because __________________________________________________________

Fill in the chart below about benefits and risks clean energy (List two of each)

<table>
<thead>
<tr>
<th>Benefits [Paragraphs 2 &amp; 3]</th>
<th>Risks</th>
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<tbody>
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<td>1)</td>
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7.6 : Solar Power

The first panels to create electricity from sunlight were invented during the late 1800s. However they could only produce tiny amounts of power compared to coal and oil. Over the next 100 years almost nobody tried to improve solar panels until the 1970s when the price of oil suddenly rose quickly. People also began to worry about the pollution which it and coal were putting into the Earth’s atmosphere. Governments began to put more money into researching how solar panels could be made to produce more energy.

Modern solar panels are made up of thousands of small photovoltaic cells which are made up of layers of silicon. The top layer of silicon is covered with phosphorus which gives it a negative charge. The bottom layer is covered with boron which gives it a negative charge. The positive and negative charges create an electric field. Light particles called photons hit the cells and knock off electrons from atoms. These electrons are then collected by metal plates on the side of the panel and sent down wires as electricity.

One of the earliest uses for modern solar panels was on spacecraft and satellites. Solar panels would be created which could be packed tightly together and then unfolded once they were in space. During the 1980s many people began putting solar panels on the roofs of their buildings where they could be used to make electricity. These panels create Direct Current (DC) which has a much higher voltage and is more dangerous. Homes with solar panels have special inverters which change this to Alternating Current (AC) which is safer and used by most home appliances. Electric panels safely send this energy throughout homes while any electricity which is not needed is sent, through the meter, into the electric grid.

Supporters of solar panels argue that they are a much cleaner and safer way to produce energy as they emit no pollution and have no moving parts. Opponents argue that solar panels cannot produce electricity around the clock due to changes in weather and the amount of daylight.

The largest solar farm in the world is located in China. It’s 4 million solar panels create enough electricity to power 200,000 homes.

Another type of solar power uses huge mirrors to focus sunlight onto a chamber filled with water which boils it and creates steam to turn a turbine.

1. Why were early solar panels not popular?

2. How do solar panels create electricity?

3. Why do you think solar panels would work well in space?

4. What disadvantages do solar panels have?

___ __________________________ Name __________________________ Class _______