Lesson Plan Title:

<table>
<thead>
<tr>
<th>Teacher Name: John L Harkness</th>
<th>School: West Washington Jr/Sr High School</th>
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<tbody>
<tr>
<td>Subject: ICP/PBL</td>
<td>Grade Level: 10-12</td>
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### Problem statement, Standards, Data and Technology

#### Asking questions and defining problems
Establish driving question for the lesson plan or define problem students will be solving.

What energy resources do we need to do to maintain our quality of life?
We would begin with activity I call, “Time Machine.” I tell the students I am going back in time, and when I take away a piece of technology that you cannot live without, then raise your hand. Typically, most students drop out after cell phones and ipods, but I have holdouts until running water to the home.
We then discuss what it takes to sustain the standard of living to which we are accustomed.
Eventually, it comes down to energy generation.
Then I drop the bomb...the source of the majority of our energy is going to run out.
I have a couple of websites that we would then examine as possible sources.

#### Incorporating Next Generation Science Standards, Common Core, or State Standards
State the standards that will be covered during this lesson plan. Include all standards which may apply (NGSS, Common Core, or State Standards).

ICP.8.1 Describe how energy needs have changed throughout history and how energy needs are met in modern society.
ICP.8.2 Describe the benefits and risks of the development of non-renewable forms of energy such as coal, oil, natural gas and uranium fission sources.
ICP.8.3 Describe the benefits and risks of the development of renewable forms of energy such as solar energy, wind-energy, geothermal energy, fusion energy and biofuels.
ICP.8.4 Describe how efficient use of renewable and non-renewable energy sources is essential to maintaining an acceptable environment.

#### Obtaining and evaluating information
I will provide a guideline to selecting reliable websites from which to collect information.
Students will do guided research on the internet on all energy resources.
### How will students be obtaining and/or collecting the information?

<table>
<thead>
<tr>
<th>Students will created a power-point presentation on one renewable energy resource as part of debate to convince a panel that they have the best resource and why</th>
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<tbody>
<tr>
<td>Students will design a “booth” as part of an Alternative Energy Expo. They must have a demonstration of their alternative energy resource, general information, timeline, and some kind of handout to give away.</td>
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**Analyzing and interpreting data**

How will students be analyzing and interpreting the collected data?

They must analyze the validity of all data they intend to share as part of the debate, as well as justify any conclusions they claim as part of their debate and demonstration expo. Along with guideline of selecting reliable websites, any information or data that is shared must be supported by multiple sources. Data will be presented on the poster boards of their “booths” and can be shared on the pamphlet they give to their audience.

**Use of technology and software**

Indicate the type of technology and software students will be using in order to implement this lesson plan.

- Research tools online
- Motor/generators for any alternative energy resource that utilizes turbines
- Solar panels and cells

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**Collaboration, critical thinking and communication**

<table>
<thead>
<tr>
<th>Collaboration</th>
<th>Students will work in teams to research materials, deliver presentations for the debate and demonstration expo, and build the expo.</th>
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<tbody>
<tr>
<td>Critical Thinking</td>
<td>Students will have to explain about alternative energy generation and defend it in debate. They will have to explain their alternative energy demonstration and design a pamphlet aimed at a fifth or sixth grade level.</td>
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</table>
### Communication

**How will the students communicate their findings and conclusion regarding the established question and/or problem?**

Students will debate and demonstrate their findings to an audience of 5th or 6th graders.

### References

**Teacher’s References**

Include all references used to develop and implement this lesson plan.

- [https://www.census.gov/popclock/world](https://www.census.gov/popclock/world)
- [https://www.ecotricity.co.uk/our-green-energy/energy-independence/the-end-of-fossil-fuels](https://www.ecotricity.co.uk/our-green-energy/energy-independence/the-end-of-fossil-fuels)

My choice in the last two websites is to show the idea of bias in websites and the necessity for following a review program for choosing information and data from the internet.

**Student’s References**

Include all references students will need to complete this lesson plan.

The students will find and verify the appropriate references.

Webpage evaluation guide based on 2004 Joe Barker, The Teaching Library, University of California, Berkeley

“The Best Stuff On The Web”

### Assessment Plan

**Assessment Plan**

**How will the students be assessed during and/or at the end of the lesson plan?**

- Guided research worksheet that addresses general information about energy generation
- Debate Presentation (Content, Presentation skills, Persuasion)
- Demonstration Booth (Demo, Presentation skills, Age appropriate explanations of booth information)
- Written exam

Include resources that will be used to assess the students for the lesson plan.
## Resources and Costs

<table>
<thead>
<tr>
<th>Resources Needed</th>
<th>Costs</th>
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<tbody>
<tr>
<td>List all the resources needed (equipment, facilities, materials or any other resources).</td>
<td>Approximately $100.00 in materials and equipment</td>
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<tr>
<td>Trifold science fair boards</td>
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<tr>
<td>low-resistance light bulbs</td>
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<tr>
<td>Small generator/motors</td>
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<tr>
<td>solar panels</td>
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<tr>
<td>wire</td>
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## Implementation Plan

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<th>Implementation Plan Timeline</th>
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<tr>
<td>Establish the timeline to implement the lesson plan.</td>
<td>This would take place in April-May.</td>
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<tr>
<td>Provide an estimate of time and days in order to complete the lesson plan.</td>
<td>Week 1- Preliminary research and instruction on all energy sources both nonrenewable and renewable. Experimentation stations for 2 days with alt energy devices like windmill and solar. By end of week, teams for debate and alternative energy source will be given. Students given the task to debate this as if they were trying to gain a grant for alternative energy to be brought into the county, and only one group will get the money. Week 2- Prepare power point presentation and debate. Debate at end of the week. Week 3- In same teams, design expo booth presentation and demo. After 5 days of preparation, students will hold the Alternative Energy Expo 2017 now open for the inquiring minds of 10-12 year olds.</td>
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