## Lesson Plan Title: The Power Grid

**Teacher Name:** Michael Schmidt  
**School:** Hartland High School  
**Subject:** Energy “The Power Grid”  
**Grade Level:** 11<sup>th</sup> and 12<sup>th</sup>

### Problem statement, Standards, Data and Technology

<table>
<thead>
<tr>
<th>Asking questions and defining problems</th>
<th>Can students explain the Electric Power Transmission Process, discuss the application of different electric power transmission principles and name electric power transmission equipment and systems.</th>
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</thead>
<tbody>
<tr>
<td>Establish driving question for the lesson plan or define problem students will be solving.</td>
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<tr>
<td>Attach any documents used to establish the driving question or define the problem.</td>
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| Incorporating Next Generation Science Standards, Common Core, or State Standards | Energy Industry Fundamentals (EIF)  
| Education to Transmission: Power Grid Configuration.  
| Segment 6 Electric Transmission and Distribution. |  
| Students will be able to:  
| 04.01 Explain the Electric Power Transmission Process.  
| 04.02 Discuss the application of different electric power transmission principles.  
<p>| 04.03 Name electric power transmission equipment and systems |</p>
<table>
<thead>
<tr>
<th><strong>Obtaining and evaluating information</strong></th>
<th>Students will take notes while viewing PowerPoint presented by Instructor. Students will ask questions and discuss PowerPoint in groups of two while reviewing PowerPoint on individual chrome books. Students will further collect Data while working with Simulation software and answering questions. Students will further collect data while preparing for Best Practice Presentation.</th>
</tr>
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<tr>
<td><strong>Analyzing and interpreting data</strong></td>
<td>Knowledge and notes will then be used to work with the Power Grid Applet produced by Illinois. The Applet is an interactive simulation program showing how the Grid is made up of Power Plants, Transmission and Distribution. Students will complete in groups of two a question and answer sheet corresponding to simulation Power Grid program. Students will use the OSHA Illustrated Glossary for further insight into transmission equipment and system. Students will work in groups of Four to produce “Best Practice” Presentation to be given in front of class.</td>
</tr>
</tbody>
</table>
| **Use of technology and software** | Instructor: PowerPoint shown on Smart Board. Students: Google Classroom to Review PowerPoint presented, on Individual Chrome Books.  
A. Interactive Applet used on Chrome Book  
B. Illustrated Glossary by OSHA, used as reference for better understanding  
   A. [https://credc.mste.illinois.edu/applet/pg](https://credc.mste.illinois.edu/applet/pg)  
   B. [https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/](https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/)  
(CREDC) Cyber Resilient Energy Delivery Consortium, Illinois  
(OSHA) Occupational Safety and Health Administration, Federal Goverment  
Presentation Software to present ideas for presentation. |
| **Collaboration, critical thinking and communication** | Students will be working together to review main points of PowerPoint. Students will be working together to manipulate successfully the Power Grid simulation. Students can work together and discuss answers for questions and answer sheet corresponding to simulation. Students must work together in larger groups to present Information on Best Practices Presentation. |
### Critical Thinking
How will the students evaluate the question or defined problem to reach an objective conclusion? How will the students be using the learned content and collected data to be able to critically think about the established question and/or problem on this lesson plan?

The students will first use critical thinking in their discussion with partner while reviewing PowerPoint, next in manipulation of simulation of Power Grid and in open ended questions related to simulation and finally in discussion with large group to decide “Best Practices with Power Grid System”.

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

- Discussion Points while conferring on PowerPoint.
- Discussion Points and successful manipulation of simulation.
- Correct Answers to corresponding Power Grid sheet.
- Talking Points in “Best Practice” Presentation.

### References

#### Teacher’s References
Include all references used to develop and implement this lesson plan.

  - A. [https://credc.mste.illinois.edu/applet/pg](https://credc.mste.illinois.edu/applet/pg)
- (CREDC) Cyber Resilient Energy Delivery Consortium, Illinois
  - B. [https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/](https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/)

- (OSHA) Occupational Safety and Health Administration, Federal Government

#### Student’s References
Include all references students will need to complete this lesson plan.

- [https://credc.mste.illinois.edu/applet/pg](https://credc.mste.illinois.edu/applet/pg)
- [https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/](https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/)
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<tr>
<th>Assessment Plan</th>
<th>During lesson students will be assessed using a formative (the Question and answer sheet) assessment. Students will also get observed formative grade on participation in group and group presentation grade. Summative assessment will come in form of questions on quiz and final.</th>
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</thead>
<tbody>
<tr>
<td>Assessment Plan</td>
<td>How will the students be assessed during and/or at the end of the lesson plan? Include resources that will be used to assess the students for the lesson plan.</td>
</tr>
</tbody>
</table>
## Resources and Costs

<table>
<thead>
<tr>
<th>Resources Needed</th>
<th>Instructor: Computer, PowerPoint and Smart Board</th>
<th>Students: Internet, Chrome Books, Handouts</th>
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</thead>
<tbody>
<tr>
<td>List all the resources needed (equipment, facilities, materials or any other resources).</td>
<td>Internet access, Web sites, Grade Book and Handouts</td>
<td>Smart Board for Presentations, Google Classroom for Sharing Documents</td>
</tr>
<tr>
<td>Google Classroom for Sharing Documents</td>
<td></td>
<td>Google Classroom for Sharing Presentations</td>
</tr>
</tbody>
</table>

### Costs

List the estimated cost of implementing this lesson plan.

- All Equipment Listed already in House
- Cost of Printout of Question and Answer (Could Post on Google Classroom)
- No Paper Cost

## Implementation Plan

### Implementation Plan Timeline

Establish the timeline to implement the lesson plan.

Provide an estimate of time and days in order to complete the lesson plan.

- Three Complete Hours of class to finish
  - Day One: PowerPoint, review in groups of two
  - Day two: Simulation, worksheet and discuss presentation
  - Day Three: OSHA site and Presentation