# Lesson Plan Title: Energy Reduction Team

**Teacher Name:** Shannon Walmoth  
**School:** Reagan Elementary  
**Subject:** Physical Science/Earth Science  
**Grade Level:** 4/5 high ability

## 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.  
Attach any documents used to establish the driving question or define the problem.

- How much energy does a regular computer use daily?  
- How much energy does Reagan Elementary use on a monthly basis?  
- Where can we get that information from?  
- Where does our energy for Reagan Elementary come from?  
- What can we do to reduce energy costs at Reagan Elementary?

**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).

- **4.PS.4** Describe and investigate the different ways in which energy can be generated and/or converted from one form of energy to another form of energy.  
- **4.PS.5** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.  
- **4.ESS.2** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.  
- **4.ESS.4** Develop solutions that could be implemented to reduce the impact of humans on the natural environment and the natural environment on humans.  
- **3-5.E.2** Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.  
- **6-8.LST.7.3:** Draw evidence from informational texts to support analysis, reflection, and research.  
- **6-8.LST.4.2:** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

**Obtaining and evaluating information**  
How will students be obtaining and/or collecting the information?

- Students will speak with a local energy consultant from Duke Energy. Together, we will take a tour of Reagan Elementary and find out where students can get measurements for electricity being used. Students will contact our local maintenance facility to attain a previous monthly energy bill for our building. As a class, we will use a Kill a Watt device to track how much electricity one computer uses during a school day. Students will use that
information to find an average for how much energy is being consumed on all of the computers at Reagan Elementary. They will utilize the Kill A Watt devices and research the best ways to conserve energy for different components in our building.

### Analyzing and interpreting data
**How will students be analyzing and interpreting the collected data?**

At the beginning of school, students will create and give a beginning of year survey to the teachers and staff of Reagan. They will use that information as a baseline before they implement any changes. Students will use a variety of tools to collect data throughout Reagan Elementary. They will locate our electricity meter to keep track of the energy being consumed at Reagan. They will use a Kill A Watt to figure out how much electricity is being consumed by different devices around the building through the day. With the help of our maintenance facility, students will locate previous electric bills to determine when energy consumption is highest. In small groups, students will take this information to devise an Energy Reduction Plan for Reagan Elementary.

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

Students will track one school year and the energy that is being consumed monthly on an excel spreadsheet. They will take that information and create a bar graph showing how much electricity Reagan Elementary is using during each month. This graph will stay near our front office for the school to keep track of. We will be using the National Energy Education Development Project website for information and activities. We will also use the Duke Energy website: [https://www.duke-energy.com/visitor-centers/energy-education.asp](https://www.duke-energy.com/visitor-centers/energy-education.asp) to help explore energy conservation activities that could help our staff and students at Reagan. The small groups will each take specific steps to reduce energy and focus on educating classroom teachers and students about how we can reduce consumption. They will put their information into a Prezi that will reflect all of the groups’ energy reduction ideas.

### Collaboration, critical thinking and communication

**Collaboration**

**Indicate how students will be collaborating during the implementation of the lesson plan.**

Students will work in small groups to educate different groups at Reagan. For example, one group might take the cafeteria and custodial staff, while one group might have first grade and our office staff. They will work as a small group to educate the different groups in the building about how much energy we Reagan consumes monthly and ways to reduce that. The small groups will have short ten minute check-ins monthly with their assigned groups to review best practices. This will provide time for students to share how our energy saving efforts are working. The students will share the monthly usage with their groups so that students and staff can see how small changes can make a big difference in one building.
### 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?

Students will use the monthly energy bills to help evaluate if the new practices have been successful. Once students see that they can help to reduce the energy costs for Reagan, we will have a Duke Energy representative join us again for a part 2 discussion. This discussion will give students the opportunity to see if there are further ways that Reagan can reduce energy consumption at an administration level. For example, can we have hall lights turned off at a specific time? Can the furnace or air conditioner be lowered and raised at different times of the day? This phase of the activity will require students to gather administrative support at Central Office. Students might consider discussing the plan at an upcoming Brownsburg School Board meeting.

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

Students will have the chance to communicate their data and practices monthly with our classroom. From there, they will share that information in a short 5-10 minute meeting with their assigned groups. This could be in the form of a graph, a Prezi, or just a quick discussion.

### References

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

- [http://www.need.org/intermediate](http://www.need.org/intermediate)

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

- [http://www.need.org/intermediate](http://www.need.org/intermediate)

### Assessment Plan
<table>
<thead>
<tr>
<th>Assessment Plan</th>
<th>Students will be assessed on their research to find best practices for reducing energy use. Each month, they will be assessed on their participation and efforts with their assigned classroom. Rubric attached.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How will the students be assessed during and/or at the end of the lesson plan?</td>
<td></td>
</tr>
<tr>
<td>Include resources that will be used to assess the students for the lesson plan.</td>
<td></td>
</tr>
</tbody>
</table>
## Resources and Costs

<table>
<thead>
<tr>
<th>Resources Needed</th>
<th>6 Kill A Watt devices: $18.96= $113.76</th>
</tr>
</thead>
</table>

### Costs

List the estimated cost of implementing this lesson plan.

Include all costs related to equipment, materials and any resource critical to the implementation of the lesson plan.

Total cost to implement: $113.76

## 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.

This plan will take all year to implement. We will do our energy activities at the beginning of the year in order to get reacquainted with what energy is and where it comes from.

- **Research time:** 4-5 days
- **Create classroom Prezi with each group’s energy reduction step:** 2 days
- **Time in classrooms:** 10 minutes, once a month
## Energy Reduction Plan Rubric

Research on Practices to Reduce Energy Consumption

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Student did not collect quality information for energy reduction practice.</td>
<td><strong>2</strong> Student collected some quality information for energy reduction practice.</td>
<td><strong>3</strong> Student collected quality information for energy reduction practice.</td>
</tr>
<tr>
<td><strong>1</strong> Student did not use a variety of resources for energy reduction plan.</td>
<td><strong>2</strong> Student used 1-2 resources for energy reduction plan.</td>
<td><strong>3</strong> Student used a variety of resources for energy reduction plan.</td>
</tr>
<tr>
<td><strong>1</strong> Student was not prepared to speak to class about energy reduction plan.</td>
<td><strong>2</strong> Student struggled with some parts to speak to class about energy reduction plan.</td>
<td><strong>3</strong> Students was well-prepared to speak to class about energy reduction plan.</td>
</tr>
</tbody>
</table>

Total Score: ____________ out of 9

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## Participation on Energy Reduction Plan

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Student was not prepared monthly to speak to assigned group about data on energy reduction plan.</td>
<td><strong>2</strong> Student was mostly prepared to speak to assigned group about energy reduction plan.</td>
<td><strong>3</strong> Student was well-prepared to speak to assigned group about energy reduction plan.</td>
</tr>
</tbody>
</table>

Total score: _________________ out of 3