The Great Energy Exploration  
Grades 9-12

Names: ________________________________________________
Room: ________________________________________________

Exploration 1
In this exploration, you will learn how to use the computer monitor to determine the energy use of the appliances in the room.

1. Click START
2. Find the appliances that are using the most and least amount of energy by turning on all the outlet switches and reading the monitor.
3. PAUSE when you find the two appliances
4. Record the Current Time and Electricity Cost
5. Record the data for those appliances in the chart below
6. Calculate the Total Watts, Total Watt Hours Used, and Total Usage Cost for the two appliances:

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Part Number</th>
<th>Watts</th>
<th>Watt Hours Used</th>
<th>Usage Cost</th>
</tr>
</thead>
<tbody>
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Current Time: ____________ AM  
Electricity Cost: __________$/kWh

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Total Watts: __________ W  
Total Watt Hours Used: __________ kWh  
Total Usage Cost: $ __________

7. Turn OFF all appliances
8. Click RESET
Discussion 1

1. Which appliance is more expensive to run based on **Usage Cost**?

2. Which appliance used more Watts?

3. Which of the two appliances used more energy, and how do you know?

4. How much does energy cost per kilowatt hour (Electricity Cost)?

5. How much would it cost to run the **most expensive** appliance for an entire day? Formula: (Watts/1000) x Electricity Cost x 24 hours

6. How much would it cost to run the **least expensive** appliance for an entire day? Formula: (Watts/1000) x Electricity Cost x 24 hours

7. Do we use all of the appliances for the same length of time in our daily lives?  Yes  or  No

8. If no, give an example of an appliance that we usually keep running for a long period of time.

9. Give an example of an appliance that we usually keep running for a short period of time.

10. How could you use this data to decide which appliances to run for longer or shorter amounts of time during the day?
**Exploration 2**
In this exploration you will learn the difference between standard meters and Smart Meters.

1. What is the Current Time? ________AM
2. Turn ON all appliances in the room.
3. Click START
4. What is the Electricity Cost? $__________/kWh
5. Click PAUSE after 1 hour
6. What is the Current Time? ________AM
7. What is the Electricity Cost? $__________/kWh
8. What is the Total Usage Cost? $____________
9. What is the Total Watt Hours Used? ___________/kWh
10. Click RESET
11. **Raise your hand for the electricity technician to come over and install a Smart Meter.**
12. What is the Current Time? ________AM
13. Click START
14. What is the Electricity Cost? $__________/kWh
15. Click PAUSE after 1 hour
16. What is the Current Time? ________AM
17. What is the Electricity Cost? $__________/kWh
18. What is the Total Usage Cost? $____________
19. What is the Total Watt Hours Used? ___________/kWh
20. Click RESET
21. **Turn off all appliances and click RESET**

**Discussion 2**

Answer the questions and then discuss as a group:

1. What change do you notice on the screen when you switch the standard meter with the Smart Meter?

________________________________________________________________________

2. How would seeing different prices during the night and day affect when you use appliances?

________________________________________________________________________

3. If energy is cheaper at night, why wouldn’t you run your appliances at night?

________________________________________________________________________

4. Why do you think an energy company would charge less to use energy at night?

________________________________________________________________________
Exploration 3
In this exploration you will test three of the same appliance in your room to learn about its energy efficiency. (Example: three toasters or three vacuums). Your group can test the same appliance or you can each choose your own.

1. Pick the appliance you want to test and turn it ON
2. Click START when everyone’s appliance is ON
3. Copy the EnergyGuide Tag
4. What is its purchase price? $_____________
5. Click PAUSE after 1 hour.
6. Record the data from the monitor and RESET

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7. Turn OFF and UNPLUG your appliance
8. Swap it out in the appliance store for a different model of the same appliance.

1. Plug in the SECOND appliance and turn it ON
2. Click START when everyone is ready
3. Copy the EnergyGuide Tag
4. What is its purchase price? $_____________
5. Click PAUSE after 1 hour.
6. Record the data from the monitor and RESET

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1. Plug in the THIRD appliance. Turn it ON
2. Click START when all teams are ready
3. Copy the EnergyGuide Tag
4. What is its purchase price? $_____________
5. Click PAUSE after 1 hour.
6. Write the data from the monitor and RESET

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Discussion 3
Assume the Electricity Cost is $.10/kWh

1. Which of the three appliances is the most expensive to buy? ________________

2. Which one is the least expensive to buy? ________________

3. How much would it cost to run the most efficient appliance for a month?
   Formula: (Watts/1000) x Electricity Cost x 24 x 30
   _______________________________________________________________________

4. How much would it cost to run the least efficient appliance for a month?
   Formula: (Watts/1000) x Electricity Cost x 24 x 30
   _______________________________________________________________________

5. How much money would you save per month by using the more efficient appliance?
   (difference between the totals found in questions 3 and 4)
   _______________________________________________________________________

6. Give two reasons related to energy why you would purchase an appliance that had a more expensive original cost.
   1. _______________________________________________________________________
   2. _______________________________________________________________________

7. How could having knowledge about how to read an EnergyGuide tag help you make informed decisions about purchasing appliances?
   _______________________________________________________________________
   _______________________________________________________________________

Turn OFF all appliances
Leave one plugged in. Put the other two back in the appliance store.
Click RESET