

Saving Energy

This lesson plan will introduce students to the financial costs of energy use. Through exploring the cost of lighting their classroom, students will understand financial concepts such as the hidden costs of everyday energy use, and gain a deeper understanding of managing finances in the real world. Complete each section by following the instructions below.

 Teacher Led	 Requires Computer OR Mobile Device	 Requires Spaces
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Spaces Prep

Create your Activity in Spaces before the lesson. Not sure how to create an Activity? Check out this [short video tutorial](#) on assigning and managing Activities.

Learning Goals

1. Students will apply financial literacy concepts to real-life situations by completing a cost analysis of energy use in their classrooms.
2. Students will develop and practice strategies for adding and multiplying decimal numbers to the nearest thousandths.

Materials

 Student Handouts	HANDOUT [A]: My Electricity Use HANDOUT [B]: Cost of Lighting our Classroom
 Technology Requirements	<ul style="list-style-type: none"> • Internet • Mobile device, tablet, or laptop

**Additional
Materials**

- Chalkboard, whiteboard, or Smart Board
- Manipulatives (Ex. Base ten materials)

Instructions

Introducing the Lesson

1. Ask students to think about how often they use **electricity** in their lives. Students can reflect on their own habits of electricity use at home and at school by using **HANDOUT [A]: My Electricity Use** (see page 6). You may wish to invite students to share some examples of where they use electricity in their daily lives.
2. Tell students that they will be investigating the financial cost of using electricity. Students will be investigating by answering the following question: **How much money does it cost to light our classroom for one hour?**
3. **Think-Pair-Share:** Using think-pair-share, ask students: What information do you need in order to find out how much money it costs to light our classroom?
4. Allow each pair to share with the class what information they think they need to answer the question. Draw attention to the following pieces of information that are needed to solve the problem:
 - How much does it cost to use energy for one hour?
 - How many light bulbs are in the classroom?
 - How much energy does each light bulb use?

*Teacher's Note: Take the opportunity to define the term **watt** with students, a unit of measurement for electrical energy.*

5. Supply students with the following information:
 - Wattage of light bulbs: This information will vary across schools. The wattage of bulbs can be found labelled on the packaging, on many bulbs, or online.
 - Cost of electricity for one hour: \$0.095 per kWh in Ontario (According to 2017 Ontario Energy Board)
 - Number of light bulbs: This information will vary across schools. You can ask students to count the light bulbs in the classroom or pre-count to save time.

Class Brainstorm and Activity

1. Give out **HANDOUT [B]: Cost of Lighting Our Classroom** and review as a class. Fill in the information you and your students already know:
 - o Number of light bulbs
 - o Wattage of light bulbs
 - o Cost for one hour: \$0.095/kWh
2. Students should be reminded of the conversion of watts to kilowatts:
 - o 1 kilowatt equals 1000 watts
 - o Converting watts to kilowatts is done by dividing the wattage by 1000 (Ex. 60 watts = 0.06 kilowatts)
 - o Cost of energy is measured in kilowatts. Therefore, students must divide the cost (\$0.095) by 1000
3. Model solving an example problem with your students.

**Teacher's Note: Students should continue to use the strategies and algorithms they have learned for adding, subtracting, multiplying, and dividing decimal numbers to the thousandths. This might include, but is not limited to:*

- o *Use available manipulatives such as base ten materials to represent decimal numbers*
 - o *Use a calculator to look for patterns and generalize a rule when multiplying/dividing with decimal numbers*
 - o *Use a standard column, addition algorithm to add decimal numbers*
 - o *Look for patterns in place value and decimal position*
4. Divide the class into small-groups and allow students to work collaboratively to solve the problem.
 5. **Think-Pair-Share:** Using think-pair-share, ask students to talk with a partner from another group about how their group solved the problem. This will give students an opportunity to consolidate their thinking before sharing as a whole class. Use the following questions to guide discussion:
 - o What strategies did you use to solve the problem?

- o What challenges, if any, did your group encounter?
 - o Did the cost for lighting the classroom surprise you? Why or why not?
6. As a class, ask for a few students to share their strategies for solving the problem. Highlight differences and similarities in how students chose to solve the problem.

Documenting the Activity in Spaces

Teacher Tip!

This lesson has been created as an Activity in Spaces, but you can easily adapt the instructions if you'd prefer for your students to post directly into the Class Space or their Individual Space.

1. Explain to students that they will complete an Activity in Spaces that includes the following:
 - a. Media entry (picture): HANDOUT [A]: My Electricity Use
 - b. Media entry (picture): HANDOUT [B]: Cost of Lighting Our Classroom
 - c. Description: A reflection of the lesson that answers the following prompts:
 - Were you surprised by how expensive it is to light your classroom? Why or why not?
 - What strategies did you use to solve how much it costs to light your classroom?

*Teacher's Note: Explain to students that they should take this opportunity to use the **Have a question?** feature in the Activity before submitting their work.*

- *What is one thing you don't understand or one question you have about today's math lesson?*



Have a question?

Add a comment to start a conversation with your teacher

    

2. Students will complete the Activity in Spaces by following these guidelines:
 - a. Click **Activities** > Choose today's activity
 - b. Read the Activity and Click **✓ Start Activity**



- c. Media > Choose **Camera** or **File** > add a picture of HANDOUT [A]: My Electricity Use
- d. Media > Choose **Camera** or **File** > add a picture of HANDOUT [B]: Cost of Lighting Our Classroom
- e. Add a title > “Electricity Use in School”
- f. Post Description > This is where students should write their reflection.
- g. ✓ **Submit** > Click **Yes, Submit**

Extension: Reducing Classroom Energy Use

Once you have reviewed student work and added student work to either the Class Space or the Individual Space, students can revisit the concepts from this lesson. Discuss with students how energy use also has an environmental cost and discuss how reducing energy use can help the environment. Create a class-wide goal to reduce the amount of electricity used in the class.

1. Encourage students to create posters to display in the classroom and school that promote saving energy.
2. Ask students to also document their poster in Spaces. Students should locate their post in the **Class Space** or their **Individual Space**
3. In the **Add reflection** box, students can **Add Media** to digitally document their poster. Encourage students to also answer the following questions:
 - What information did you decide to include in your poster?
 - Why do you believe it is important to save energy?

Lesson adapted from:

http://www.edugains.ca/resourcesFL/VideoClipsFL/Elementary/Gr6_ScienceLanguage_SavingEnergy/AssociatedFiles/Gr6_SciLang_Lesson.pdf

HANDOUT [A]: My Electricity Use

How often do I use electricity?

Compile a list of all the sources of electricity that you use in the morning, afternoon, and evening.

Morning	Afternoon	Evening

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HANDOUT [B]: Cost of Lighting our Classroom

Take an inventory of all the light bulbs in your classroom. Record your findings in the chart below.

Room	Example: Home Bedroom	Classroom
# of Lights	1 ceiling light 2 lamps	
Wattage of Bulbs	100 W 60 W (2)	
Cost for Electricity *0.095/kWh	=\$0.000095/W	
Total Cost of Light (for 1hr)	100 W x \$0.095= \$0.0095 60 W x \$0.095= \$0.0057 60W x \$0.095= \$0.0057	
Total Cost per Room (for 1hr)	$ \begin{array}{r} \$0.0095 \\ \$0.0057 \\ + \$0.0057 \\ \hline \$0.0209 \end{array} $	
Total Cost for 1 year (for 1hr of use each day)	$\$0.0209 \times 365 = \7.63	

Remember: 1 Kilowatt (kW) = 1000 Watts (W)