Kill-A-Watt Activity

This information is used to calculate the cost to provide electricity for the lights. NGSS Performance Expectations: This activity can be used to facilitate the following performance expectation: HS-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one for another.* (Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that convert sorted energy to cause motion or produce light or sound.] Science & Engineering Practices: Disciplinary Core Ideas: HSPS.B: Conservation of energy and energy transfer Crosscutting Concepts: Cause and effect Planning and carrying out an investigation Using mathematical and computational thinking Cause and effect Constructing explanations and designing solutions EXESSON PLAN – 5-E Model Energy and matter ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Materials Needed Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 Materials Needed Kilowatt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Key Vocabulary: Kilowatt h	Grade/Grade Band: 6-8/9-12	Topic: Electricity	Subject Area: Physical Science/Chemistry	
NGSS Performance Expectations: This activity can be used to facilitate the following performance expectation: HS-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one for another.* [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that com light into heat. Examples of constraints could include the materials, cost, or time to design the device [Assessment Boundary: Devices should be limited to those that convert motion energy to electric end or use stored energy to cause motion or produce light or sound.] Science & Engineering Practices: Planning and carrying out an investigation Using mathematical and computational thinking Constructing explanations and designing solutions LESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Kilowatt meter Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run multiple strands of each light. EXPLORE: Lesson Description: Key Vocabulary: Conserve Company. <td colspan="4">Brief Lesson Description: A kilowatt meter is used to measure the electricity consumed by holiday lights.</td>	Brief Lesson Description: A kilowatt meter is used to measure the electricity consumed by holiday lights.			
This activity can be used to facilitate the following performance expectation: HS-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one for another.* [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that conlight into heat. Examples of constraints could include the materials, cost, or time to design the device (Assessment Boundary: Devices should be limited to those that convert motion energy to electric end or use stored energy to cause motion or produce light or sound.] Science & Engineering Practices: Disciplinary Core Ideas: Planning and carrying out an investigation Disciplinary Core Ideas: Using mathematical and computational thinking Crosscutting Concepts: Constructing explanations and designing solutions EESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Key Vocabulary:				
HS-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one for another.* [Clarification Statement: Examples of devices could include electric circuits that convert light into heat. Examples of constraints could include the materials, cost, or time to design the device [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.] Science & Engineering Practices: Planning and carrying out an investigation Using mathematical and computational thinking Constructing explanations and designing solutions LESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. EXPLAN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. HSPLS: Concept Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.	NGSS Performance Expectations:			
another.* [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that com light into heat. Examples of constraints could include the materials, cost, or time to design the device [Assessment Boundary: Devices should be limited to those that convert motion energy to electric end or use stored energy to cause motion or produce light or sound.] Science & Engineering Practices: Disciplinary Core Ideas: Crosscutting Concepts: Planning and carrying out an investigation Disciplinary Core Ideas: Crosscutting Concepts: Using mathematical and computational thinking Constructing explanations and designing solutions Crosscutting Concepts: ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Materials Needed Guiding Question: Can you afford to have holiday lights like Clark Griswold? Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Key Vocabulary: Kilowatt hour and generation/transmission charges from the electric conserve Energy Conserve Energy	This activity can be used to facilitate the following performance expectation:			
Planning and carrying out an investigation HSPS.B: Conservation of energy and energy transfer Cause and effect Energy and matter Using mathematical and computational thinking Constructing explanations and designing solutions Cause and effect ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? Materials Needed Kilowatt meter Holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Students use a Kill-A-Watt meter The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary:	electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy			
Planning and carrying out an investigation HSPS.B: Conservation of energy and energy transfer Cause and effect Using mathematical and computational thinking Constructing explanations and designing solutions Cause and effect ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? Materials Needed Kilowatt meter Holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Students use a Kill-A-Watt meter to relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary:	Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:	
Using mathematical and computational thinking Constructing explanations and designing solutions ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Kilowatt meter Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Materials Needed Kilowatt meter EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary: Conserve Energy	u u		. .	
computational thinking Constructing explanations and designing solutionsLESSON PLAN – 5-E ModelENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials Needed Kilowatt meterStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Student HandoutEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	investigation	and energy transfer	Energy and matter	
Constructing explanations and designing solutions LESSON PLAN – 5-E Model LESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Student Handout EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary:	Using mathematical and			
designing solutions LESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Student Handout EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary:				
LESSON PLAN – 5-E Model ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Students use a watt, a kilowatt hour and generation/transmission charges from the electric company.				
ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's) Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials Needed Kilowatt meterStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Key Vocabulary: Conserve EnergyEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	designing solutions			
Optional: Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here? Guiding Question: Can you afford to have holiday lights like Clark Griswold? EXPLORE: Lesson Description: Materials Needed Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light. Student Handout EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company. Key Vocabulary:	LESSON PLAN – 5-E Model			
Christmas Vacation Lights Scene, https://www.youtube.com/watch?v=iXaw70X7wb4 What is happening here?Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials NeededStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Students use a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	ENGAGE: Suggested Opening Activity (Access Prior Learning / Stimulate Interest / Generate Q's)			
What is happening here?Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials NeededStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Materials Needed Kilowatt meterEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy				
Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials Needed Kilowatt meterStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Student HandoutEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	Christinas vacation Lights Scene, <u>https://www.youtube.com/watch:v=ixaw/ox/wb4</u>			
Guiding Question: Can you afford to have holiday lights like Clark Griswold?EXPLORE: Lesson Description:Materials Needed Kilowatt meterStudents use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Materials Needed Kilowatt meter 	What is happening here?			
Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Kilowatt meter Holiday lights Student HandoutEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy				
Students use a Kill-A-Watt meter to determine the wattage used by two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Holiday lights Student HandoutEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	EXPLORE: Lesson Description:		Materials Needed	
two different strands of holiday lights. This data is then used to calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Student HandoutEXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy			Kilowatt meter	
calculate the cost to run each strand of lights for one hour, one day and one month. Then students calculate the cost to run multiple strands of each light.Key Vocabulary:EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy			Holiday lights	
and one month. Then students calculate the cost to run multiple strands of each light.Key Vocabulary:EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy	· •		Student Handout	
strands of each light.Key Vocabulary:EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy				
EXPLAIN: Concepts Explained: The relationship between a watt, a kilowatt hour and generation/transmission charges from the electric company.Key Vocabulary: Conserve Energy				
kilowatt hour and generation/transmission charges from the electricConservecompany.Energy				
company. Energy	•••			
	Company.			
Watt/Kilowatt/Kilowatt hour				

ELABORATE: Suggested Activity	SEP (Select/highlight)	CCC (Select/highlight)	
(Making sense through building models and constructing explanations by connecting concepts to the SEP and CCC.)	1. Asking questions	1. Patterns.	
	2. Developing and using models	2. Cause and effect	
	3. Planning and carrying out	3. Scale, proportion, and	
	investigations	quantity.	
	4. Analyzing and interpreting	4. Systems and system models.	
	data	5. Energy and matter	
	5. Using mathematics and	6. Structure and function	
	computational thinking	7. Stability and change.	
	6. Constructing explanations		
	7. Engaging in argument from		
	evidence		
	8. Obtaining, evaluating, and		
	communicating information		
EVALUATE Formative Monitoring (Questioning / Discussion):		Summative Assessment (Quiz /	
		Project / Report): Post lab	
Suggestion(s) to Flaborate Further	/ Deflect / Envices Students could a	questions provided.	
Suggestion(s) to Elaborate Further / Reflect / Enrich: Students could conduct this investigation at home in real life. They could learn how to read their own electric bill, find out where their electric company			
obtains electricity and learn about renewable and nonrenewable energy sources.			