Stations (Lesson 3)

*****Please note: The highlighted stations are ones the class did not get a chance to complete due to limited amount of time.**

- Station #1: Light Energy Video

Students are watching a video on the iPad

https://www.youtube.com/watch?v=4lnKoDAb33A

Procedures:

- Write "Station #1" on your notebook paper
- Then with space in between each number, write #1 #2 #3
- Watch the video on the iPad
- Answer these question in your notebook
  - #1 Is light a form of energy? How do you know?
  - #2 Light passes through _____ objects.
  - #3 If there was no light on Earth, could we see anything?
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:

#1 Yes, it moves.
#2 Transparent
#3 No

- Station #2: Light as Heat Energy

  A black t-shirt, a white t-shirt, and a blue t-shirt will be under a lamp that is turned on in order for the t-shirts to heat up. When students come to the station, they will feel all the t-shirts and realize how warm the black t-shirt is compared to the others.

Procedures:

- Write "Station #2" on your notebook paper
- Then with space in between each number, write #1 #2 #3
- Each person take turns touching every t-shirt
- Answer these question in your notebook
  - #1 What do you feel when you touch each t-shirt?
  - #2 Which t-shirt feels the warmest?
  - #3 Why is that t-shirt warmer than the others?
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:

#1 Warmth; heat
#2 Black t-shirt
#3 The black t-shirt absorbs more light from the lamp than the other t-shirts.

*More background information about question #3: Light is a source of heat (radiant energy). Black absorbs (takes in) all the light from the lamp, which makes the t-shirt feel warmer than the others. White reflects (throws back) the light, which is why it doesn't feel as warm. The blue t-shirt absorbs all light except for blue, which is reflected. That is why the t-shirt looks blue. It will be helpful to elaborate on this using the electromagnetic spectrum chart.

- Station #3: Pencil in a cup of water

Students are observing a pencil placed in a clear cup with water in it.

Procedures:

- Write "Station #3" on your notebook paper
- Then with space in between each number, write #1 #2 #3
- Look at the pencil in the cup of water
- Answer these question in your notebook
  - #1 What do you notice about the pencil? (get down low and look at the pencil from the side of the cup)
  - #2 Is the pencil really bent? (someone pick up the pencil)
  - #3 Why does the pencil look bent?
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:

#1 The pencil looks bent
#2 No
#3 The light that hits the water bends and makes the pencil look bent

*More background information about question #3: The pencil looks broken because light shining from the air to the water is bent. Light that is bent when moving from one substance to another (air to water) is called refraction.

- Station #4: Flashlight and a mirror

Students shining light from a flashlight at a mirror and observing what is happening.

Procedures:

- Write "Station #4" on your notebook paper

- Then with space in between each number, write #1 #2 #3
- One person needs to hold the mirror
- Another person needs to turn on the flashlight and shine it at the mirror about 5 feet away (**DO NOT SHINE IT IN ANYONE'S EYES!**)
- Everyone else needs to look at what is happening to the light
- Answer these question in your notebook

  #1 How does light travel when you are shining it at the mirror?

  #2 What happens to the beam of light when you shine it at the mirror?

  #3 What is the scientific word when light bounces back (off a mirror)?
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:

#1 In a straight line
#2 It bounces off the mirror
#3 Reflection

*More background information about question #3: When light hits a smooth and shiny object (like a mirror) it bounces off, reflects.

- Station #5: Light Absorption, Reflection, and Refraction Video

Students are observing a pencil placed in a clear cup with water in it.

http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/light-absorb-reflect-refract.htm

Procedures:

- Write "Station #5" on your notebook paper
- Watch the video
- After you've finished the video, take the quiz as a group
- Review the answers and talk about why you got any of the questions wrong
- Write three things you learned from the video
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:

The teacher will have to look over each students' notebook or ask students what they wrote down when reviewing all the stations as a class. You may even want to watch this video as a whole class again and retake the quiz.

- Station #6: Light Energy Quiz

Students are answering five different questions about light energy.

Procedures:

- Read all five questions on the quiz worksheet and work together as a group to answer the questions
- Turn in your paper after you have finished
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:
Review the quiz answers with the entire class

- Station #7: "Get Logical" and Light Energy Concept Map

Students are completing a worksheet called "Get Logical" and drawing a concept map in their notebook and filling it with information about light energy.

Procedures:

- Write "Station #7" on your notebook paper
- Complete the "Get Logical" worksheet together (read the directions)
- Then draw a concept map in your notebook like the paper shown (**Do not draw on the concept map worksheet**)
- Draw five branches from the circle and write five things you know about light
- Once everyone is done with the concept map, share the five things you wrote
- Turn in your "Get Logical" worksheet
- Move to the next station! Take your stuff!

Answers for the teacher to review with the class:
Review the "Get Logical" worksheet together as a class and ask students to share their five things aloud with the entire class once you review this station.

***Another video about light energy if time allows:
http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/light.htm

Lesson 4: The Importance of Light and Thomas Edison

EFFECTIVE INSTRUCTIONAL DESIGN – STANDARDS BASED LESSON PLAN

Elements of the Lesson	Evidence that Documents the Elements
Standard **MDE grade level or CCSS**	**P.EN.03.11** Identify light as a form of energy. **P.PM.03.52** Explain how we need light to see objects: light from a source reflects off objects and enters our eyes.
Objectives/Targets – I can statements **What am I going to teach?** **What will the students be able to do at the end of the lesson?** **How will the objectives be assessed? How will they use/apply their new knowledge?** **What formative assessments will I use to inform instruction?**	**I can…** I can describe the importance of light and its use in everyday life. I can explain how we use light to see. I can summarize the importance of Thomas Edison.
Lesson Management: Focus and Organization **What positive strategies, techniques and tools will I use?** **What are my ideas for on task, active and focused student behavior?**	To promote positivity, I will always be announcing student's names that are following directions and participating in the discussion. I will also be wandering around the room as students are filling out the Important Information about Thomas Edison worksheet. Active students are watching the video, looking at pictures of the Thomas Edison statue/museum, talking to their classmates, and filling out the worksheet.
Introduction: Creating Excitement and Focus **What will I do to capture student interest?** **What prior knowledge needs to be accessed?** **In what practice/review will students participate?**	At the beginning of the lesson, I engage students by asking them if they remember whom they read about a few weeks ago for their constructed response reading that worked with light (hint: he's from my hometown). I will have students talk to someone near them for a few minutes in order to recall his name. After students answer that question, I will explain that todays lesson will discuss Thomas Edison and his contribution to science, specifically light.

Input: Setting up the Lesson **Task analysis:** • **What information does the learner need? If needed how will it be provided?** • **How is the lesson scaffolded? [step-by-step)** **Thinking levels: questions to engage students' thinking** • **Remembering** • **Understanding** • **Applying** • **Analyzing** • **Evaluating** • **Creating** **Accommodations: implementing differentiation principles** • **Remediation/Intervention** • **Extension/Enrichment** • **Learning styles** **Methods, Materials and Integrated Technology** • **Instructional methods** • **Engagement strategies** • **Materials needed and prepared** • **Integrated technology list**	**Task Analysis:** The learner needs information about Thomas Edison and his invention of the long lasting light bulb. This knowledge will be provided to students via watching a video, looking at pictures, and completing a fill-in-the-blank worksheet. In addition, students will spend a brief time with the lights off to understand the importance of artificial light and learn how some people in different countries around the world don't have such light. First, the students and I will watch short video discussing Thomas Edison and his significance toward science. Then the class and I will look at pictures of the statue of Thomas Edison and the museum in honor of him in my hometown of Port Huron. Next, they will read bits of information about Thomas while filling in some of the blanks. Before the lesson ends, I will ask students some questions about having the lights off all hour: "Why did I turn off the lights?" "How did having the lights off make you feel?" "Why are lights so important to us?" Lastly, I will also explain to the class how people in other countries don't have artificial light as readily as we do in the United States. **Thinking Levels:** Remembering- Whom did you read about a few weeks ago that invented a long lasting light bulb? Understanding- Did Thomas Edison invent the light bulb? Evaluating- Why is Thomas Edison so important to all of us? **Accommodations:** For intervention I will wander the room and individually help students as needed with the fill-in-the-blank worksheet. I will redirect students who seem to be off task or distracted. For an extension, I will encourage students to research additional information about Thomas Edison. Learning styles for this lesson include linguistic, visual/spatial, interpersonal, and auditory (musical).

	Methods, Materials, and Integrated Technology: An instructional method I'm using in this lesson is whole group discussion and choral reading. The class and I will talk about Thomas Edison and his accomplishments. Also, they will be reading pieces of information about Thomas aloud and trying to figure what goes in the blanks. I will engage students by showing pictures of my hometown and the museum and statue dedicated to Thomas Edison. I will also show a brief video summarizing Edison's work with the long lasting light bulb via song. Each student will need a pencil and one copy of the Important Information about Thomas Edison worksheet. I will need a computer, speakers, the ELMO, copies of the Important Information about Thomas Edison worksheet, pictures of the Thomas Edison statue and museum, and the link for the video. Technology used in this lesson is a computer, the ELMO, and a video.
Modeling: "I DO" **Show/Tell: visual/verbal input (i.e. demonstrate/tell)** **How/What: questioning and redirecting techniques**	I will be modeling how to fill out the worksheet about Thomas Edison on the ELMO by reading the first bullet point and then thinking about the best answer for the blank.
Checking for Understanding **Teach some – stop and check – resume teaching** **Ways in which students will respond and be engaged** **Formative assessment strategies to be implemented**	In addition to walking around the room when students are completing the worksheet together as a class, I will be asking students to put up their thumbs in the air when they are finished filling in each blank. This will let me know when it's a good time to move onto the next one. As for watching the video and looking at pictures, I will pose different questions to the students and pick sticks to see who will answer them. Some of the questions I will ask: "What did Thomas Edison invent?" How many hours did his light bulb last?" "Where did he grow up?"
Guided Practice: "WE DO" **What do the teacher and student do together?** **Modeling first then with a gradual release of responsibility**	After I've modeled how to fill in the blank for the first bullet point, I will have the whole class read the next two bullet points and we will think of the best words to go in the blanks as a class.

Collaborative ("YOU DO TOGETHER") and/or Independent Practice ("YOU DO") **What practice(s) will be demonstrated/modeled?** **How will connections be made?** **How will students demonstrate target?**	We will continue to fill in the blanks, but I will ask individual students to read the bullet points rather than the whole class. We will discuss what word should go in each blank until the worksheet is completed. Connections will be made because as students are reading the information, they will understand Thomas Edison's contribution to the light. Students will demonstrate the target by completing the worksheet, which I will collect and correct.
Closure **How will I review the I can statements?** **How will connections be made to future learning?**	After we've filled out the worksheet and looked at pictures, I will pose the questions about turning the lights off for the entire hour. Once those are answered I will restate the "I Can" statements with the class. Then I will discuss that we will review our learning in the next lesson for the upcoming test.
Assessment **What evidence supports that the objective(s) were met?** **What do my students know, understand and are able to do?** **What formative assessments informed your instruction?**	The students' Important Information about Thomas Edison worksheet will be evidence of meeting the objectives. The students understand that Thomas Edison was a scientist whom invented the long lasting light bulb. They will also know that he is a native (lived in Michigan). Students will understand that light is needed to see and it is very important to us. They are able to discuss who Thomas Edison was and his contributions toward light. Students putting their thumbs up and the completion of the worksheet are both ways in which I will formatively assess.
Reflection **Using your assessment data, what will you change?** **How well did the students perform? Were all students engaged?** **How was my timing?** **How many students struggled? What will I do to help those who struggled?** **What will I do to extend the learning for those who met target?** **What did everyone know? What did no one know? Were there any surprises?**	This lesson focused on integrating social studies so the information wasn't assessed on the final test. It was just another way to ensure students understood that light is needed in order to see and that light is important. Students completed the worksheet without difficulty and they were really interested in learning about Thomas Edison! I finished the lesson in a timely manner because I condensed an informational passage about Thomas Edison. Rather than students reading the passage and answering questions, I had students read fewer details about Thomas and fill in missing information. Students didn't struggle because they were only writing in a word or two. If anything, the worksheet was an easy task to accomplish and I could have made it

	more difficult. To extend the lesson, I will have students research more about Thomas Edison on their own time. Everyone knew at least one reason why light is important to us. No one knew what Thomas Edison invented. Most thought he invented the light bulb, which isn't true. There were really no surprises with this lesson.

(2014/2015)

Name: _____ Date: _____

Important Information about Thomas Edison

- Born on February 11, 1847 in Milan, Ohio and moved to _____, Michigan when he was seven

- Had many different _____- phonograph, motion picture camera, and more

- Thomas Edison was self-educated, he only went to school for - _____ months

- Started _____ with different electrical items at a young age

- Edison _____ invent the light bulb

- He tinkered with light bulbs and created a bulb that lasted for _____ hours

- Thomas was totally deaf in one ear and couldn't hear much in his other ear- didn't talk much, which allowed him to work more

- He worked _____ hard- 16 out of every 24 hours

- Passed away on October 18, 1931

- Thomas _____ many things that still help us today

Lesson 5: Light Energy Review

EFFECTIVE INSTRUCTIONAL DESIGN – STANDARDS BASED LESSON PLAN

Elements of the Lesson	Evidence that Documents the Elements
Standard **MDE grade level or CCSS**	**P.EN.03.11** Identify light as a form of energy. **P.EN.03.21** Demonstrate that light travels in a straight path and that shadows are made by placing an object in a path of light. * **P.EN.03.22** Observe what happens to light when it travels from air to water (a straw half in the water and half in the air looks bent). * **P.PM.03.51** Demonstrate how some materials are heated more than others by light that shines on them. **P.PM.03.52** Explain how we need light to see objects: light from a source reflects off objects and enters our eyes.
Objectives/Targets – I can statements **What am I going to teach?** **What will the students be able to do at the end of the lesson?** **How will the objectives be assessed? How will they use/apply their new knowledge?** **What formative assessments will I use to inform instruction?**	**I can…** I can list different light sources. I can identify characteristics of light. I can describe how light can travel through some objects and not others. I can illustrate how light can be reflected and refracted. I can discuss how light can change into heat energy.
Lesson Management: Focus and Organization **What positive strategies, techniques and tools will I use?** **What are my ideas for on task, active and focused student behavior?**	To promote positivity, I will always be announcing student's names that are following directions and completing the Light Energy Study Guide. I will also be wandering around the room as students are working with partners in order to fill out the review. Active students are working together with their partner to answer various questions.

Introduction: Creating Excitement and Focus **What will I do to capture student interest?** **What prior knowledge needs to be accessed?** **In what practice/review will students participate?**	At the beginning of the lesson, I will capture students interest by showing them a beautiful picture of the Thomas Edison statue, the Blue Water Bridge, and the Saint Clair River while the sun is setting in order to review the prior lesson. The knowledge that needs to be accessed is what we have discussed in the previous four lessons about light energy. The students will participate in completing a study guide to review for the test.
Input: Setting up the Lesson **Task analysis:** • **What information does the learner need? If needed how will it be provided?** • **How is the lesson scaffolded? [step-by-step)** **Thinking levels: questions to engage students' thinking** • **Remembering** • **Understanding** • **Applying** • **Analyzing** • **Evaluating** • **Creating** **Accommodations: implementing differentiation principles** • **Remediation/Intervention** • **Extension/Enrichment** • **Learning styles** **Methods, Materials and Integrated Technology** • **Instructional methods** • **Engagement strategies** • **Materials needed and prepared** • **Integrated technology list**	**Task Analysis:** The learner needs to review all of the information previously taught in lessons one through four. The students will work with another classmate to complete the study guide. Before I send them to work together, I will read all of the questions and discuss what needs to be done for each question. After students have about fifteen minutes to work on it, I will go over the answers with the class. **Thinking Levels:** Remembering- Most of earth's light energy comes from the _____. When light passes through water, it bends, or _____. Light travels in a _____ _____ and does not bend. Understanding- Explain why we can see the moon at night, even though it doesn't create its own light. Explain how shadows are made. You may also draw a picture to add to your written explanation. Applying- Draw a picture to demonstrate the vocabulary word: Reflection, refraction, translucent, opaque, transparent. Draw and label 3 sources of light. **Accommodations:** For intervention I will wander the room and individually help students as needed with the study guide. I will redirect students who seem to be off task or distracted. For an extension, students need to review the study guide again at home for the upcoming test. Learning styles for this lesson include linguistic, visual/spatial, interpersonal, and

	logical. **Methods, Materials, and Integrated Technology:** Since students are reviewing information, an instructional method won't be used. I will engage students by showing them a picture of the Thomas Edison statue. Each student will need a pencil, a clipboard (if they decide to work around the room), and a copy of the Light Energy Study Guide. I will need the ELMO and copies of the Light Energy Study Guide. The only technology used in this lesson is the ELMO.
Modeling: "I DO" **Show/Tell: visual/verbal input (i.e. demonstrate/tell)** **How/What: questioning and redirecting techniques**	I will model for students by reading each question from the study guide and telling them how to fill each section out prior to having them complete it with a partner.
Checking for Understanding **Teach some – stop and check – resume teaching** **Ways in which students will respond and be engaged** **Formative assessment strategies to be implemented**	I will check for understanding by walking around the room and looking at student work. I will also get an understanding based on how well students can provide the answers to the questions on the study guide. Students will respond by completing the study guide.
Guided Practice: "WE DO" **What do the teacher and student do together?** **Modeling first then with a gradual release of responsibility**	Toward the end of the lesson, students and I will review the study guide together by going over the answers. I will call upon students to give me the answer to the questions as a way to check in with students.
Collaborative ("YOU DO TOGETHER") and/or Independent Practice ("YOU DO") **What practice(s) will be demonstrated/modeled?** **How will connections be made?** **How will students demonstrate target?**	Students will complete the study guide with a partner. Connections will me made to previous lessons because of the questions on the study guide. They will demonstrate the targets by successfully answering the questions.
Closure **How will I review the I can statements?** **How will connections be made to future learning?**	After we review the study guide as a class, the students and I will name some of the concepts we've learned about over the past couple of weeks. I will ask that they go over the study guide as homework for the evening

	in order to do well on the upcoming test.
Assessment **What evidence supports that the objective(s) were met?** **What do my students know, understand and are able to do?** **What formative assessments informed your instruction?**	The students' work on the study guide will be evidence of meeting the objectives. The students understand that light is form of energy, it is needed in order to see things, light can go through some objects and not others, light can be reflected, it can be refracted, and it can change into heat. Students' completion of the study guide is the way in which I will formatively assess.
Reflection **Using your assessment data, what will you change?** **How well did the students perform? Were all students engaged?** **How was my timing?** **How many students struggled? What will I do to help those who struggled?** **What will I do to extend the learning for those who met target?** **What did everyone know? What did no one know? Were there any surprises?**	Based on the assessment data, I would have gone back and reviewed the definitions of the words they wrote in their science notebook (opaque, transparent, translucent, reflection, refraction). I would have also again talked about the word radiant and how it's another word for heat. Students completed about half or more of the study guide before time was up and we had to review it as a class. Ideally, I would have liked the students to spend more time on the study guide, but due to time we had to wrap it up. Some students struggled on the fill-in-the-blank and I helped those students by reviewing it together as a class. To extend the learning, I will having students review the study guide as home on their own. Everyone knew light sources and the many characteristics of light. Some students still struggled with the meaning of some scientific words we learned (reflection, refraction). There were no surprises for this particular lesson.

Name _____

Light Study Guide

Fill in the blanks

1. _____ energy, or radiant energy, can increase _____ of things it shines on.

2. _____ are formed when light is blocked and a dark area appears.

3. Most of the earth's light energy comes from the _____.

4. When light passes through water, it bends, or _____.

5. When light hits a mirror it _____, or bounces back.

6. Light travels in a _____ _____ and does not bend.

Draw a picture to demonstrate the vocabulary word

Reflection

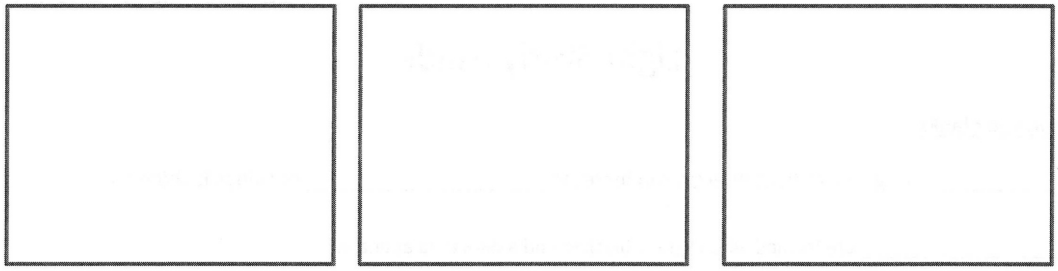
Refraction

Translucent

Opaque

Transparent

Draw and label 3 sources of light



Short Answer

1. Explain why we can see the moon at night, even though it doesn't create its own light.

_____

_____

_____

_____

2. Explain how shadows are made. You may also draw a picture to add to your written explanation.

_____

_____

_____

_____

_____

_____

_____

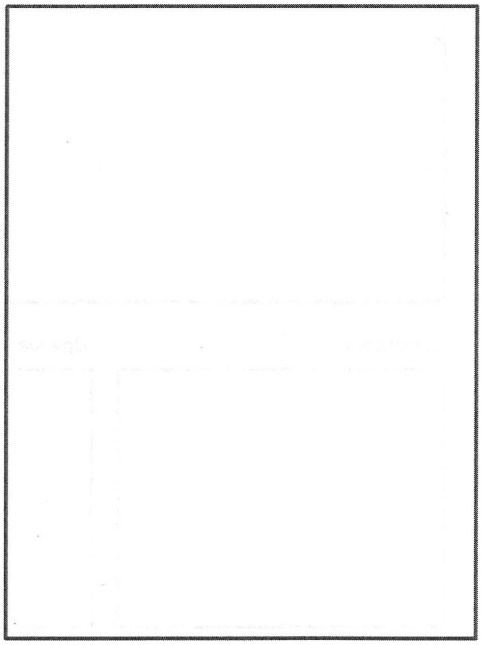
_____

_____

_____

_____

_____



Assessment:

Pre

Name _____ Date _____

Light Energy Diagnostic Assessment

1. Circle all examples of light sources. (Hint: You might have to circle more than one answer.)

a. a telescope b. a flashlight

c. the sun d. the moon

☐ Sure ☐ Unsure

2. Ms. Wheeler is standing outside on a bright, sunny day. She notices a dark shape on the sidewalk right behind her that is her exact size. What is this dark shape called?

_____

☐ Sure ☐ Unsure

3. Jacqueline left her black sweatshirt outside and it has been warming in the sun. The sweatshirt feels hot when she touches it because it has been exposed to _____.

a. mechanical energy b. light, or radiant energy

c. thermal, or heat energy d. electrical energy

☐ Sure ☐ Unsure

4. When a flashlight is shone at a mirror, the light is _____.

a. refracted b. blocked

c. reflected d. sped up

☐ Sure ☐ Unsure

5. Can light travel through a wooden block? Circle one answer.

YES NO

How do you know?

_____

☐ Sure ☐ Unsure

The pre-assessment consisted of five questions pertaining to light energy. Three questions were multiple choice, one question was a short answer, and the last question was yes or no with a brief explanation. The pre-assessment was worth five points and the class results are as follows.

Number Correct	0	1	1.5	2	2.5	3	3.5	4	4.5	5
Amount of Students	1	3	6	3	0	0	4	1	1	2

Class Average: 2.4/5 48%

Based on these results, many of my students are still unaware of the properties and sources of light energy. Fortunately, the questions from the pre-assessment are taught throughout my unit plan! There are a few students who aced the pre-assessment to which I've decided to give provide them with an independent project in addition to the work assigned in class.

Post

Name _____ Date _____

Light Energy Summative Assessment

_____ 1. Jim jumps into a swimming pool full of water that has been warming in the Sun. The pool water temperature increases because the water has been exposed to _____.

a. mechanical energy

c. light, or radiant energy

b. thermal, or heat energy

d. electrical energy

_____ 2. Karen says "Shadows are formed by turning off the lights." Is she correct? Yes or No. **Explain** your answer.

_____

_____

_____

_____

_____ 3. Most light energy on Earth comes from

a. the moon

c. candles

b. street lights

d. the sun

_____ 4. Sunlight energy can heat up everything **EXCEPT**:

a. sand

c. cement

b. water

d. an indoor television

_____ 5. When light passes through water it is _____.

a. refracted
c. blocked
b. reflected
d. sped up

_____ 6. The Moon produces no light, and yet it shines at night. Why is this?

a. The Moon reflects the light from the sun
c. The Moon is covered with a thin layer of ice
b. The Moon rotates at a very high speed
d. The Moon has many craters

_____ 7. Which makes its own light?

a. a mirror
c. a diamond ring
b. a candle flame
d. a magnifying lens

Write the letter of the definition that matches the word

_____ 1. Reflection	A. Something that doesn't allow any light to pass through
_____ 2. Refraction	B. When light bounces off an object that is smooth and shiny
_____ 3. Opaque	C. When light passes through a different substance and bends
_____ 4. Transparent	D. The dark area created when light gets blocked
_____ 5. Translucent	E. Something that allows all light to pass through clearly
_____ 6. Shadow	F. Something that allows *some* light to pass through

Light Energy Summative Assessment Rubric

Points Correct:	**14-12**	**11-9**	**8-6**	**5-0**
	Student successfully understands the concept of light energy including its properties, sources, and historical importance.	Student mostly understands the concept of light energy including its properties, sources, and historical importance.	Student somewhat understands the concept of light energy including its properties, sources, and historical importance.	Student does not understand the concept of light energy including its properties, sources, and historical importance.

The post-assessment consisted of thirteen questions pertaining to light energy. Six questions were multiple choice, one question was a short answer, and six were matching. The post-assessment was worth fourteen points and the class results are as follows.

Number Correct	6	7	8	9	10	11	12	13	14
Amount of Students	2	1	1	1	3	2	4	4	3

Class Average: 11/14 79%

Based on these results, all students at least somewhat understand the concept of light energy. Most of the students successfully understand the concept of light energy. A question that stumped the majority of students was about a sun warming a swimming pool. Students had to understand that light, or radiant energy heated up the pool not thermal, or heat energy. Overall, I'm pleased with the test results and believe that a significant amount of students understand light energy.

Reflection:

Student Reflection

Name _____ Date _____

Light Energy Self-Reflection

1. What was your most favorite activity from this unit? Why?

_____
_____
_____
_____

2. What was your least favorite activity from this unit? Why?

_____
_____
_____
_____

3. What concept from light energy was the most difficult to learn?

_____
_____
_____
_____

4. Why was learning about light energy so important to you?

_____
_____
_____
_____

Teacher Reflection

I think the unit plan I created was an overall success. Although there are some definite changes I would make, students seemed pretty engaged in most of the lessons. The only lesson that lacked engagement and had difficulty with classroom management was lesson two. Taking that into consideration, I would incorporate more movement and have students interact with each other more. As for the summative assessment, many students struggled to identify light, or radiant energy as the reason why the temperature of pool water increases. Because of this, I would spend more time talking about light as a source of heat. Even though I addressed this concept in lesson three, students still had a hard time understanding it. The last concept I could have spend more time on was reflection and refraction. Since the two terms look so similar, I should have found a way for students to differentiate between the two words. I know students understood what the meaning of both was, but to match the definition with the word was tough for students. The class average for the summative assessment was a 79%, which I think is great! I'm satisfied with the results and I truly think all students have at least somewhat of an understanding of light energy.

Student Work

The following pages are examples of student work for the pre-assessment, lessons one through five, and the post-assessment. I tried my best to pick different students' samples for each assignment.

Conclusion

Conclusion: After the third grade students learn about light energy through various activities, they will take a written summative assessment. It focuses on the content and skills addressed in each of the individual lessons. The test consists of thirteen questions in the form of multiple choice, short answer, and matching for a total of fourteen points. Once the unit has been completed, the students should be able to list various light sources, list properties of light, describe how light can travel through some objects and not others, explain the properties of shadows, illustrate how light can be reflected or refracted, and discuss how light can change into heat energy. Again, the students should finish this unit knowing more about light energy and its significance in our world.

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