

Unit Plan  
Light Energy  
3<sup>rd</sup> Grade  
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Fall 2015  
EDI 430-01

# Table of Contents

## Unit Overview:

Introduction.....	4
Standards.....	5
Goals.....	6
Objectives.....	7
Timeline.....	8
Bloom’s Chart.....	9
Accommodations/Learning Style/Adaptations/Differentiated Strategies....	10
Hands-on Learning.....	11
Subject Integration.....	12
Global/Multicultural.....	13
Technology.....	14
Affective Domain.....	15
Classroom Set up.....	16
Formative/Summative Assessment.....	17

## Body of Unit:

Lesson 1.....	18-23
Lesson 2.....	24-30
Lesson 3.....	31-39
Lesson 4.....	40-45
Lesson 5.....	46-51

Assessment:

Pre..... 52-53

Post..... 54-57

Reflection:

Student Reflection..... 58

Teacher Reflection..... 59

Student Work..... 60

Conclusion..... 61

Bibliography:

References..... 62

# Unit Overview:

## Introduction

This science unit is intended for third grade students to broaden their knowledge about light. Students will learn about the properties of light: generally travels in a straight line, reflects, refracts, creates shadows, is a source of heat, and is needed in order for us to see. When light shines upon an object it can either all go through an object (transparent), some can go through an object (translucent), or none can go through at all (opaque). The most important form of light energy is from the sun; it heats up objects differently depending on the color. The sun is a natural light source as well as fireflies, lightning, fire etc. There are artificial sources of light too: flashlights, light bulbs, glow sticks, etc. Before artificial light, people had a limited lifestyle. Students will learn more about this issue through an activity and also learn about a Michigan native who contributed to longer lasting light bulb. Students will learn about light energy in this particular unit by creating a mini book, watching videos, reading a book, and participating in different stations. The ultimate goal for this unit is to educate students about light energy and show how it's imperative to our everyday lives.

# Standards

**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.

**S.IP.03.16** Construct simple charts and graphs from data and observations.

# Goals

The learner will identify light as a form of energy.

The learner will understand how light travels and how shadows are made.

The learner will be able to make observations about light traveling from air to water.

The learner will describe how light heats materials differently.

The learner will explain how light is necessary in order to see objects.

# Objectives

I can list different light sources and properties of light.

I can describe how light can travel through some objects and not others.

I can explain the characteristics of shadows.

I can illustrate how light can be reflected and refracted.

I can discuss how light can change into heat energy.

# Timeline

The Light Energy unit plan will take about nine days to complete including the day of the test. Most of the lessons will take about two class days, which consist of thirty-five minutes. The third lesson will take longer as compared to the other lessons because of different stations students will go to in order to learn about light energy. Each lesson is sequenced as follows.

November/December 2015

Monday	Tuesday	Wednesday	Thursday	Friday
16	17	18	19 Lesson One	20 Lesson One
23 Lesson Two	24 Lesson Two	25 Thanksgiving Break	26 Thanksgiving Break	27 Thanksgiving Break
30 Lesson Three	1 Lesson Three	2 Lesson Four	3 Lesson Five	4 Summative Assessment



# Bloom's Chart

This unit plan has multiple questions in each lesson that incorporate higher level thinking derived from Bloom's Taxonomy. The following chart identifies the type of questions addressed in each lesson.

	Remember	Understand	Apply	Analyze	Evaluate	Create
Lesson 1	<b>X</b>	<b>X</b>		<b>X</b>		
Lesson 2	<b>X</b>	<b>X</b>	<b>X</b>			<b>X</b>
Lesson 3	<b>X</b>	<b>X</b>			<b>X</b>	
Lesson 4	<b>X</b>	<b>X</b>			<b>X</b>	
Lesson 5	<b>X</b>	<b>X</b>	<b>X</b>			

# Accommodations/Learning Style Adaptations/Differentiation Strategies

Accommodations are important to recognize for this unit. Light energy may be a difficult topic for many so I plan to support students in meaningful ways. In my first lesson, we are completing the Light Energy Mini Book together as a class, which I hope will help more students understand and question the material they'll learn. I will model how to fill out the mini book before students do and then review the answers afterwards to ensure students understand. In the second lesson, students will be reading an informational text about shadows together as a class. I will ask guiding questions throughout the text in order to prepare them for the independent worksheet. Once we've read the text, students will reread the text and answer questions provided on the worksheet. This will allow me to wander through the classroom to answer questions and refocus students who are struggling with the concept. The third lesson consists of many different stations about light energy. Although this is way more independent than students are used to, I will model the stations prior to students working independently. Then once students are working, I will roam around the room and help students at particularly difficult stations.

Learning styles vary throughout the unit plan, but many reoccur from lesson to lesson. Students are constantly reading information and writing about the content, which covers the linguistic learning style. The mini book and informational text provides diagrams and illustrations that visual/spatial learners need. Assignments will vary between working independently and in groups, which requires students to learn by interpersonal and intrapersonal styles. Some lessons require students to think about patterns and relationships about light energy. For example, lesson three requires students to investigate in many ways in order to successfully learn about light energy. This will support students with a logical learning style. Lastly, students will move around in a few lessons (one and three), which this will aid kinesthetic learners.

A differentiation strategy I will use for students who excel in the topic of light energy is having them help other classmates on assignments. The best way to solidify learning is to teach it to others. Two of my students aced the pre-test so I have a feeling they will understand the material quickly. So, I want those students who move at a fast pace to support others who struggle with the material. This will not only ensure these students are still learning the content, but it will also assist students who are struggling with the lessons I've created.

# Hands-on Learning

Students will participate in hands-on learning in lessons one and three. In the first lesson, students will create mini books about light energy, which will require them to fill out information, cut, past, and color. By having students actively making a mini book, it will ensure hands-on learning. Another form of hands-on learning is in lesson three. Students are moving to different stations about every ten minutes. These stations require students to manipulate objects and answer questions about light energy. This lesson will require much hands-on learning and I hope students learn a great deal about light energy from each station.

# Subject Integration

Students are reading an informational text to further their knowledge on light and shadows. Throughout the unit, students are writing about light and answering questions. Technology is integrated in the unit plan by various videos explaining light energy to students. The Light Energy Mini Book requires students to draw and color, which integrates art into the unit. Social studies will be integrated into lesson four when students participate in a scenario about living conditions before the invention of modern light sources. In addition, they will learn about Thomas Edison, a Michigan native who made considerable contributions toward the light bulb. Lastly, math will be integrated into this unit plan by identifying angles (acute, right, obtuse) at which light is reflected. The integration of the previously mentioned subject areas into this unit plan will show students how learning is connected in different areas and not in science alone.

# Global/Multicultural

During the fourth lesson of the unit plan students will learn about the history of light and the current global issues still prevalent today regarding the topic. In the first lesson students will learn about both natural and artificial light. Lesson four will expand on artificial light and how it wasn't always around for people to utilize. Once the students grasp this concept I will inform them through an activity of how there are people today who still don't have the luxury of artificial light. By recognizing this global issue, I hope this provides a platform for discussion and gaining a perspective on issues around the world for students.

# Technology

Technology is integrated throughout the lesson in order to enhance the learning of light energy. In the first lesson are using flashlights to identify whether materials are opaque, translucent, or transparent. In the second lesson, the ELMO is used along with another flashlight. The ELMO is a necessary and useful piece of technology because it projects information and instruction for the entire class. The flashlight will be used in the second lesson in order to create shadows. As for the third lesson, students are using flashlights again to observe reflection of light. Lamps are also used in the third lesson for the concept of light energy changing into thermal energy. In addition, iPads are another important pieces of technology used in the third lesson, which will show videos explaining concepts about light energy.

# Affective Domain

Throughout this unit plan students will actively communicate with others about light energy. Lesson three requires the most communication because students are answering various questions with group members. By completing the activities in this unit, I hope students' value light energy by realizing how necessary it is to our everyday lives. Students will participate in different discussions (whole class and small group) about light energy. This method of learning is intentional so students organize their thoughts about light energy.

# Classroom Set Up

In lessons one, students will work on the carpet at the front of the classroom. During lesson two, students will work at their desks. Since those lessons require whole group teaching, I think it would be most effective to have students remain together on the carpet and at their desks. As for lesson three students are moving to different stations. These will be at various locations around the room and also immediately outside the classroom. Ideally the stations will be set up on the counters, the kidney table in the corner of the room, the small table in the back of the room, and other open areas on the carpet. The stations need to have enough space among them in order to reduce distractions.



# Formative/Summative Assessment

Students will be formatively assessed by the completion of their Light Energy Mini Book and the informational text worksheet for lessons one and two. In lesson three students will be assessed by the completion and accuracy of the questions asked at each station. One station requires students to take a quiz on light energy, which will be a significant indication of whether students understand the content. The district has already created the summative assessment. Students will complete multiple choice, short answer, and matching questions for the final assessment of light energy.

# Body of Unit:

## Lesson 1: Light Energy Mini Book

### EFFECTIVE INSTRUCTIONAL DESIGN – STANDARDS BASED LESSON PLAN

Elements of the Lesson	Evidence that Documents the Elements
<b>Standard</b> MDE grade level or CCSS	<b>P.EN.03.11</b> Identify light as a form of energy.  <b>P.EN.03.21</b> Demonstrate that light travels in a straight path and that shadows are made by placing an object in a path of light. *  <b>S.IP.03.16</b> Construct simple charts and graphs from data and observations.
<b>Objectives/Targets – I can statements</b> 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?	<b>I can...</b> 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.
<b>Lesson Management: Focus and Organization</b> 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 activity. When students are completed with a task, I will ask them to put their thumbs up so I know they're ready to move forward with the lesson. Active students who are on task are completing the Light Energy Mini Book when told to do so and talking with other classmates about light energy.
<b>Introduction: Creating Excitement and Focus</b> 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 engage students by flickering the lights and ask them what I'm doing. Then I will ask them a couple of questions: What is light? Why is it so important? Then I will shut off all the lights and point a flashlight upwards under my face as I say to the class that we are going to be learning about light for this science unit. To access prior knowledge, I'm going to write

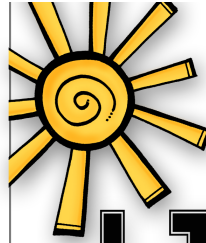
	<p>the word “light” on the white board and have students participate in the activity white board splash. Students will go up to the board in small groups and write down any information they know about light.</p>
<p><b>Input: Setting up the Lesson</b></p> <p><b>Task analysis:</b></p> <ul style="list-style-type: none"> <li>• <b>What information does the learner need? If needed how will it be provided?</b></li> <li>• <b>How is the lesson scaffolded? [step-by-step]</b></li> </ul> <p><b>Thinking levels: questions to engage students’ thinking</b></p> <ul style="list-style-type: none"> <li>• <b>Remembering</b></li> <li>• <b>Understanding</b></li> <li>• <b>Applying</b></li> <li>• <b>Analyzing</b></li> <li>• <b>Evaluating</b></li> <li>• <b>Creating</b></li> </ul> <p><b>Accommodations: implementing differentiation principles</b></p> <ul style="list-style-type: none"> <li>• <b>Remediation/Intervention</b></li> <li>• <b>Extension/Enrichment</b></li> <li>• <b>Learning styles</b></li> </ul> <p><b>Methods, Materials and Integrated Technology</b></p> <ul style="list-style-type: none"> <li>• <b>Instructional methods</b></li> <li>• <b>Engagement strategies</b></li> <li>• <b>Materials needed and prepared</b></li> <li>• <b>Integrated technology list</b></li> </ul>	<p><b>Task Analysis:</b></p> <p>The learner needs information on light energy and the characteristics of light. The Light Energy Mini Book will provide it this knowledge. The lesson will begin by introducing the unit topic (stated above) and the “I Can” statements for the lesson. Then the students will look at an overview of the mini book as I explain each section to them. I will model how to draw one picture for the types of light energy page. Then I will explain how we’re going to complete the diagram on the other page together. Students will work on the types of light energy page for about ten minutes before we move on as a class. Then I will have students help me shine light on the objects listed in the front of the classroom and fill in the diagram along the way. I will ask the question, “Does any light shine through the object?”. Depending on students’ answers I will give the name of the term they’re explaining (opaque, translucent, and transparent). After we’ve completed the diagram, we will make another smaller diagram on the back and discuss a few more objects. Once we’re finished looking at objects, the students will write the definitions of opaque, translucent, and transparent in their science notebook. Lastly, we will review the lesson and they can color their mini book if we have any time left.</p> <p><b>Thinking Levels:</b></p> <p>Remembering- What are forms of natural light? Manmade light?</p> <p>Understanding- Why does light only completely go through some objects and not others?</p> <p>Analyzing- How would you classify aluminum foil: opaque, translucent, or transparent? How would you classify plastic wrap?</p>

	<p><b>Accommodations:</b> For intervention I will wander around the room and individually help students as needed with the types of light energy page. I will also ask particular students who struggle to help me with the light experiment to keep them involved. On the back of their mini book, I will have students write down three objects to classify at home for an extension of the lesson. Learning styles for this lesson include linguistic, visual/spatial, kinesthetic, interpersonal, and logical.</p> <p><b>Methods, Materials, and Integrated Technology:</b> An instructional method I'm using in this lesson is white board splash to access students' prior knowledge. I will engage students by flickering the lights and introducing the unit in a spooky voice. In addition, I will have students assist me during the investigation portion of the Light Energy Mini Book. Each student will need a pencil, colored pencils or crayons, and a copy of the Light Energy Mini Book. I will need a flashlight, a toilet paper roll, a piece of black paper, aluminum foil, a plastic bag, a paper bag, felt, a plastic cup, wax paper, and plastic wrap. Technology used in this lesson is the ELMO and a flashlight.</p>
<p><b>Modeling: "I DO"</b> <b>Show/Tell: visual/verbal input (i.e. demonstrate/tell)</b> <b>How/What: questioning and redirecting techniques</b></p>	<p>I will have the Light Energy Mini Book on the projector screen as I'm demonstrating how to draw a light source in the mini book. Not only will I show them how, but I will explain it too. I will then explain and show how they are going to fill out the diagram on the other page. Questions I will ask: "How many examples of light sources are you drawing?" Six; "Are you filling out the diagram independently or together with the class?" Together.</p>
<p><b>Checking for Understanding</b> <b>Teach some - stop and check - resume teaching</b> <b>Ways in which students will respond and be engaged</b> <b>Formative assessment strategies to be implemented</b></p>	<p>About five minutes after I've explained the directions, I will stop the class and ask where everyone is at with the light sources page. I will also wander the room to make sure students are drawing on the correct page. Then we will review the answers when most students are finished. I will ask students to put their thumbs up when they're done as a</p>

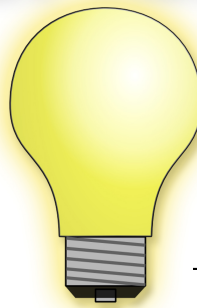
	<p>formative assessment. If any of the groups had trouble with the examples, I will clarify any confusion before moving on. For the investigation portion, I will have students stop half way through and make sure their neighbors have the same answers since we're all completing the activity together. This will make every student accountable for completing the assignment. Again, I will also walk around the room and make sure everyone is filling out the diagram.</p>
<p><b>Guided Practice: "WE DO"</b>  <b>What do the teacher and student do together?</b>  <b>Modeling first then with a gradual release of responsibility</b></p>	<p>The students and I will be filling out the diagram from the Light Energy Mini Book together as we investigate light shining on different objects. Some students will help me with the investigation, but the last two objects I want just the students to help direct the class and fill out the diagram.</p>
<p><b>Collaborative ("YOU DO TOGETHER") and/or Independent Practice ("YOU DO")</b>  <b>What practice(s) will be demonstrated/modeled?</b>  <b>How will connections be made?</b>  <b>How will students demonstrate target?</b></p>	<p>Students will fill out the diagram for the last two objects after the other students and I have modeled it. They will also write down the definitions of opaque, translucent, and transparent in their notebook as we review the terms together. Lastly, they will write down three objects to investigate at home. Connections will be made from completing this activity by students realizing how light sources can determine whether an object is opaque, translucent, or transparent. Students will demonstrate the targets by observing how light travels during the investigation, explaining why light is so important to us (at the beginning of the lesson), and filling out a diagram from the data collected during our investigation.</p>
<p><b>Closure</b>  <b>How will I review the I can statements?</b>  <b>How will connections be made to future learning?</b></p>	<p>Before the lesson ends, I will have the class read the "I Can" Statements aloud with me and explain how we met those through our Light Energy Mini Book. Then I will describe how we will continue to learn about the properties of light in upcoming lessons.</p>
<p><b>Assessment</b>  <b>What evidence supports that the objective(s) were met?</b>  <b>What do my students know, understand and are able to do?</b>  <b>What formative assessments informed your instruction?</b></p>	<p>Evidence of students meeting the objectives will be the completion of the Light Energy Mini Book. If the book is filled out correctly, the students will know both natural and manmade light sources and understand how to classify objects based on how much light passes through them. The formative</p>

	<p>assessment used in my lesson is having students put their thumbs up when they're finished with a section of the book. Also, I'll be walking around the room to ensure every student has the diagram filled out.</p>
<p><b>Reflection</b>  <b>Using your assessment data, what will you change?</b>  <b>How well did the students perform? Were all students engaged?</b>  <b>How was my timing?</b>  <b>How many students struggled? What will I do to help those who struggled?</b>  <b>What will I do to extend the learning for those who met target?</b>  <b>What did everyone know? What did no one know? Were there any surprises?</b></p>	<p>Students seemed to enjoy filling out the mini book and classifying different objects so there is nothing I would change that I didn't alter already while performing the lesson. The students were <i>very</i> engaged in the activity! They all giggled during the introduction as I shined the light on my face. The students were actively involved with filling out the diagram to classify different objects. The lesson took longer than expected. Plus, I wanted students to get a clear understanding of opaque, translucent, and transparent so we ended up taking two class periods to complete the lesson. I noticed a few students were off task and I called on them to redirect their focus. I also encouraged students to help other classmates around them with the mini book. Unfortunately I didn't have enough time to complete the white board splash activity and the extension of the lesson. I still could have students find objects at home to bring in and we could test whether light goes through them or not. Everyone knew at least one example of light. No one knew the terms opaque and translucent, but some recognized the term transparent. I was surprised at how engaged students were in the activity. Normally management is an issue for me, but not during this lesson, which was wonderful!</p>

(2014/2015)



# LIGHT ENERGY



By: \_\_\_\_\_

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## Types of Light Energy

Draw and label three different types of manmade light and three different types of natural light.

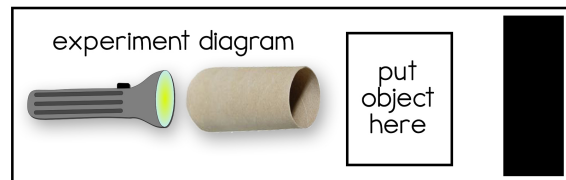
Manmade Light

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Natural Light

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## What can light pass through?



Object	Did the light pass through? Yes or No?	Is the object <u>opaque</u> , <u>translucent</u> , or <u>transparent</u> ?
aluminum foil		
plastic bag		
paper bag		
felt		
plastic cup		
tracing paper		

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# Lesson 2: Shadows Informational Text

## EFFECTIVE INSTRUCTIONAL DESIGN – STANDARDS BASED LESSON PLAN

Elements of the Lesson	Evidence that Documents the Elements
<p><b>Standard</b> MDE grade level or CCSS</p>	<p><b>P.EN.03.21</b> Demonstrate that light travels in a straight path and that shadows are made by placing an object in a path of light. *</p> <p><b>P.PM.03.52</b> Explain how we need light to see objects: light from a source reflects off objects and enters our eyes.</p>
<p><b>Objectives/Targets – I can statements</b> 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?</p>	<p><b>I can...</b></p> <p>I can explain the characteristics of shadows.</p> <p>I can describe how light can travel through some objects and not others.</p> <p>I can explain how we need light to see.</p>
<p><b>Lesson Management: Focus and Organization</b> What positive strategies, techniques and tools will I use? What are my ideas for on task, active and focused student behavior?</p>	<p>To promote positivity, I will always be announcing student’s names that are following directions and participating in the activity. When students are completed with a task, I will ask them to put their thumbs up so I know they’re ready to move forward with the lesson. Active students who are on task are reading aloud the book <i>Sunshine and Shadows</i> with the entire class, completing the Scavenger Hunt worksheet following the read aloud, and answering any questions I ask.</p>
<p><b>Introduction: Creating Excitement and Focus</b> What will I do to capture student interest? What prior knowledge needs to be accessed? In what practice/review will students participate?</p>	<p>At the beginning of the lesson I will engage students by turning off all the lights and pulling down the shades. I will ask what students see, if anything. This will help students realize that light is needed in order to see. To access prior knowledge, I will reference back to one of the pretest questions about shadows. Then I will have them talk to their table partner and think of shadows they’ve seen before. After students answer the questions, I will explain how we will be reading a book about shadows.</p>



<p><b>Input: Setting up the Lesson</b></p> <p><b>Task analysis:</b></p> <ul style="list-style-type: none"> <li>• <b>What information does the learner need? If needed how will it be provided?</b></li> <li>• <b>How is the lesson scaffolded? [step-by-step]</b></li> </ul> <p><b>Thinking levels: questions to engage students' thinking</b></p> <ul style="list-style-type: none"> <li>• <b>Remembering</b></li> <li>• <b>Understanding</b></li> <li>• <b>Applying</b></li> <li>• <b>Analyzing</b></li> <li>• <b>Evaluating</b></li> <li>• <b>Creating</b></li> </ul> <p><b>Accommodations: implementing differentiation principles</b></p> <ul style="list-style-type: none"> <li>• <b>Remediation/Intervention</b></li> <li>• <b>Extension/Enrichment</b></li> <li>• <b>Learning styles</b></li> </ul> <p><b>Methods, Materials and Integrated Technology</b></p> <ul style="list-style-type: none"> <li>• <b>Instructional methods</b></li> <li>• <b>Engagement strategies</b></li> <li>• <b>Materials needed and prepared</b></li> <li>• <b>Integrated technology list</b></li> </ul>	<p><b>Task Analysis:</b></p> <p>The learner needs information about the properties of shadows and how light is needed in order for us to see objects; the <i>Sunshine and Shadows</i> book and a group discussion will provide it. The lesson will begin with an introduction (stated above) and the "I Can" statements for the lesson. Then the students will look at the book as I explain that we're going to read it aloud together as a class. We will read each page together and I will ask a few questions: "How does light travel?" In a straight line; "If objects block light, it creates a...?" Shadow; "Name three ways from your reading we get light." Sun, flashlight, moon. After the read aloud, the students and I will look at the electromagnetic spectrum and discuss what humans can see. I will then explain how light from a source off objects and enters our eyes, which allows us to see the object and its color. Teaching points for the discussion are light is needed from a source to reflect off objects and enter our eyes, humans only see the visible light portion of the spectrum, and the color of objects we see is reflected light (all other colors are absorbed). Once the class discussion has been completed, students will use the text and our discussion to answer the questions on the Scavenger Hunt worksheet (I will read all the questions and model how to complete the first question). Each student will turn in this paper and read their own book quietly once they're finished or if possible, they will have the option to use flashlights to make hand animal shadows on the back wall of the classroom.</p> <p><b>Thinking Levels:</b></p> <p>Remembering- What is a shadow? How does light travel?</p> <p>Understanding- Does the moon make its own light? How does the moon get its light?</p> <p>Applying- Draw a picture of where you think the sun would be in the sky in the morning, at lunchtime, and in the evening.</p>
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	<p>Creating- Draw and fill out the main idea and details graphic organizer using information from the text.</p> <p><b>Accommodations:</b> For intervention I will wander the room and individually help students as needed with the Scavenger Hunt worksheet. I will also ask questions to particular students who struggle in order to keep them involved. Students will make shadows (animals shadows) first hand as an extension to the lesson. Learning styles for this lesson include linguistic, visual/spatial, intrapersonal, and logical.</p> <p><b>Methods, Materials, and Integrated Technology:</b> An instructional method I'm using in this lesson is choral reading the book <i>Sunshine and Shadows</i> in order to increase students' fluency. Another method used in this lesson is think-pair-share during the read aloud. I will engage students by making the classroom completely dark in order to exemplify how light is needed in order to see objects. Each student will need a pencil, a copy of <i>Sunshine and Shadows</i>, and a Scavenger Hunt worksheet. I will need a copy of <i>Sunshine and Shadows</i>, a copy of the Scavenger Hunt worksheet, a picture of the electromagnetic spectrum, a flashlight, and a handout of hand shadow puppets. Technology used in this lesson is the ELMO and a flashlight.</p>
<p><b>Modeling: "I DO"</b> <b>Show/Tell: visual/verbal input (i.e. demonstrate/tell)</b> <b>How/What: questioning and redirecting techniques</b></p>	<p>I will have the book on the projector screen as the class and I are reading it aloud. Once the book is finished and our discussion about light has concluded, I will read all of the questions on the Scavenger Hunt worksheet and complete one of them as a model.</p>
<p><b>Checking for Understanding</b> <b>Teach some - stop and check - resume teaching</b> <b>Ways in which students will respond and be engaged</b> <b>Formative assessment strategies to be implemented</b></p>	<p>While we are reading the book aloud I will stop and ask the students a couple of questions in order to check for understanding. The questions are "How does light travel?" In a straight line; "If objects block light, it creates a...?" Shadow; "Name three ways from your reading we get light." Sun, flashlight, moon. Students will participate in the think-pair-share method in</p>

	order to answer the questions. Once the students are working on the Scavenger Hunt, I will wander the room to make sure students are on task and completing the worksheet.
<b>Guided Practice: "WE DO"</b> <b>What do the teacher and student do together?</b> <b>Modeling first then with a gradual release of responsibility</b>	The students and I will read the book aloud together. We will also answer another question from the Scavenger Hunt worksheet after I've answered the first question as a model.
<b>Collaborative ("YOU DO TOGETHER") and/or Independent Practice ("YOU DO")</b> <b>What practice(s) will be demonstrated/modeled?</b> <b>How will connections be made?</b> <b>How will students demonstrate target?</b>	Students will finish the rest of the Scavenger Hunt worksheet on their own by using the text. After most students have completed the Scavenger Hunt, we will review the answers together. Connections will be made from the text to the worksheet about the properties of shadows and from our class discussion to the worksheet about how light is necessary in order to see objects. Students will demonstrate the targets by completing the questions on the worksheet.
<b>Closure</b> <b>How will I review the I can statements?</b> <b>How will connections be made to future learning?</b>	Before the lesson ends, I will have the class read the "I Can" Statements aloud with me and explain how we met those through read the text, having a class discussion, and completing the worksheet. Then I will describe how we will continue to learn about the properties of light in upcoming lessons.
<b>Assessment</b> <b>What evidence supports that the objective(s) were met?</b> <b>What do my students know, understand and are able to do?</b> <b>What formative assessments informed your instruction?</b>	The students will meet the objectives by reading the text aloud and completing the Scavenger Hunt worksheet. If the worksheet is filled out correctly, the students will know what a shadow is, how the sun changes positions throughout the day, and how we get light. The formative assessment used in my lesson is think-pair-share and the answers provided on the worksheet. Also, I'll be walking around the room to ensure every student has the worksheet finished.
<b>Reflection</b> <b>Using your assessment data, what will you change?</b> <b>How well did the students perform? Were all students engaged?</b> <b>How was my timing?</b> <b>How many students struggled? What will I do to help those who struggled?</b> <b>What will I do to extend the learning for</b>	After using the formative assessment data and analyzing the lesson as a whole there are some definite changes I would make to the lesson. I would incorporate more movement. Students had a difficult time staying still and there behavior was totally unacceptable. Students weren't very engaged in the reading and had trouble staying on task. Their

<p><b>those who met target?</b> <b>What did everyone know? What did no one know? Were there any surprises?</b></p>	<p>performance wasn't great either, which is why I had to extend the lesson another day to review important concepts. Timing was off because of all the management issues I had to take care of during the lesson. As for the Scavenger Hunt worksheet, most completed that without any issues. I did my best to keep everyone on task and we even went over the questions together as a class rather than having them turn the assignment in after it was completed. Everyone had seen shadows before and gave plenty of examples. No one knew that the moon didn't produce its own light. I was really surprised at the behavior of my students during that lesson. I don't really know the exact reason why they were all zoned out and defiant, but it was frustrating! The second day of this lesson went better, even without my CT in the room. It's interesting to learn how just a few students misbehaving in class sets the whole tone for all the other students. Due to time constraints, students didn't get a chance to make shadow puppets when finished with the Scavenger Hunt worksheet.</p>
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(2014/2015)

Name \_\_\_\_\_

Date \_\_\_\_\_

Scavenger Hunt for Sunshine and Shadows

1. What is the title of this book? (Remember to include capitals)

\_\_\_\_\_

2. Go through the book and circle all the text features that you see:

Bold print Table of contents Glossary Photographs Headings

3. What is a shadow?

\_\_\_\_\_

4. How does light travel?

\_\_\_\_\_

5. Name three things from the reading that can make a shadow?

\_\_\_\_\_

6. Name the objects that made the shadows on page 11.

\_\_\_\_\_

7. What is the name of the person that predicts the weather?

\_\_\_\_\_

8. Think about where the sun is in the sky at different times of the day. Draw a picture of where you think the sun would be in the sky in the morning, at lunchtime, and in the evening.

9. Name three ways from your reading that we get light.

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10. Look at the bottom of the back inside cover. Read the paragraph called "Note to the teacher for page 10". Does the moon make its own light? How does the moon get its light?

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11. Look at the back inside cover of the book, using the space that is left, draw and fill out the main idea and details graphic organizer.

# Lesson 3: Light Energy Stations

## EFFECTIVE INSTRUCTIONAL DESIGN – STANDARDS BASED LESSON PLAN

Elements of the Lesson	Evidence that Documents the Elements
<p><b>Standard</b> MDE grade level or CCSS</p>	<p><b>P.EN.03.11</b> Identify light as a form of energy.</p> <p><b>P.EN.03.22</b> 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> <p><b>P.PM.03.51</b> Demonstrate how some materials are heated more than others by light that shines on them.</p>
<p><b>Objectives/Targets – I can statements</b> 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?</p>	<p><b>I can...</b></p> <p>I can identify characteristics of light.</p> <p>I can illustrate how light can be reflected and refracted.</p> <p>I can discuss how light can change into heat energy.</p>
<p><b>Lesson Management: Focus and Organization</b> What positive strategies, techniques and tools will I use? What are my ideas for on task, active and focused student behavior?</p>	<p>To promote positivity, I will always be announcing student’s names that are following directions and participating in each station. I will also be wandering around the room as students are working at stations making sure they are on task and I will answer any questions. Students have approximately seven minutes at each station with procedures to follow. After the timer is up, students will move from one station to the next until all are completed. Active students who are on task are following the procedures at each station and answering the provided questions.</p>
<p><b>Introduction: Creating Excitement and Focus</b> What will I do to capture student interest? What prior knowledge needs to be accessed? In what practice/review will students participate?</p>	<p>At the beginning of the lesson, I will be telling the students how today they are working with group members at different stations involving light energy. We will briefly discuss how we’ve been learning about light energy and will continue to do so for the next couple of days. There are four stations, which means each station will have about five students at</p>

	<p>it. There is only seven minutes spent at each station so students will be encouraged to get started right away and stay on task. After the time is up, they move to the next station. Students will participate in various stations and will answer three questions at each spot.</p>
<p><b>Input: Setting up the Lesson</b></p> <p><b>Task analysis:</b></p> <ul style="list-style-type: none"> <li>• <b>What information does the learner need? If needed how will it be provided?</b></li> <li>• <b>How is the lesson scaffolded? [step-by-step]</b></li> </ul> <p><b>Thinking levels: questions to engage students' thinking</b></p> <ul style="list-style-type: none"> <li>• <b>Remembering</b></li> <li>• <b>Understanding</b></li> <li>• <b>Applying</b></li> <li>• <b>Analyzing</b></li> <li>• <b>Evaluating</b></li> <li>• <b>Creating</b></li> </ul> <p><b>Accommodations: implementing differentiation principles</b></p> <ul style="list-style-type: none"> <li>• <b>Remediation/Intervention</b></li> <li>• <b>Extension/Enrichment</b></li> <li>• <b>Learning styles</b></li> </ul> <p><b>Methods, Materials and Integrated Technology</b></p> <ul style="list-style-type: none"> <li>• <b>Instructional methods</b></li> <li>• <b>Engagement strategies</b></li> <li>• <b>Materials needed and prepared</b></li> <li>• <b>Integrated technology list</b></li> </ul>	<p><b>Task Analysis:</b></p> <p>The learner needs information about light: it's a form of energy, it travels in a straight path, it refracts, it reflects, and it changes into heat. The four stations students will participate in will cover these key concepts. The lesson will begin with an introduction (stated above) and the "I Can" statements for the lesson. I will also pretend to be a student and model what should be done at each station (get started right away, read procedures, <b>keep group members on task</b>, raise your hand if there are any questions, complete activity, answer questions, clean up area, and move to the next station quickly and quietly when time is up). After I've modeled what to do at each station, I will have students repeat the directions with me before starting (directions will be written on the whiteboard at the front of the classroom). Then the students will be put into groups and guided to a station. Once everyone is at a station, I will set the timer for seven minutes. Students will complete tasks and questions until the timer is up and then move to the next station until all are completed. After students have finished all the stations, we will review our "I can" statements. This lesson will take two day to complete. The first day students will complete the stations. On the second day, we will review the questions from each station and watch a video to further learn about light absorption, reflection, and refraction. After students watch the video they will use a mini whiteboard to respond to questions about the video. Before the lesson is finished, students will write the definitions of reflection and refraction in their science notebook.</p> <p><b>Thinking Levels:</b></p> <p>Remembering- How does light travel when you're shining it at the mirror?</p>



	<p>Understanding- If there was no light on Earth, could we see anything? Why is that shirt warmer than the others?</p> <p>Evaluating- Why does the pencil look broken?</p> <p><b>Accommodations:</b> For intervention I will wander the room and individually help students as needed with the stations, but ideally group members will help keep each other on task. I will redirect students who seem to be off task or distracted while at stations. For an extension, students who finish with extra time should go back and highlight important questions/information from previous station. Learning styles for this lesson include linguistic, visual/spatial, interpersonal, logical, and kinesthetic.</p> <p><b>Methods, Materials, and Integrated Technology:</b> An instructional method I'm using in this lesson is station work by having students complete different activities in small groups. In addition, stations are completed collaboratively in order for students to work on their communication skills. I will engage students by varying the activities at each station. One station has a video to watch, one has students feeling heated t-shirts, another has students observing a pencil in a cup, and the last station has students shining light at a mirror. Each student will need a pencil, a highlighter, and their science notebook. I will need one iPad, computer paper for each station with directions and questions written on it, a lamp, three t-shirts (black, white, blue), a clear cup, water, a pencil, one flashlight, one mirror, copies of the Light Energy quiz, copies of the Get Logical worksheet, and one copy of the Concept Map worksheet. Technology used in this lesson is an iPad, a flashlight, and a lamp.</p>
<p><b>Modeling: "I DO"</b> Show/Tell: visual/verbal input (i.e. demonstrate/tell)</p>	<p>I will be modeling what to do at stations prior to them starting. I will pretend to be a student and model what should be done at each</p>

<p><b>How/What: questioning and redirecting techniques</b></p>	<p>station (get started right away, read procedures, <b>keep group members on task</b>, one team member raise your hand if there are any questions, complete activity, answer questions, clean up area, and move to the next station quickly and quietly when time is up).</p>
<p><b>Checking for Understanding</b>  <b>Teach some - stop and check - resume teaching</b>  <b>Ways in which students will respond and be engaged</b>  <b>Formative assessment strategies to be implemented</b></p>	<p>In addition to walking around the room during station time, I will be checking their science notebooks to see how well they have completed each of the three questions at each station (formative assessment). Students will respond and be engaged by answering questions in their notebook and writing the letter answer to the questions from the video at the end of the lesson. Another type of formative assessment I will use is looking at students responses on the mini whiteboards used after they watch the video about reflection and refraction. Students will write either A, B, C, or D after I've read each question and possible answer aloud.</p>
<p><b>Guided Practice: "WE DO"</b>  <b>What do the teacher and student do together?</b>  <b>Modeling first then with a gradual release of responsibility</b></p>	<p>After I've modeled what to do at each station, I will have students say the directions with me before starting.</p>
<p><b>Collaborative ("YOU DO TOGETHER") and/or Independent Practice ("YOU DO")</b>  <b>What practice(s) will be demonstrated/modeled?</b>  <b>How will connections be made?</b>  <b>How will students demonstrate target?</b></p>	<p>Students will work in groups of about five at every station and complete the assigned task. Connections will be made from station to station because students will directly observe what is happening and writing about it in their notebook. Students will demonstrate the targets by writing their answers down. In addition, students will write the definitions of reflection and refraction in their notebook.</p>
<p><b>Closure</b>  <b>How will I review the I can statements?</b>  <b>How will connections be made to future learning?</b></p>	<p>After each student has completed all four stations, I will restate the "I Can" statements with the class. I will mention how a certain person had a huge impact on artificial light and we will talk about this person next.</p>
<p><b>Assessment</b>  <b>What evidence supports that the objective(s) were met?</b>  <b>What do my students know, understand and are able to do?</b>  <b>What formative assessments informed</b></p>	<p>The students' notebook work will be evidence of meeting the objectives. The students understand that light is form of energy, it travels in a straight path, it bends when moving from one substance to another</p>

<p><b>your instruction?</b></p>	<p>(refraction), it bounces off smooth or shiny objects (reflection), and it heats objects differently. They are able to write about it and identify various properties of light. Both the questions in their notebook and the responses on their mini whiteboards are formative assessments that will inform my instruction.</p>
<p><b>Reflection</b>  <b>Using your assessment data, what will you change?</b>  <b>How well did the students perform? Were all students engaged?</b>  <b>How was my timing?</b>  <b>How many students struggled? What will I do to help those who struggled?</b>  <b>What will I do to extend the learning for those who met target?</b>  <b>What did everyone know? What did no one know? Were there any surprises?</b></p>	<p>There is nothing I would change with this lesson. All students performed well and were engaged in each station by participating in the activities. Not many students struggled with the stations because they had team members to rely on. But, if there were questions, I wandered around the classroom and assisted them the best I could without directly providing the answers. Students will see this information again during the review, which will be an extension of the learning for those who met the target. Everyone knew which t-shirt felt the warmest at one of the stations. They also noticed how the light bounced off the mirror. No one knew the scientific word for light bending. The only surprise was that all students were engaged, which minimized behavioral problems in the classroom. Due to time constraints, I eliminated the concept map station completed some of the other stations in a different way. Instead of making seven stations, I made four so all stations were completed in one day. We watched the light absorption, reflection, and refraction video as a class rather than as a station. Students also completed the Light Energy quiz and Get Logical worksheet for morning work, not as a station.</p>

(2014/2015)