

Kindergarten

Under Construction: What makes the best shelter?

Eco-Energy for Schools



Unit Overview	
Unit Title	Under Construction: What makes the best shelter?
Unit Summary	Through modeling and experimentation, students will determine the best material for creating a canopy to block the effects of the Sun.
Subject Area Strands	Science – Energy Math – Geometry ELA – Literature; Informational Text; Writing: Speaking and Listening; Language Social Studies – Economics
Grade Level	Kindergarten
Appropriate Time	5 days

Lesson Foundation

Common Core Standards	
Targeted Content Standards	Mathematics G.A.2 Correctly name shapes regardless of their orientations or overall size. G.A.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length.)
	English / Language Arts <u>Reading Strands for Literature</u> RL K.2 With prompting and support, retell familiar stories, including key details. <u>Reading Strands for Informational Text</u> RI K.1 With prompting and support, ask and answer questions about key details in a text. RI K.3 With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text. <u>Writing</u> W.K.3. Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened. <u>Speaking and Listening</u> SL K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. <u>Language</u> L.K.1.A Print many upper- and lowercase letters. L.K.1.B Use frequently occurring nouns and verbs. L.K.2 Demonstrate command of the conventions of standard English

capitalization, punctuation, and spelling when writing.

TN Standards

Science

GLE 0007.10.2

Investigate the effect of the sun on a variety of materials.

0007.10.3

Place a thermometer under pieces of different colored paper on a sunny window. Compare results and discuss possible causes.

Social Studies

K.2.01

Describe potential costs and benefits of personal economic choices in a market economy.

- A. Explain how basic human needs of food, clothing, shelter, and transportation are met.
- B. Understand that people create shelter according to both culture and environment.

Next Generation Science Standards

K-PS3-2.

Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Lesson Foundation – Big Ideas & Cross-Curricular Connections

Big Ideas

- Our homes are made of shapes.
- Some building materials are better for protecting us from the Sun while others are not.

Cross-Curricular Connections

- **Earth's Rotation- Day and Night:** Writing and the Sun's path across the sky
- **The Shape of Things:** Geometry and Informational Text
- **Shelter/Geometry/Shape Walk:** Geometry and Informational Text
- **Sun Path:** Writing; Earth's Rotation
- **Building A Canopy:** Measurement; Ordering Numerals; Writing; Different Types of Shelter

Lesson Foundation – Essential Questions

1. What lines are required to make a square? Rectangle? Hexagon? Triangle? Circle?
2. What materials block the sun?
3. How are homes different around the world?
4. How can labels help describe a drawing?

Lesson Foundation – Student Objectives

Going Beyond	<ul style="list-style-type: none"> • Identify a pentagon. • Identify an octagon. • Use written communication to label a diagram of an experiment. • Explain why the temperature reading under aluminum foil is less than black fabric because the foil reflects the sun’s thermal energy. • Give examples of homes built based on the environment and culture.
Mastery	<ul style="list-style-type: none"> • Identify a rectangle, square, circle, triangle, and hexagon. • Use a combination of drawing and writing to narrate an experiment. • Compare the temperature using a thermometer that is under different colored fabrics. • Identify the basic need of shelter. • Explain why homes are built based on the environment and culture.
Building the Basics	<ul style="list-style-type: none"> • Identify a circle. • Identify a square. • Use a combination of drawing and dictating to narrate an experiment. • Identify which material blocks the most heat from the Sun. • Identify that houses are different around the world.

Lesson Foundations – Prerequisite Content & Skills

Content Knowledge	<ul style="list-style-type: none"> • Student should understand the concept of shape. Most will be able to identify a square and circle. • Students should understand that thermometers measure temperature. • Students should understand the differences between day and night.
Skills	<ul style="list-style-type: none"> • iPad Responsibility • Proper Thermometer Use • Fine Motor Skills for Building • Collaboration

Unit Anchor Text

Unit Anchor Text	A House for Hermit Crab - By Eric Carle
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Unit Companion Texts

Informational Text(s)	<ul style="list-style-type: none"> • House and Homes- Ann Morris • What Makes Day and Night- Frankly Mansfield Branley • The Shape of Things- Dayle Ann Dodds • <i>When a Line Bends...a Shape Begins</i> by Rhonda Gowler Green
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Assessments

Formative Assessments	<ul style="list-style-type: none">• Students will be observed during the Geometry lesson to assess their understanding of shapes.• Throughout the discussion and experiment on homes, the students will be assessed for understanding.
Summative Assessments	<ul style="list-style-type: none">• Pre-Test Using pattern blocks, the students will identify a circle, square, rectangle, triangle, and hexagon with the use of manipulatives.• Post-Test Repeat the process by using pictures of the shapes as the assessment.
Writing Assessments	<ul style="list-style-type: none">• Students will be assessed on the written description of the experiment. An illustration, labels, and a record of temperature are expected for each student.• Students will illustrate and write a description of the Sun's path across the sky based on their observations.

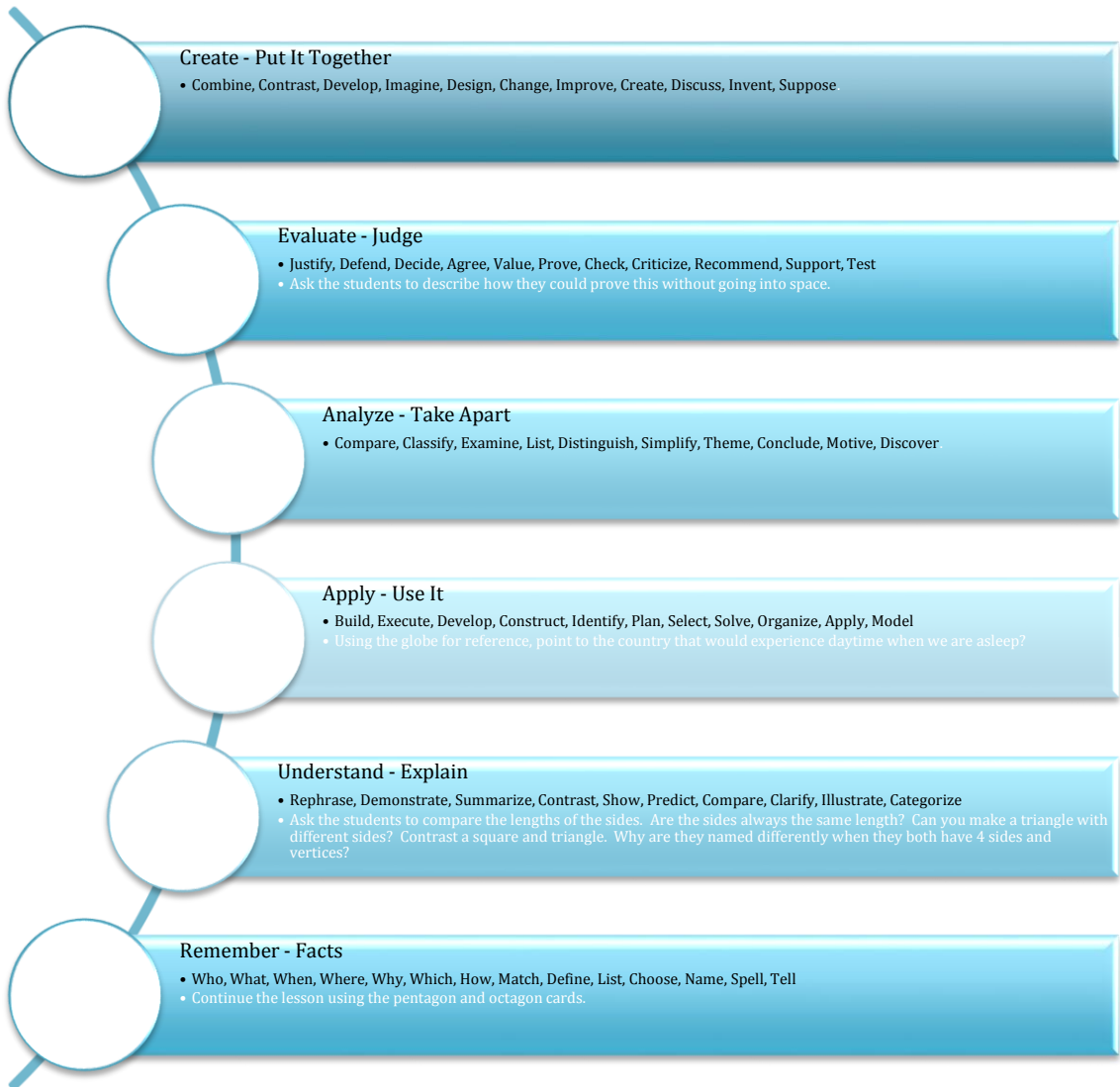
Unit Vocabulary

Term	Definition
Rotation	Spinning in a circle in one place
Compare	Finding the similarities between two or more things
Contrast	Finding the differences between two or more things
Temperature	The amount of heat
Thermometer	Tool that measures temperature

Teaching the Unit

Initial Strategies	<p>Walt Disney- <i>The Little House</i></p> <ul style="list-style-type: none">• As progress brings the city directly around a little house, the house becomes more and more depressed in this cartoon.• The video introduces young learners to environmental issues, social issues, and urban sprawl.• Have a class discussion focused on the homes we live in.<ul style="list-style-type: none">○ What do they like about their home?○ Where do they want to live when they are grown-up?○ What kind of house?
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<p>Direct Instruction</p>	<p>Earth's Rotation- Day/Night</p> <ul style="list-style-type: none"> • Place the students in a straight line facing the teacher. Turn off the lights. The teacher will hold a spotlight/flashlight directly in front of him/her. (A piece of wax paper can be placed over the lamp so it will not hurt the students' eyes.) • Ask the students if they can see the light. Next, instruct them to turn around. Ask if they can see the light, now. Instruct the students to turn SLOWLY in a circle, without turning their head, and take note of when they can see the light, when it is the brightest, when it begins to fade, and when it is completely gone. • Using a globe, along with the flashlight, do the same demonstration to show how day/night occurs do to the spinning (rotation) of the Earth (on its axis). • Read <i>What Makes Day and Night</i> by Frankly Mansfield Branley. Finally, the students will illustrate the Sun's path and write a sentence explaining the process. <p>Shapes, Shapes Everywhere</p> <ul style="list-style-type: none"> • Read <i>The Shape of Things</i>. <ul style="list-style-type: none"> ○ Throughout the reading, have students identify the shapes and predict what real-world object it represents. • Display pictures of the basic shapes (triangle, square, rectangle, hexagon). • Demonstrate to the students how to identify the sides and vertices (corners). • Using the "Shape Cards" encourage the students to form each shape using Q-Tips. <ul style="list-style-type: none"> ○ Each time the students create a shape, have them count the sides and vertices with a partner. • When all of the shapes are formed, compare and contrast the shapes: Which shapes have the same amount of sides? Corners? Which shape has the most sides and corners? Which shape has the least amount of sides and corners?
<p>Higher-Level Cognitive Function Strategies</p>	<ul style="list-style-type: none"> • Earth's Rotations: Day and Night <ul style="list-style-type: none"> ○ Using the globe for reference, point to the country that would experience daytime when we are asleep? (Some students will be able to point to the country while others will be able to name the country.) ○ Ask the students to describe how they could prove this without going into space. (The sun travels in an arch across the sky.) • <i>The Shape of Things</i> <ul style="list-style-type: none"> ○ Continue the lesson using the pentagon and octagon cards. ○ Ask the students to compare the lengths of the sides. Are the sides always the same length? Can you make a triangle with different sides? Contrast a square and triangle. Why are they named differently when they both have 4 sides and vertices?



Guided Practice & Activities

Shelter/Geometry/Shape Walk-

- Read *House and Homes* by Ann Morris.
 - Throughout the story emphasize the different shapes, colors, and materials of the homes. Ask the students to make inferences as to why the African homes are made of straw or an igloo is made of ice. Why are some houses brightly painted when others are not? Are all houses shaped like a rectangle? Are the doors always a rectangle? Use the book to compare and contrast colors, materials, and shapes.
- Take the students on a shape walk on the school's campus.
- Divide the students into pairs.
- Each time a student locates one of the shapes, they take a picture using the iPad.
- Challenge each student to find an example of each shape.
- After the walk, allow time for the students to share their findings with their peers by having a gallery walk. The Gallery Walk technique may also be used.
- Students can review each other's iPad by flipping through the pictures. The teacher may choose to display good examples to the entire class.

<p>STEM Projects</p>	<p>Sun Path Complete one or both of these activities at least four times throughout the school day in order to show the sun’s movement.</p> <ul style="list-style-type: none"> • Use an iPad to take a picture of the sun and the horizon. The sun will move in an arch across the sky. • Trace a partner’s shadow at four distinctive times from the same spot. - Have the student stand on an “x” while another student traces the shadow. • After an hour or so, repeat the process to observe the effects of the sun’s movement. • View and discuss the results with the students. Ask the students what this demonstration proves- the earth rotates and the sun rises and sets in the sky. • Instruct the students to illustrate their observations from the demonstration. Encourage them to write a descriptive sentence or label their drawing. (Students are expected to use phonetic spelling.) • After the student is finished, they will read the sentence to the teacher. The teacher will model writing the sentence correctly.
<p>STEM Culminating Event</p>	<p>Building A Canopy</p> <ul style="list-style-type: none"> • Before the experiment: <ul style="list-style-type: none"> ○ Gather the materials for each group- trays for transporting the houses, Lincoln Logs, one piece of cotton material, one rectangular piece of aluminum foil, one hexagon piece of white cotton fabric, and one circular piece of black cloth. Each group needs enough materials to build 3 shelters for testing, but every group needs the same amount of building supplies. ○ Divide the students into groups of 3-4. • Pose this problem to the students: <ul style="list-style-type: none"> ○ You are stranded on a tropical island that is very hot. You must build a shelter or you will get sunburned and too hot. The problem is that you have an odd assortment of materials: a shiny material, black cotton cloth, and sticks. Which cloth would you want to use? Why? • Students will use Lincoln Logs, a thermometer, and the three cloths to determine which material would reduce the effect of the sun. • Give students time to discuss and design their shelters. Some may build it like a house with four walls while others may build a teepee. • When the shelters have been constructed, the students will use a digital thermometer to test the temperature. • Each child must document the experiment by illustrating the shelters, recording the temperatures, and labeling their drawings. • Students must also label the shapes that are represented in the shelter. • Leave the shelters in direct sunlight. • Students will collect and record the temperature data throughout the day. • At the end of the day, the students need to rank their shelter as good, better, and best. • Display the shelters based on the rankings. <p>Discuss why certain shelters were better than the others. Lead the students to the conclusion that the shiny material reflected the sun and was the best choice; the white cloth was good because some of the heat was reflected; and the black cloth was the worst because it trapped the heat in. The shiny material would be the best option.</p>

<p>Differentiated Instruction</p>	<ul style="list-style-type: none"> • <u>Earth's Rotation- Day and Night</u> <ul style="list-style-type: none"> ○ Adjusted Questioning ○ Modeling- Performing the experiment ○ Connecting Literature • <u>The Shape of Things</u> <ul style="list-style-type: none"> ○ Modeling with Literature ○ Kinesthetic- Building of Shapes ○ Peer Tutoring • <u>Shelter/Geometry/Shape Walk</u> <ul style="list-style-type: none"> ○ Peer Tutoring ○ Real World Examples ○ Adjusted Questioning • <u>Sun Path</u> <ul style="list-style-type: none"> ○ Peer tutoring ○ Real World Examples ○ Visuals- Photos • <u>Building A Canopy</u> <ul style="list-style-type: none"> ○ Problem Based Learning ○ Peer tutoring- Groups of 3-4 ○ Prompting- Teacher
<p>Re-teaching Strategies</p>	<ul style="list-style-type: none"> • Using pop-sicle sticks, have the students construct each shape using the Shape Cards as reference. • Reiterate the shapes' name, number of sides, and number of vertices. • Then allow the student the opportunity to build the shapes when verbally prompted without the cards.
<p>Enrichment Strategies</p>	<ul style="list-style-type: none"> • Using Pattern Blocks, challenge the students to use multiple blocks to create a larger shape; for example, two triangles will make a square. • Once the shapes are created, ask the students to identify the sides and vertices. • Discuss the pentagon and octagon with the students. Identify the vertices and sides. • Ask the students to identify the shapes in <i>When a Line Bends...a Shape Begins</i> by Rhonda Gowler Green.
<p>Independent Practice Activities</p>	<ul style="list-style-type: none"> • Teacher Preparation: Divide a large piece of paper into 5 sections. Label each section: circle, triangle, square, rectangle, and hexagon. • Instruct the students to find examples of each shape in the magazines. • Once they have located the shapes, the student will cut it out and glue it on the corresponding area on the paper. • Challenge the students to find two examples for each shape.
<p>Materials & Resources</p>	<p>Globe Flashlight Shape Cards- Attached Lincoln Logs Aluminum Foil White Cotton Fabric</p>

	<p>Black Fabric Digital Thermometers A House for Hermit Crab- Eric Carle House and Homes- Ann Morris What Makes Day and Night- Frankly Mansfield Branley The Shape of Things- Dayle Ann Dodds When a Line Bends.. A Shape Begins by Rhonda Gowler Green Pattern Blocks Trays iPads Magazines</p>
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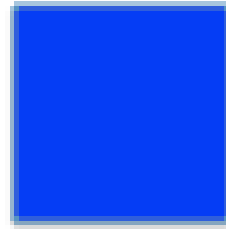


Comments	<p>This unit needs to be implemented when the weather is hot and sunny. It may also be expanded another week to include the many different types of precipitation.</p> <p>If you have an questions you may contact: Felicia Kellner at mary.kellner@sullivank12.net Jessica Carr at jessicawcarr@hotmail.com</p>
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Square

4 sides

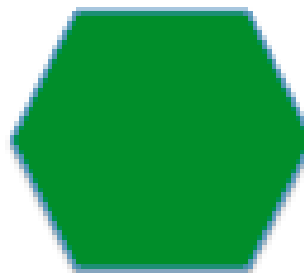
4 vertices



Hexagon

6 sides

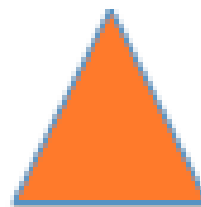
6 vertices



Triangle

3 sides

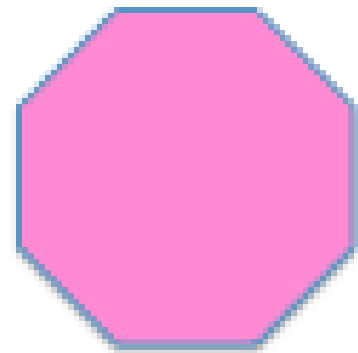
3 vertices



Octagon

8 sides

8 vertices



Pentagon

5 sides

5 vertices

