

Grade Level: <b>Kindergarten</b>	Topic/Unit: Day Sky	Lesson Name: The Atmosphere: Diving through the layers
<b>Lesson Time:</b> Approximately 5 science class periods approximately 30 – 40 minutes each	<b>Lesson Description:</b> <i>Essential Question: What is in our Day Sky?</i> This second lesson is located within the Day Sky unit, where the unit’s focus is upon the objects that we see within the day sky. This particular lesson would come after the lesson, <i>The Sun: The Heat is on!</i> This lesson will focus on the layers of our atmosphere, and the clouds that reside within our troposphere.  A summative Day Sky unit assessment will be given from the Science Fusion curriculum.  <b>Background:</b> As discussed in prior lessons, from Earth we can see many things in our day sky. Clouds are another object that we see in our sky. Students will learn about the layers of the atmosphere and that clouds are located in the layer closest to the Earth. Using a jigsaw activity, students will teach each other about the different types of clouds in the troposphere.	
<b>Prior Student Knowledge</b>		<b>Possible Preconceptions/Misconceptions</b>
<ul style="list-style-type: none"> <li>• Students should be familiar with what a cloud looks like</li> <li>• Students should be familiar with clouds can be different shapes, sizes and colors</li> <li>• Students should be familiar with comparing and contrasting information</li> <li>• Students should be able to listen, or read for understanding about a specific topic</li> </ul>		<ul style="list-style-type: none"> <li>• All clouds produce rain, or inclement weather</li> </ul>
<b>STANDARDS</b>		
<b>NGSS: K-ESS2 Earth’s Systems</b>		
<b>Science &amp; Engineering Practices:</b> <i>Analyzing and Interpreting Data</i> Use observations to describe patterns in the natural world in order to answer scientific questions. <i>Engaging in Argument from Evidence</i> Construct an argument with evidence to support a claim.  <b>Connection to Nature of Science:</b> <i>Scientific Knowledge is based on Empirical Evidence</i> Scientists look for patterns and order when making observations about the world.	<b>Disciplinary Core Ideas:</b> <i>ESS2.D: Weather and Climate</i> Weather is the combination of sunlight, wind, snow, or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	<b>Crosscutting Concepts:</b> <i>Patterns</i> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Common Core Standards	Florida State Specific Standards*
<p><b>RL.K.1</b> – With prompting and support, ask and answer questions about key details in a text.</p> <p><b>RL.K.10</b> – Actively engage in group reading activities with purpose and understanding</p> <p><b>W.K.7</b> - Participate in shared research and writing projects</p> <p><b>K.MD.B.3</b> – Classify objects into given categories; count the number of objects in each category and sort the categories by count</p> <p><b>CCSS.MathPractice.MP6</b> - Attend to precision</p>	<p>* The state of Florida has not adopted NGSS and CCSS standards.</p> <p><b>Science:</b></p> <p><b>SC.K.E.5.5</b> – Observe that things can be big and things can be small as seen from Earth</p> <p><b>SC.K.E.5.6</b> – Observe that some objects are far away and some are nearby as seen from Earth.</p> <p><b>SC.K.N.1.1</b> – Collaborate with a partner to collect information</p> <p><b>SC.K.N.1.3</b> – Make observations of the natural world and know that they are descriptors collected using the five senses.</p> <p><b>SC.K.N.1.5</b> – Recognize that learning can come from careful observation</p> <p><b>SC.K2.CS-CP.1.1</b> – Identify different kinds of data (e.g., text, charts, graphs, numbers, pictures, audio, video, and collections of objects).</p> <p><b>Math:</b></p> <p><b>MAFS.K.G.1.1</b> Describe the relative positions of objects in the environment using terms such as above, below, beside, in front of, behind and next to.</p> <p><b>MAFS.K12.MP6</b> - Attend to precision</p> <p><b>English Language Arts:</b></p> <p><b>LAFS.K.RI.1.10</b> – Actively engage in group reading activities with purpose and understanding</p> <p><b>LAFS.K.RI.1.1</b> – With prompting and support, ask and answer questions about key details in a text.</p> <p><b>LAFS.K.RI.1.2</b> – Within prompting and support, identify the main topic and retell key details in a text.</p> <p><b>LAFS.K.RI.1.3</b> – With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.</p> <p><b>LAFS.K.SL.1.1</b> – Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.</p> <p><b>LAFS.K.SL.2.4</b> – Describe familiar people, places, things and events and with prompting and support, provide additional detail.</p> <p><b>LAFS.K.SL.2.6</b> – Speak audibly and express thoughts, feelings and ideas clearly.</p> <p><b>LAFS.K.W.1.2</b> – Use a combination of drawing, dictating and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.</p>
<b>Justification</b>	
<p>This lesson integrates science, reading, writing, math and technology throughout the classroom lesson. Students will use science skills to perform careful observations to learn about the layers of the atmosphere, record information about each layer, and make observations about clouds. They will use their knowledge of the</p>	

location of clouds and types of clouds in the atmosphere to better understand patterns in weather they may see day to day.

Math is minimal in this lesson. It is utilized in explaining position of atmospheres and clouds to each other.

This lesson provides excellent opportunities for extended work with writing and communication. Students will use journal entries to demonstrate the importance of recording information for further reference and discussion. The student work in groups to read basic cloud facts, interpret them, and finally represent them on paper in order to become experts and then “teach” what they know to the class.

Technology is utilized in the form of online videos, online books and presentations of images through a projector.

Integration such as this, enhances student understanding that science is not just experiments, design, and engineering. They begin to realize that reading for understanding is important to further their knowledge and that communication in the form of presentations is equally important, allowing others to learn from their own understandings.

#### **Measurable Objectives**

Students will be able to:

- List objects that you can see in the day sky, including clouds (DOK 1)
- Observe and describe features of a cloud (DOK 1)
- List types of clouds (DOK 1)
- Compare a series of clouds (DOK 2)
- Draw conclusions about the relationship of weather and clouds to form predictions about why a particular cloud type has formed (DOK 3)
- Apply concepts of the atmosphere and/or clouds to create a model. (DOK 4)

Materials and Resources Required	
<ul style="list-style-type: none"> <li>• Chart paper and markers</li> <li>• An orange</li> <li>• STEM/STEAM Journals (1 per student)</li> <li>• Chart Example – Earth’s Atmosphere - Blank</li> <li>• NASA Space Place website (links throughout lesson plan)</li> <li>• Image of Earth’s Atmosphere Layers (link in lesson plan)</li> <li>• Levels of Clouds Cards</li> <li>• Blackline master of cloud types and their levels</li> <li>• Types of Clouds Cards with details</li> <li>• Cloud Types Matching Task Cards (link within lesson)</li> <li>• Scrap pieces of paper for exit tickets (1 per student)</li> <li>• 4 Jigsaw puzzle pieces (1 per group)</li> <li>• Jigsaw Groups Activity Support file</li> <li>• Computer (teacher)</li> <li>• Projector</li> </ul>	<ul style="list-style-type: none"> <li>• Video Files: “Felix Baumgartners’s historic skydive from the stratosphere”; “Dr. Binocs Show – Layers of the Atmosphere”; “Dr. Binocs Show – Types of Clouds”</li> <li>• NASA Eyes on the Earth</li> <li>• Student puzzle presentation rubric [Blackline Master]</li> <li>• Student diagram/model rubric [Blackline Master]</li> <li>• Classroom materials for students to create diagram/model (e.g. construction paper, blocks, Legos, playdough, modeling clay, straws, etc.)</li> <li>• Optional poster resources: NOAA-NASA Introduction to Clouds; NOAA-NASA Wild World of Clouds; NOAA-NASA Reading the Clouds</li> <li>• Optional E-Book resources: listed in E-Learning Connections</li> </ul>
E-Learning Connections	
<ul style="list-style-type: none"> <li>• Optional EPIC Books e-book resources: What are cumulus clouds? By Lynn Peppas; What are Stratus Clouds? By Lynn Peppas; What are Cirrus Clouds? By Lynn Peppas; Cloud Cover by Kristin Schuetz</li> <li>• Online videos</li> <li>• NASA Eyes on the Earth application: <a href="https://eyes.nasa.gov/eyes-on-the-earth.html">https://eyes.nasa.gov/eyes-on-the-earth.html</a></li> <li>• NASA Space Place website</li> </ul>	
Engaging Context or Phenomena	
<p>Engaging phenomena for this lesson will begin with a video of Felix Baumgartner skydiving from the stratosphere. Using observations of the video and the discussion of the day sky, students will journey to make a connection to clouds, and how weather affects the types of clouds they see in the sky.</p>	
Lesson Plan Procedures	
<p><b>ENGAGE</b></p>	<p><b>Teacher</b> will show students a <a href="#">video</a> (10 minutes) of Felix Baumgartner skydiving from the stratosphere. Following the video, the <b>Teacher</b> will ask <b>students</b> to share observations they saw from the video.</p> <p><b>Teacher</b> will ask <b>students</b> what time of day he skydived. [day time] Follow up with a question about how the students know this. Discuss. Then ask what are some things that we can see in the day sky? Record student answers on chart paper.</p> <p>Looking at the items on the chart, the <b>Teacher</b> will indicate to the <b>Students</b> that their objects that they listed are located in the atmosphere of our Earth, where their objects are located in (<i>fill-in the blank #</i>) layers of our atmosphere.</p> <p><b>Teacher</b> will ask <b>students</b> what they think the Earth’s atmosphere is. Record their thoughts on chart paper.</p> <p><b>Teacher</b> will show <b>students</b> an orange. Ask <b>Students</b> to share some characteristics of the orange. At the conclusion of the discussion, the <b>Teacher</b> will share that the peel of the orange is much like our Earth’s atmosphere. It is like a “jacket”. It keeps us warm, its is full of the right types of gases for us to</p>

	<p>breathe (air), and our weather happens in the atmosphere (NASA, 2018) The orange peel is also like our Earth’s atmosphere because the peel may be thinner and thicker in different parts of the orange, much like our own atmosphere. <b>Teacher</b> can peel all or part of the orange to demonstrate this. Our Earth’s atmosphere is a bit different from an orange peel in that the peel is only one layer around the orange, our Earth has six layers, but we are going to focus on the four main ones.</p> <p><b>Teacher</b> will remind <b>students</b> that we have learning about temperature in class. Post a chart [see sample] that has four layers shown above the Earth without any labels. Have students predict what happens to the temperature as we move away from the Earth up into each layer of the atmosphere. Record their predictions.</p>
<p><b>EXPLORE</b></p>	<p><b>Teacher</b> will have <b>students</b> get out their STEAM Journal. Students will create a journal entry page (Title: Earth’s Atmosphere; Date: mm/dd/yy)</p> <p><b>Teacher</b> will ask <b>students</b> to draw an image of the Earth at the bottom of their journal page. Ask students to draw an arc above their Earth image (model on the board for students).</p> <p><b>Teacher</b> will show students a <a href="#">video</a> about the Earth’s atmosphere.</p> <ul style="list-style-type: none"> <li>• At 1:08, stop the video and review the layer of the atmosphere just talked about (troposphere). Ask students what they saw in the troposphere (plane and clouds). In their journal entry, ask students to draw the objects that are in the troposphere they saw in the video and label the sphere. Ask student to tell what they remember about what Dr. Binocs said about the temperature as you move away from the Earth. Switch over to <a href="#">NASA Space Place – Troposphere</a> page, review the information and add any new learning to the journal page. Draw another arc on the journal page.</li> <li>• Continue the video. Stop at 1:47. What object will we find in the stratosphere? (planes) Draw the object we see here on the journal page and label the sphere. Ask students about what happens here with the temperature. Switch over to <a href="#">NASA Space Place – Stratosphere</a> page, review the information and add any new learning to the journal page. Draw another arc on the journal page.</li> <li>• Continue the video. Stop at 1:57. What did you see in the mesosphere? (meteors burning up). Draw this on the journal page. Switch over to <a href="#">NASA Space Place – Mesosphere</a>, review the information and add any new learning to the journal page. Draw a final arc on the journal page.</li> <li>• Continue the video. Stop at 2:24. Show students the <a href="#">image</a> from NASA showing the different layers of the atmosphere. Talk about the objects that it shows in the thermosphere. (satellites, ISS, Hubble Telescope). Have the students draw these objects on their journal page and label the sphere. <a href="#">Switch over to NASA Space Place – Thermosphere</a>, review the information and add any new learning to the journal page.</li> <li>• Optional: Discuss Exosphere using video and/or NASA Space Place</li> </ul> <p><b>Teacher</b> will show <b>students</b> a <a href="#">picture</a> of the Earth and the visible layers of the atmosphere. Have students turn and talk with a science partner about what they see and which color goes with each layer. Come back together as a class, discuss the colors and have <b>students</b> color code their layers in their journals.</p>

	<p><b>Teacher</b> will explain to <b>students</b> that we are going to be talking about a weather object that you will find in the troposphere. Have students look at their journals and predict what object we will be talking about. (clouds)</p> <p><b>Teacher</b> will bring up NASA <a href="#">Eyes on the Earth</a> app and display the CloudSat. Explain how we can use its information to learn more about clouds from space. Ask students where they think this satellite is located around the Earth (which sphere?).</p> <p><b>Teachers</b> will either place <b>students</b> into groups, or have students self-choose their own groups. <b>Students</b> will perform a jigsaw type strategy for learning about different clouds. Provide each group a different level of cloud(s): High Cloud, Middle Cloud, Low Cloud, Vertical Cloud – give each group a card with their level of cloud and a cloud diagram. <b>Students</b> will work together to find the clouds that would fit into their level.</p> <p><b>Teacher</b> will display a clouds poster obtained from NASA Space Place (either Reading the Clouds or Wild World of Clouds). Have <b>students</b> check their work against the posters.</p> <p><b>Teacher</b> will show <b>students</b> a <a href="#">video</a> about clouds. Pass out 1 – 2 types of cloud info cards to each group to correspond to their level of cloud. Have students go over the information from the video and their cards. They will become experts in their cloud types.</p> <p><b>Exit Ticket:</b> Using a variety of images of cloud types, student will choose a cloud they believe corresponds to the clouds their group is learning about. Utilize cards from the <a href="#">Cloud Types Matching Task Cards</a> digital file to display and students can select the letter of the card they believe corresponds to the clouds their group is learning about and write it on a scratch piece of paper with their name on it.</p>
<p><b>EXPLAIN</b></p>	<p><b>Teacher prep:</b> <i>using the 4-piece puzzle template in the Jigsaw Groups Activity Support file, project onto the board, trace onto chart paper, cut out a puzzle piece for each group.</i></p> <p><b>Teacher</b> will explain to <b>students</b> that they are going to become experts about their type of cloud types. They will design and create a puzzle piece that has information about their cloud(s) that they can present to the class to “teach” them about their clouds. As they are creating their puzzle piece they can be creative as they would like in order to best teach it. Students may have additional questions about their types of clouds. Help answer their questions or direct them to additional resources if available to help them answer their own questions.</p> <ul style="list-style-type: none"> <li>• Optional book resources from EPIC Books: What are cumulus clouds? By Lynn Peppas; What are Stratus Clouds? By Lynn Peppas; What are Cirrus Clouds? By Lynn Peppas; Cloud Cover by Kristin Schuetz</li> <li>• Optional poster resources: NOAA-NASA Introduction to Clouds; NOAA-NASA Wild World of Clouds; NOAA-NASA Reading the Clouds</li> </ul> <p>Allow students time to create their puzzle piece.</p> <p><b>Student</b> groups will present their cloud knowledge by presenting their puzzle pieces to the class. As they present, hang each puzzle piece up for display.</p>

	<p><b>Teacher</b> will use a Student Puzzle Presentation rubric to evaluate each group as they present.</p> <p><b>Teacher</b> will review each type of cloud – display it and then discuss what type of weather we can expect to have.</p>
<b>ELABORATE / EXTEND</b>	<p><b>Students</b> will demonstrate what they have learned to create a diagram, model, or other type of demonstration of knowledge from either atmosphere or clouds. Students will use materials currently existing in the classroom that the teacher has on hand. Examples of such items: construction paper, blocks, Legos, playdough, modeling clay, straws, etc.</p> <p>Conduct a gallery walk when complete.</p> <p><b>Teacher</b> will take <b>students</b> outside with their <a href="#">Cloud Viewer</a> and students will observe clouds through their viewer and discuss what types of clouds they are seeing that day.</p>
<b>EVALUATE</b>	<p>This lesson will use both Formative and Summative Assessment in order to measure whether the lesson objectives have been met.</p> <p><b>Formative Assessments:</b></p> <ul style="list-style-type: none"> <li>• Teacher monitoring and observation</li> <li>• Analyzing student work</li> <li>• Turn and talk will be used where students will share their ideas with a partner. The teacher will be listening in on the conversations as they occur.</li> <li>• Exit Tickets: (1) Paper</li> </ul> <p><b>Summative Assessment:</b></p> <ul style="list-style-type: none"> <li>• Student Puzzle Piece Presentation Rubric</li> <li>• Student diagram/model rubric</li> </ul>
<b>RESOURCES AND REFERENCES</b>	
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[video](#)