# 6E Cloud Elevation Lesson for Upper Elementary

**Overview:** Students will investigate how clouds are formed, at what elevations they occur and how they can help predict the weather.

**Driving Question:** How can cloud formation and location help us predict the weather?

**Learning Targets:**

- Students will explain the different cloud types and where they occur in the atmosphere.
- Students will explain how knowledge of cloud types can help predict the weather.
- Students will demonstrate an understanding of the hydrologic cycle and how weather is affected.

## Next Generation Science Standards

**5 Earth's Systems**

**Students who demonstrate understanding can:**
**5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere and/or atmosphere interact**. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
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| **Obtaining, Evaluating and Communicating Information**<br>Obtaining, evaluating and communicating information in grades 3-5 builds on K-2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.<br>• Obtain and combine information from books and other reliable media to explain phenomena. | **ESS2.A: Earth Materials and Systems**<br>• Earth's major systems are the geosphere (solid and molten rock, soil and sediments), the hydrosphere (water and ice), the atmosphere (air) and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms and influences climate. Winds and clouds in the | **Structure and Function Patterns**<br>• Patterns in the natural world can be observed, used to describe phenomena and used as evidence. (K-ESS2)<br><br>**Systems and System Models**<br>A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1)<br>- - - - - - - - - - - - - - - - - - - - - -<br>***Connections to Nature of Science***<br>Science Addresses Questions About |

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| **Developing and Using Models Modeling**<br>Developing and Using Models Modeling in grades3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.<br>Develop a model using an example to describe a scientific principle. (5-ESS2-1) | atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1) | the Natural and Material World.<br>• Science findings are limited to questions that can be answered with empirical evidence. |

## ENGAGEMENT

Students will access their background knowledge and generate questions about clouds and weather predictions after viewing a clip from the movie The Aeronauts.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| Show clip in ***The Aeronauts*** movie near beginning of balloon launch with white cumulus (Timestamp 3:49 -5.01) and then a video clip in the movie (Timestamp 20:03 - 23:07) where the clouds change / storm occurs.<br><br>• Chart paper (KWL charts)<br>• Markers | Show movie clips from ***The Aeronauts.***<br><br>Lead discussion about the clouds and how they change.<br><br>• Focus should include the color of the clouds, shape and weather changes that occur with the different clouds.<br>• Discuss what students already know about clouds.<br>• Complete **Know** on KWL Chart with information they know about clouds.<br>• Complete **Want** on KWL Chart adding questions students generate about clouds and weather.<br>• Explain that they will revisit the chart to review what they **Learn** about clouds<br>• Introduce and post the Driving Question. (How can cloud formation and location help us predict the weather?) | • What did you notice about the clouds at the beginning of the movie?<br>• What changed about the clouds in the second clip?<br>• What kind of weather was occurring during the clips?<br>• Do you know anything else about clouds?<br>• What questions do you have about clouds and weather?<br><br>Listen for misconceptions that will need to be addressed throughout the lesson. |

## EXPLORATION

Students review the hydrologic cycle, investigate how clouds are formed and create a one-pager* about the hydrologic cycle.

* A one-pager is a strategy for presenting information about a topic all on one page that includes specific criteria to build meaning and comprehension.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| • Hydrologic Cycle one-pager Directions/expectations sheet<br>• Paper<br>• Colored pencils<br>• crayons<br>• Books and websites that explain the hydrologic cycle and how clouds are formed<br><br>The Water Cycle https://youtube.com/watch?v=ZzY5-NZSzVw<br><br>The Water Cycle https://youtube.com/watch?v=Mcw2KgS7dHo<br><br>The Water Cycle and You https://youtube.com/watch?v=R8NQUQDZ3N0<br><br>Water Cycle Rap https://youtube.com/watch?v=yNW1evt93e4<br><br>Water Cycle Rap—Go Noodle https://youtube.com/watch?v=KM-59ljA4Bs | • Students work in small groups to find information about the hydrologic cycle and how clouds are formed.<br>• Students will individually create a one-pager that tells the story of the hydrologic cycle and how clouds are formed. The directions and expectations for the one pager can be printed or displayed for students. One-pager will include labels, drawings and explanations.<br>• Teacher circulates and assists students as necessary.<br>• Students share their one-pagers with the rest of the class. | *Listen for misconceptions that will need to be addressed throughout the lesson<br><br>**Be sure to explain that the water cycle and the hydrologic cycle are the same thing; "hydrologic cycle" is the scientific name for the water cycle.<br><br>What types of precipitation fall from clouds?<br><br>What do we call it when the water falls back to earth and collects in different places?<br><br>Can you use arrows to show how the water moves through the water (hydrologic) cycle?<br><br>Be sure to label pictures. |

## EXPLANATION

Part 1: Students will observe a teacher-led cloud formation demonstration to identify the ingredients needed to form a cloud.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| Making a Cloud in a Bottle www.mos.org/sites/dev-elvis.mos.org/files/docs/education/mos_weather-wind-water-temperature_making-a-cloud.pdf<br><br>• Empty 2-liter plastic bottle (label removed)<br>• Bottle cap<br>• Matches<br>• Warm water | Review the directions given at the website provided to demonstrate how a cloud is formed.<br>1. First, rinse the inside of bottle with warm water. Swirl the water around the inside. Dump water out leaving a little in the bottom.<br>2. Cap the bottle tightly. Squeeze release the bottle.<br>3. Explain that a cloud does not form because it is missing a key ingredient, something to condense on. In the atmosphere, there are many dust particles for water vapor to condense on.<br>4. Complete the demonstration again only this time light a match, blow it out and put the smoldering match in the bottle before capping it. When you squeeze and release the bottle a cloud should form. | What do you see?<br><br>What happens to the water left in the bottle?<br><br>Did a cloud form? Why not?<br><br>What did you observe? Did a cloud form?<br><br>What can we say about how a cloud is formed?<br><br>What key ingredients need to be present for a cloud to form? |

Part 2: Students will complete a foldable that explains cloud types and what they tell us about the weather.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| • Paper (8.5 x 11)<br>• pencil<br>• Colored pencils<br>• Pictures of clouds printed for each student<br><br>Teacher resource for creating 4-door shutter foldable— Dinah Zike | 1. Teacher will model the steps to make a 4-door foldable using a sheet of paper and following the directions from Dinah Zike.<br>2. Instruct students to label the outside of the door with the four main types of clouds—cirrus, cumulus, stratus, and | Teacher should circulate to monitor student progress with the activity.<br><br>For more support, the teacher can do this as a teacher-led activity for each door/cloud type of the foldable. |

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| Four Door Book on page 29 of resource: https://blogs.edutech.nodak.edu/badlandsreadingcouncil/files/2012/03/reading-and-study-skills-foldables.pdf<br><br>Books and websites about clouds for students to conduct research<br><br>All About Clouds for Kids: https://youtube.com/watch?v=QAqeFSa60TE<br><br>"Clouds." *Discovery Education*, Mazzarella Educational Media, 2014: http://app.discoveryeducation.com/learn/videos/e58c0059-aabf-46f3-a8d7-6102deee9f41.<br><br>"Clouds." *Discovery Education*, Visual Learning, 2018: http://app.discoveryeducation.com/learn/videos/531714cd-0c8e-40cf-8ddb-0ca898e42d56. | nimbus and then glue on the matching picture<br>3. Students can write their own name on the back of the foldable.<br>4. Students will work with partners to find and enter the following information from cloud books or website resources:<br>• Description of clouds;<br>• Weather associated with cloud;<br>• Any information regarding the cloud location in atmosphere; and<br>• Examples of hybrid clouds (cumulonimbus, fog, etc.).<br><br>The teacher can post criteria on the board for reference. | |

## ENGINEER

Create a cloud elevation chart that shows where each type of cloud can be found within Earth's atmosphere.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| • Poster paper<br>• Colored pencils<br>• Markers<br>• Websites and books to research cloud elevations<br>• Student-created cloud foldables<br>• Cloud elevation charts to display (two provided) or print out for student reference if not using the video below.<br><br>How to predict the weather using clouds: | 1. Explain to students that they are going to create their own cloud elevation chart to teach others where cloud types occur.<br>2. Video can be shown to a whole class or students can view on individual devices if available. If video is not available, then print or display sample charts and provide books for further research.<br>3. Students work in small groups to create their own rendition | Teacher or students may need to pause the video to take notes about where the cloud types can be found.<br><br>This resource is for teacher use only or if the lesson needs to be modified for struggling students: Cloud Elevation Map worksheet http://havefunteaching.com/worksheets/science/earth-science/cloud-elevation-map.pdf |

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| https://www.youtube.com/watch?v=I00vcHLJXCc | of a cloud elevation chart on poster paper. Students can use their cloud foldable from the previous step as a resource, as well.<br><br>Posters should include the following:<br>• Title of chart;<br>• Student names on front of chart;<br>• Clouds types illustrated and labeled elevations depicting **low, middle** and **high** must include **cirrus, cumulus, cumulonimbus, stratu**s and could include other hybrid clouds;<br>• Elevations labeled with measurement in feet on the left side of the poster; and<br>• Additional items that can be found at each elevation (trees, birds, butterflies, planes, hot air balloon, etc.).<br><br>Display finished charts so that students can share their learning with others. | When watching the video about clouds, it might be helpful to students to point out that they use an elevation chart in the video. |

## ENRICH

Students can write a cinquain poem about a cloud type to demonstrate a deeper understanding of the cloud. Students can publish their poems in a cloud poetry book for the classroom library.

| Materials | Procedure | Sample Questions/ Teacher Hints |
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| • Paper<br>• Pencil<br>• Colored pencils<br>• Graphic organizer for a cinquain poem<br>• Computer<br><br>Teacher resource: "How to write a Cinquain Poem" | 1. Provide students with an example of a cinquain poem and a graphic organizer with directions for completing a cinquain poem.<br>2. Students choose a cloud type to write about.<br>3. Students work independently to complete the graphic organizer as a rough draft. | It may be helpful to generate a word or phrase bank for struggling students. |

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| www.poetry4kids.com/lessons/how-to-write-a-cinquain-poem/ | 4. Teacher circulates and provides feedback as necessary.<br>5. When students are ready to publish, they can type their poem or write their final copy and illustrate the cloud next to their poem.<br>6. Laminate and bind the poems together to create a class poetry book for the classroom library. | |

## EVALUATION

- Students will revisit the KWL chart, and they will add what they have learned about clouds.
- Student one-pager for hydrologic cycle, cloud foldable, cloud poem and cloud elevation chart can all be used as assessments.
- Students can create PowerPoints, slide presentations, or public service announcements to teach others about clouds and weather predictions highlighting the cloud foldables and elevation charts they have created.