



Survival Kit for the Imagination

Lesson 1.6

Expert Cloudspotting

Spotting Rare and Extra-Special Clouds



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Objective:

In this lesson, students learn about some rare and extra-special formations. Mindfulness strategies presented in all the lessons are reviewed. Students develop an excellent foundation for cloud spotting and emotional resilience building.

Lesson plans, links, and resources available at cloudappreciationsociety.org

Time: 45–90 minutes depending on activity options selected and teacher preference.

Materials

- 'Rare and Extra Special Clouds' printout
- Previous Mindfulness Guides

Lesson Prep

- Print or display 'Rare and Extra Special Clouds'
- Gather all the skies students have photographed throughout the module of lessons and create a slideshow.
- Prep videos for display

Resources

- Time-lapse videos of horseshoe vortex clouds <https://www.youtube.com/watch?v=99tSWPXy9sg> <https://www.youtube.com/watch?v=I8pTVIyiGOQ>
- The Cloud Appreciation Society videos page <https://cloudappreciationsociety.org/cloud-videos>
- 'Extreme cloudspotting' video of skydivers in wingsuits <https://www.youtube.com/watch?v=F29kpua3Im4>
- NASA https://www.nasa.gov/mission_pages/station/videos/index.html
- 'Earth Day 2021' video https://youtu.be/pS0rZIV7_EQ

Previous Lesson Review

The rain clouds are Nimbostratus and Cumulonimbus. (Nimbus is Latin for a rainy cloud.) Gratitude helps get through stormy emotional times. What were you grateful for today?

Lesson Intro: Rare & Hard to Spot Clouds



We already have learned about the ten main types. Sometimes these main clouds can appear in distinctive patterns or have weird cloud features attached to them. In this lesson, we will look at three of these more unusual cloud types, some of which are quite rare. We show what it's like to become an expert cloudspotter.

The undulatus cloud pattern

Of the three clouds we are going to look at, undulatus is the one you're most likely to spot. We describe one of the ten main clouds as undulatus when it is arranged into rows of clumps or rolls. Undulatus clouds sometimes have spaces between the rows and sometimes they are joined-up:



Gaps & Joined up Undulatus

What does the pattern of undulatus remind you of? One thing undulatus clouds can look like is the pattern of ridges that you sometimes see on the sand at the beach. You can see this pattern in several of the ten main cloud types. When the low clumpy layer of cloud known as Stratocumulus forms in an undulatus pattern the rows look big because the cloud rows are nearer to you. When the high clumpy layer known as Cirrocumulus forms in an undulatus pattern they look much smaller because the cloud is much further away from you.

Fluctus Cloud Features

The fluctus cloud looks like breaking waves. It sometimes looks like a whole bunch of breakers, one behind the other. The fluctus cloud is a bit like the undulatus because it is a pattern of regular bumps, but only with a fluctus do the tops of the bumps curl over. You have to be lucky to spot a fluctus because it doesn't happen often and when it does the breaking waves only last a few minutes!

Can You Spot a Fluctus?

Even though dramatic examples of fluctus are rare you'll have a good chance of spotting the curls of fluctus if you pay careful attention to the top of Cumulus clouds. When it is windy up at the level of the clouds, a fluctus curl will sometimes appear on top of a Cumulus. They only last for a couple of minutes, so you have to be paying attention. Next time there are Cumulus clouds on a windy day, see if you can spot a fluctus feature forming on top of one.



Horseshoe Vortex Cloud

This one is really rare. It is a twisting ribbon of cloud that is shaped like a horseshoe. If you are ever lucky enough to spot a horseshoe vortex cloud, keep watching it because this cloud only appears for 5 minutes before breaking up. Watch as it changes shape.

This cloud starts out as a flat roll of cloud. This twists gently like a tiny little tornado on its side. It then starts to curve upwards in the middle to take the shape of a horseshoe. This is because it forms on top of an invisible column of air rising from the ground. When that rising air hits wind blowing up above, it starts to twist at the top. The cloud forms in the middle of this little twist of air.

Videos



Look Up Often

Because this cloud is rare and only forms for a few minutes, you have to be an expert cloudspotter to see one. Luckily, it's easy to become an expert cloudspotter. You just need to look up more often. If you look up often enough, one day you might see a cloudy horseshoe in the sky.

Activity Options



Cloudspotting outside or accessing a webcam

Take a walkabout outside, if the weather is right. If it's pouring with rain, a flat overcast sky, or there are no clouds in the sky, go to the main webcam page and choose different parts of the world they want to investigate to see different clouds. Make the webcam link available so students can explore the world of clouds in their free time.

- May review rainclouds, latin names and ten main cloud types.
- Identify any unusual formations, discuss creating weather logs.
- Ask students if they've share cloudspotting with family or friends. Discuss.
- Ask students if knowing the names and being able to identify clouds makes it more interesting to Look Up.
- Share any new observations on how cloudspotting has impacted them.



Time Lapse Videos & Special Clouds

Watch time-lapse videos on the Cloud Appreciation Society video page. Look also at the Cloudspotting Chart poster. See if you can spot any extra-special clouds in the videos.



SOME PREP



Draw Rare Clouds & We're Going on a Cloud Hunt

Primary



Secondary

Draw Clouds

Draw the three special types.

- Undulatus
- Fluctus
- Horseshoe Vortex

Webcam Sky Comparisons

Skylinewebcams website can be used in various ways to see what the sky is like at present in different locations around the world. A worksheet could be produced for predetermined locations or for a more customised search (eg, 6 locations of their choice).



Clouds from Space

How about cloudspotting from Space? Clips from the Nasa website would enable pupils to see the atmosphere over different parts of the world.

Share Collected Cloud Photos

Get the students to compare which rare and unusual clouds they found over the course of these lessons. Ask the students to judge the photos if each cloud is a low, mid, or a high level cloud. Can they identify any of the clouds by name?

Watch the 'Earth Day 2021' video for lots of good images of the atmosphere.

MORE PREP



Extreme Cloudspotting, Imaginations, & Sky Gliders

Primary



Secondary

Watch the Extreme cloudspotting video: These skydivers are flying around Cumulus clouds. The cloud types may be everyday, but this is an extreme way of spotting them!

From there they can let their imaginations take them on a cloud hunt. Students talk about their feelings as they come across different cloud types: what they could see, what it felt like. Secondary Write or discuss how the sensations and emotions with the different clouds, how high they were, what the atmospheric conditions were like, and how it changed.





Digital Posters

Primary & Secondary:
Slideshow presentation of student's spottings over the course of the cloud lessons.

Secondary: Students work in groups of 2-3 to create a digital poster to present the expert cloud of their choice.
Depending on groups, assign 2-3 different clouds



Alternative Activities

1. Sky Beach Reflections: If the beach is nearby, take students down at low tide to see the patterns in the sand are like a reflection of undulatus and look at the waves to see earthbound fluctus. Links to science work in tides and wave movement in geography.
2. An art activity here could be to give students a coloured piece of paper, eg, grey. Draw a horizon line low down on the page. Using white chalk and dark charcoal to blend and rub together draw a cloud filled sky. Add in interesting shapes. Find pictures of recurring themes or shapes in nature



Mindfulness

Review of Strategies



Students are empowered with several tools to calm their bodies and minds down, not only to help them spot clouds better, but also to navigate all the complex emotions they experience and will continue to experience. Just like all these extra special clouds, there are complex emotions that can be difficult to describe.

6 Mindfulness Strategies

1. 5 Senses Mindfulness
2. Cloud Breathing
3. 3 Mindful Breaths
4. Mindful Breathing
5. 4-7-8 Breathing
6. Gratitude Lists

Plan on reviewing all 6 Mindfulness Strategies. Ask students of them all, which one their body likes best.

Encourage students to practice them when they remember.

Encourage students that when they look to the sky, the clouds will remind them that they will have emotions come and go, sometimes flowing slowly through them, or rapidly like a storm.

Daily Practice

The more they practice paying attention to their emotions, the better they will learn to let the emotions come and go. Your class may choose to do a mindfulness strategy during each subject, at specific breaks, or after lunch. As a teacher, you can explore how to create a mindfulness or calm classroom area where students can go to do mindfulness and utilize different calming strategies. This has been a small yet powerful introduction to incorporating Mindfulness into their lives.



Assessment

Name the three extra-special clouds students learned today; undulatus, fluctus, and horseshoe vortex. These are just a few of the unusual and rare clouds. Look on the Cloudspotting Chart to discover more.



Conclusion



All you need to get better at cloudspotting is to pay more attention to the sky. When you do, you'll start to notice that the ten main clouds we learned about can sometimes show unusual patterns and features. Start learning and noticing these, and you're on your way to being an expert cloudspotter.

Next time you see a big fluffy cloud in the sky, inhale the white of that cloud and exhale back to it. You learned about identifying your emotions and sensations, just like a cloudspotter identifies clouds. You have multiple tools to help you be aware of your body and surroundings, without judgement. This is just the beginning of your mindfulness journey.

The next modules will explore the many optical effects caused by clouds (rainbows are just the beginning). We will also explore what causes the many strange and rare patterns and features that appear in clouds, how storms form, and how they can be destructive with tornadoes, floods, and other phenomena in Mother Nature.

Photo Credits

- Undulatus with gaps by Beatrice Frei
- Undulatus joined-up by Richard Bacon
- Stratocumulus undulatus by Jenny Slade
- Cirrocumulus undulatus by Kristina Machanic
- Fluctus 'surf's up!' by Amy Hunter
- Fluctus 'rare' by Hallie Rugheimer
- Fluctus on Cumulus (right) by Søren Hauge
- Fluctus on Cumulus (left) by Tania Ritchie
- Horseshoe vortex (first) by Hélène Condie
- Horseshoe vortex (second) by Matthias Heigl

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Rare & Extra-Special Clouds

Lesson 1.6 Photo Guide



The undulatus cloud pattern. Of the three clouds we are going to look at in this lesson, this is the one you're most likely to spot. We describe one of the ten main clouds as undulatus when it is arranged into rows of clumps or rolls. Undulatus clouds sometimes have spaces between the rows and sometimes they are joined-up as on the next photo.



Undulatus spotted by Beatrice Frei



What does the pattern of undulatus remind you of?
One thing undulatus clouds can look like is the pattern of ridges that you sometimes see on the sand at the beach.



Virga spotted by Richard Bacon



You can see this pattern in several of the ten main cloud types. When the low clumpy layer of cloud known as Stratocumulus forms in an undulatus pattern the rows look big because the cloud rows are nearer to you. When the high clumpy layer known as Cirrocumulus forms in an undulatus pattern they look much smaller because the cloud is much further away from you: Undulatus looks big in low clouds (Stratocumulus).



Stratocumulus Undulatus spotted by Jenny Slade



The same undulatus pattern looks small in high clouds like this Cirrocumulus. This is just because they are much further away than the low ones like the Stratocumulus undulatus.



Cirrocumulus Undulatus spotted by Kristina Goslin



Surf's up! The fluctus cloud looks like ocean breakers in the sky.



A fluctus cloud like these are rare.

The fluctus cloud looks like breaking waves. It sometimes looks like a whole bunch of breakers, one behind the other. The fluctus cloud is a bit like the undulatus because it is a pattern of regular bumps, but the important difference is that only with a fluctus do the tops of the bumps curl over. You have to be pretty lucky to spot this cloud because it doesn't happen often that the sky has a whole line of breaking waves in it!



Fluctus spotted by Amy Hunter (top) | Fluctus spotted by Hallie Rugheimer (bottom)



Your best chance of spotting a flactus feature is on the top of a Cumulus on a windy day



Even though dramatic examples of flactus are rare you'll have a good chance of spotting the curls of flactus if you pay careful attention to the top of Cumulus clouds. When it is windy up at the level of the clouds, a flactus curl will sometimes appear on top of a Cumulus. They only last for a couple of minutes, so you have to be paying attention. Next time there are Cumulus clouds on a windy day, see if you can spot a flactus feature forming on top of one.



Flactus spotted by Soren Hauge (top) | Flactus spotted by Tania Ritchie (bottom)



The horseshoe vortex cloud



You have to be an expert cloudspotter to spot a horseshoe vortex cloud!

The horseshoe vortex cloud starts out as a flat roll of cloud. This twists gently like a tiny little tornado on its side. It then starts to curve upwards in the middle to take the shape of a horseshoe. This is because it forms on top of an invisible column of air rising from the ground. When that rising air hits wind blowing up above, it starts to twist at the top. The cloud forms in the middle of this little twist of air, and it bends into a horseshoe as the air below keeps rising.



Horseshoe vortex spotted by Matthias Heigl (top)
Horseshoe vortex spotted by H  l  ne Condie (bottom)