




# STEAM Art Activity:

## Fractal Watercolors - Grades 6-8

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This lesson will teach students about amazing, intricate fractals and how they show up naturally in our world. Students will use their understanding of fractals to create a unique fractal watercolor painting. This lesson is for students in grades 6-8, but can be adapted for any grade level.

 Teacher Led	 Requires Computer OR Mobile Device	 Requires <a href="#">Spaces</a>
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### Spaces Prep





Create your Activity in Spaces before the lesson. Not sure how to create an Activity? Check out this [short video tutorial](#) on assigning and managing activities.

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### Learning Goals

1. Students will **understand** the concept of a fractal, especially in nature.
2. Students will **apply** their understanding of fractals to plan a design.
3. Students will **create** a unique fractal watercolor painting.

## Materials

 <b>Student Handouts</b>	N/A
 <b>Technology Requirements</b>	<ul style="list-style-type: none"> <li>● Mobile device, tablet, or laptop</li> <li>● Projector or Smartboard</li> </ul>
 <b>Video/Audio Clips</b>	<ul style="list-style-type: none"> <li>● <a href="#">What is a fractal?</a></li> <li>● <a href="#">Fractals and the art of roughness Ted Talk</a> (optional)</li> </ul>
 <b>Additional Materials</b>	<ul style="list-style-type: none"> <li>● Pencils (1 per student)</li> <li>● Watercolor paper (1 per student)</li> <li>● Pastels or crayons (at least 2-4 colors per student)</li> <li>● Pictures of fractal examples (pages 5-10)</li> <li>● Watercolors</li> <li>● Paintbrushes (1 per student)</li> <li>● Cup of water (1 per student)</li> <li>● A device to take pictures of or look up fractal examples (optional)</li> <li>● Black cardstock or construction paper (1 per student, optional)</li> </ul>

## Instructions

### *Before the lesson*

1. Explain to students that today, they will be learning about fractals.
  - Write “fractal” on the board, and ask students if they have heard this term before, or if they can infer what it might relate to based on how it looks/sounds.
  
2. Tell students that fractals are naturally occurring patterns that are never-ending, and that fractals show up in nature everywhere you look.
  - Show [What is a fractal?](#) video for more explanation and examples of fractals.
  - If time allows and if you think it would be beneficial for your students, you can also show the [Fractals and the art of roughness Ted Talk](#) video through about minute 2:20; this Ted Talk is by mathematician Benoit Mandelbrot, who coined the term “fractal.”

3. As a class, look at some examples of fractals that exist in nature (project and/or print out examples on pages 5-10).
  - As you observe each fractal, discuss as a class what patterns are occurring. Note that there are usually many patterns, not just one.

### ***During the lesson***

1. Tell students that they will use their understanding of fractals to create a unique fractal watercolor painting.
  
2. Students should choose a fractal they are interested in painting. They can use one of the examples in this lesson, or, as an option, you can have your students:
  - Look up and find a picture of a fractal online using a device, OR
  - If time, space, and resources allow, you can bring students outside to find a real-life fractal example to take a picture of.
  
3. Once students have chosen and/or taken their picture of a fractal, they should get the following materials to design and create their painting:
  - Pencil
  - Watercolor paper
  - Pastels or crayons (at least 2-4 colors)
  - Watercolors
  - Paintbrush
  - Cup of water
  
4. Students should follow these steps to design and create their painting:
  - Outline their fractal design in pencil on their piece of watercolor paper.
    - To differentiate, challenge students with stronger fine motor skills to create 4+ “levels” of their fractal; students with fine motor challenges should do 2-3 “levels.”
  - Next, use pastels or crayons to trace their fractal design.
    - Have students use a different color for each “level” of their fractal pattern. For example, if they are drawing a flower, the inside of the flower would be one color, the first set of petals would be another color, and the next set of petals would be a different color.
  - Once their design is traced, use watercolors to add color to their design.

- Allow and encourage students creative freedom and expression in their painting; the colors do not have to match their picture of their fractal.
- Once their painting is finished and dried, you may want students to secure their painting to black cardstock or construction paper as a background (optional).

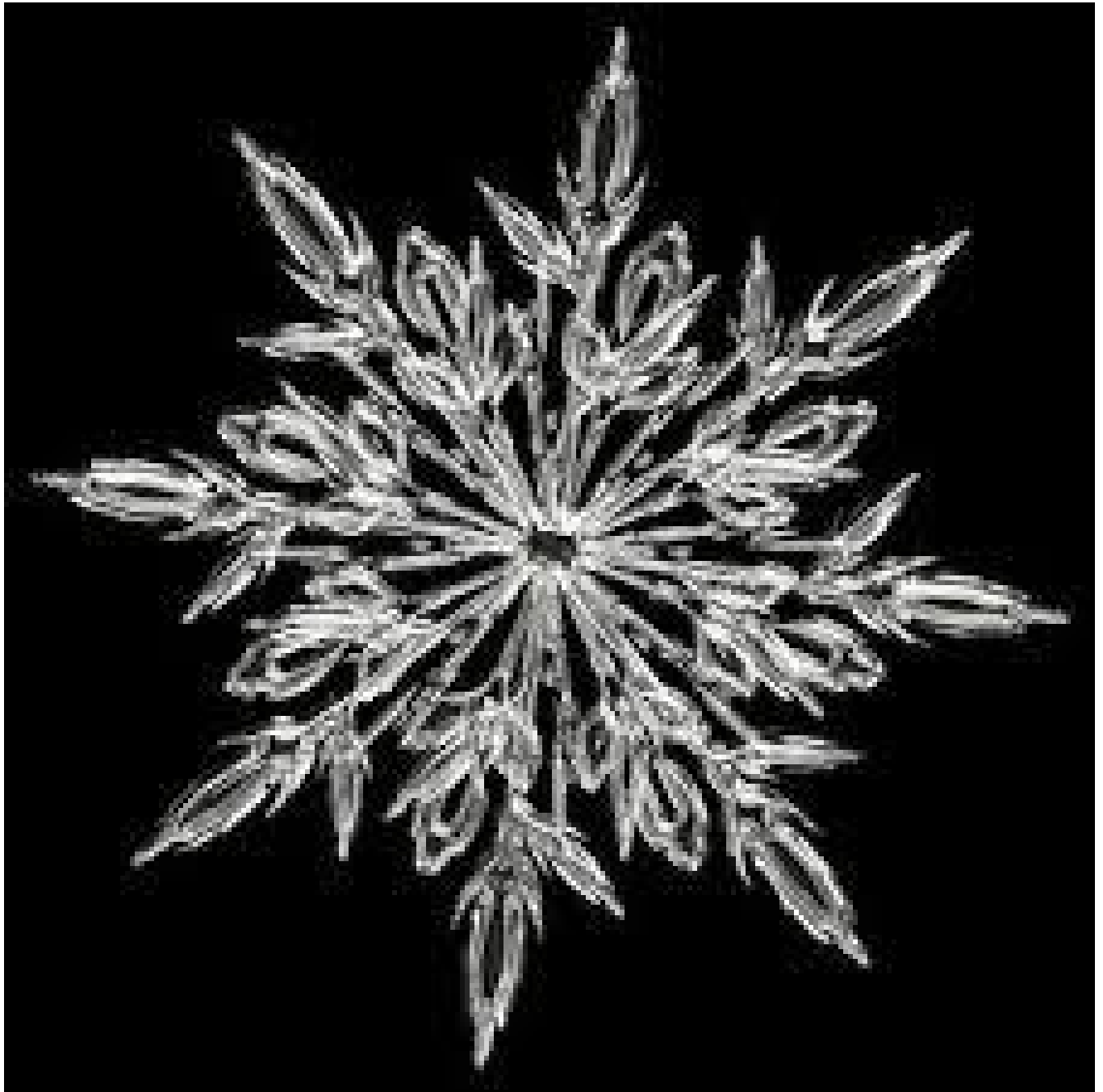
***After the lesson***

1. Have students do a gallery walk to observe each others' fractal paintings.

## Fractal Examples in Nature



## Fractal Examples in Nature



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