

LEARNING PLAN

<p>Exploratory Activities What is this stuff?????? Students are introduced to the concept of fractals using the own art work. Students are asked to compare and contrast their own art work with the art of M. C. Escher and fractal art.</p>	<p>CONCEPT Finding Fractals in Nature</p>
<p>Concept Development Activities</p> <ul style="list-style-type: none"> ➤ How small can you go?: Coastline measurements as fractals. Students will determine what it means to be a fractal. Students are given a map of Texas and asked to measure the perimeter of the border with different size measuring sticks. ➤ Create a Sierpinski Triangle using Geometry Sketchpad. Students will put their working definition of fractals to the test by creating a Sierpinski Triangle using what they have learned about fractals so far. ➤ Fractal Webquest by Sharon Swihart. Students will use internet resources to answer the main questions of what a fractal is, does it occur for a reason, etc. in cooperative learning groups. 	<p>Materials and Resources</p> <ul style="list-style-type: none"> ◆ To Fractal or not to Fractal that is the question? www.manteno.k12.il.us/webquest/middle/Math/Fractals/fractalquest.htm ◆ Fractals, in Layman's Terms www.fractalus.com/home/ ◆ Arcadia, directed by Trevor Nunn, played at the Vivian Beaumont Theater, Lincoln Center, New York City, until mid-August 1995. ◆ The Cushman Network (fractals) www.thecushman.net/projects/fractals/ ◆ Texas maps ◆ Different measuring sticks
<p>Basic Facts and Standard Algorithms Formalized</p> <ul style="list-style-type: none"> ❑ Self Similarity - The quality or state of having a likeness or resemblance to oneself. ❑ Area - A roughly bounded part of the space on a surface ❑ Ration and Proportion - A statement in which two ratios are equal ❑ Random Numbers - Numbers that are chosen using a method with no obvious pattern ❑ Midpoints - A point that is exactly half way between two set points ❑ Triangles - Three sided polygon ❑ Tessellation - Congruent plane figures/shapes that cover a plane completely without overlapping. 	<p>Originality and Creativity Student Products</p> <p>Written</p> <ul style="list-style-type: none"> ✓ Summaries of activities, observations/inferences - For all of the activities students will be required to write down their observations and inferences and turn them in at the conclusion at each activity. ✓ Daily journal of what they take away from each activity - All students will be asked to keep a journal of their daily learning experiences. These will be turned in at the end of each week. ✓ Written Report - Students who choose this project they will need to research the history of fractals, how they may be useful, and where will the research take us now.
<p>Assessment</p> <p>Daily Assessment:</p> <ul style="list-style-type: none"> ❖ Through journal entries ❖ Observation in the classroom ❖ Summaries of learning experiences <p>Final Assessment:</p> <ul style="list-style-type: none"> ❖ Student Project <p>Group Assessment: Fractal Webquest presentation</p>	

<p>Related TEKS</p> <ul style="list-style-type: none"> ∞ Underlying Processes and Mathematical Tools 8.14.A-D; 8.15.A-B; 8.16.A-B ∞ Geometry and Spatial Reasoning 8.6.A; 8.7.A-B ∞ Measurement 8.10.A ∞ Probability and Statistics 8.11.A-C 	<p>Verbal</p> <ul style="list-style-type: none"> ✓ Skit of Benoit Mandelbrot's discovery of computer generated fractals - Students may write and perform a skit about Mandelbrot's 1980 discovery of computer generated fractals ✓ Structured debate on what it takes to be a fractal <p>Kinesthetic</p> <ul style="list-style-type: none"> ✓ Create a book of naturally occurring fractals - students will be required to create a book of pictures which give different examples of fractals as they occur in nature; students will be asked to mount their pictures in a creative book. ✓ Create a press book of fractals - students will be required to collect examples of fractals in nature, press them and mount them in either a book or in a shadow box. <p>Visual</p> <ul style="list-style-type: none"> ✓ Create fractal art using a downloaded fractal program ✓ Create a book of naturally occurring fractals - students will be required to create a book of pictures which give different examples of fractals as they occur in nature; students will be asked to mount their pictures in a creative book. ✓ Paint or draw examples of fractals
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