



YALE NATIONAL INITIATIVE

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Curriculum Units by Fellows of the National Initiative
2011 Volume VII: Organs and Artificial Organs

Symmetry and Fractals in the Lungs

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This unit is designed for seventh and eighth-graders about symmetry and fractals. This will be accomplished by looking at a very common organ in all animals, lungs, to see the symmetries and fractals that exist in them. This unit can also be used, with some additions to activities, to teach high school students about fractals and symmetry as well. It will be taught over approximately 2 weeks for 90 minutes each day. Instruction will be given to students in a whole and small group setting. Students will also receive hands-on mathematics experience that will help them apply what they learn to their everyday scenarios. Students will learn and apply a lot of symmetry and fractal concepts through classroom group exercise and projects. At the end of the unit, students will be able to create and identify fractals in nature, will be able to calculate fractal dimensions, and be able to accomplish all these with computer applets as well. Not only will the students be able to create their own fractal designs, they will be able to explain their knowledge of the symmetries and fractals that exist within them. This unit will help them see how the concepts of fractals and mathematics as a whole can be easily related to the environment in which they live.

(Developed for Mathematics/Geometry, grade 7; recommended for Mathematics/Geometry, grades 6-10)

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