

# RING OF FIRE

## **Brief Description:**

A laser plane creates a two-dimensional cross-section of a three-dimensional object when the object is placed in the ring of fire.

## **Objectives:**

This exhibit helps students to connect two- and three-dimensional geometry by illuminating the polygons hidden within a polyhedron's cross-section. Students can predict and describe the different and often surprising shapes they can find within various translucent solid models.

## **Links to Websites:**

<http://mathmidway.org/Training/fire.php>

[http://www.clausentech.com/lchs/dclausen/algebra2/conic\\_sections.htm](http://www.clausentech.com/lchs/dclausen/algebra2/conic_sections.htm)

[http://www.learner.org/courses/learningmath/geometry/session9/part\\_c/index.html](http://www.learner.org/courses/learningmath/geometry/session9/part_c/index.html)

<http://www.mhhe.com/math/lbmath/applets/ch9/>

<http://demonstrations.wolfram.com/CrossSectionsOfRegularPolyhedra/>

## **Vocabulary:**

Circle	Cone
Conic section cube	Cross section
Cylinder	Decagon
Ellipse	Hexagon
Hyperbola	Octagon
Parabola	Parallelogram
Pentagon	Plane
Polygon	Rectangle
Square	Trapezoid
Triangle	

## **Before:**

- ⊙ (Level 2, 3) Review the website:  
[http://www.clausentech.com/lchs/dclausen/algebra2/conic\\_sections.htm](http://www.clausentech.com/lchs/dclausen/algebra2/conic_sections.htm)

Give students a chance to reproduce the conic sections with a flashlight.

- ⊙ (Level 1, 2, 3) Review polygons up to the decagon (as well as conic section shapes - ellipse, circle, parabola, hyperbola- for levels 2 and 3)
- ⊙ (Level 3) Use "The Graphing Calculator" or other graphing software to view both the 3-D and 2-D versions of the conic sections simultaneously.

## **During:**

- ⊙ (Level 1, 2, 3) "Predict and find" activity

Take a 3-D solid and put it through the Ring of Fire. Explain how the lasers act like a knife and slice through the solid to show a 2-D cross section.  
Ask students what other 2-D cross sections they might find.  
Review all the 3-D solids and possible 2D cross sections.  
Group students and hand out a 3-D solid. Ask them to predict what 2-D cross sections they may find.  
Take groups one at a time to the Ring of Fire to test out the 3-D solid and compare the actual cross sections to their predictions.  
Discuss the results.

**After:**

- ⊙ (Levels 1, 2, 3) Make 3D solids out of clay and let students experiment with different cuts to produce cross sections. Then view the interactive website:  
[http://www.learner.org/courses/learningmath/geometry/session9/part\\_c/index.html](http://www.learner.org/courses/learningmath/geometry/session9/part_c/index.html)
- ⊙ (Levels 1, 2, 3) Visit applet: <http://www.mhhe.com/math/ltbmath/applets/ch9/> to create cross-sections within a cube by selecting edges of the cube.  
<http://www.tricounty.k12.ia.us/TeacherPages/Ward/GeomApplets/geo3apd/index.html>
- ⊙ (Levels 2, 3) Investigations: research Magnetic Resonance Imaging (MRI) and Computerized Axial Tomography (CT) Scan.