APPLE PI

Introduction: One of the best days for celebration for mathematics is on March 14 or 3.14 as ***Pi Day***. Each year classroom across the globe hold celebrations in honor of ***pi***. Since ***pi*** is 3.14159….. a special activity (such as eating pie) can take place at exactly March 14 at 1:59 P.M. March 14 is also the birthday of Albert Einstein which makes this day extra special!

Extension activities: There are many websites that provide activities to use in the classroom including:

1. education-world.com/a_lesson/lesson/lesson335.shtml. This is an article from Education World which presents links to many websites for Pi lessons.
2. cecm.sfu.ca/pi/pi.html. Here you will find "The Pi Pages" including useful links.
3. archive.ncsa.uiuc.edu/edu/RSE/RSEorange/Piactivities.html. This site gives a pi activity similar to this lesson. It also includes some links.
4. mathwithmrherte.com/pi_day.htm. This site from "Math with Mr. Herte" presents some great activities for pi day (we used the Pi circle to make badges, and also have done the Pi chain and Pi day songs).
5. mathforum.org/dr.math/faq/faq.pi.html. This site from "The Math Forum @ Drexel" shows a lot of information about Pi. Math Forum has several sites including "circumference vs diameter circle measuring activity" and "Determination of Pi".
6. www.mathutah.edu/~alfeld/Archimedes/Archimedes.html. Information on Archimedes and an interactive applet
7. teachpi.org
8. joyofpi.com
9. eveandersson.com/trivia
10. piday.org

Research Theme: Meaningful Mathematics Discourse in the Classroom

Broad Subject Matter Goals: Discovering the formula for the circumference of a circle

Learning Objectives:
1. Students will measure the circumference and diameter of various circular objects
2. Students will calculate the ratio of the circumference to diameter
3. Students will discover the formula for the circumference

Materials:
Pieces of string
Circular objects (have students bring in prior to lesson several circular objects)
Apple pies or other pies (pizza pie)
Apple pi activity sheet
Calculators
Rulers and Yardsticks

Steps	Main Learning Activities	Students'anticipated Responses	Remarks on Teaching
Introductory Activity	Ask students to measure length and width of desks. Then have students measure the distance around the outside of their desktops Questions to discuss as a group: A. What unit did you use to measure your desks and why? B. Why did some classmates get different measurements of their desks? C. What do we call the	Students can decide on the unit of measurement to use. Check for problems in measuring around desks. May want to have students work in pairs.	You may want to list answers on the board. Answers: A. Because of the size of the desks,the most appropriate units are inches or centimeters. B.Measurements will differ because of the units. In addition, the level of precisions may give different results. Students may round to different units (nearest ½" or ¼" or whole inch) . C. The distance around polygon is the perimeter, the

	distance around a rectangular object? D. What is the formula for finding the perimeter of a rectangle?		distance around a circle is the circumference. D. P = 2L + 2W
Understanding the relationship between circumference, diameter, and *pi*	Divide the class into groups of four. Inform them that they will be measuring circumference of several circular objects during the lesson. Tell them that there is a formula (just like there is a formula for perimeter) and to be on the lookout to discovering it.		
	Students should measure the "distance around" and the "distance across" of the objects they brought to school for this lesson. (To measure the distance around they will likely need to work in pairs and assist one another).	Students should record the following information in the *Apple Pi* activity sheet: • Description of each object • Distance around the outside of each object • Distance across the middle of each object • Distance around divided by distance across	An effective method for measuring the circumference is to wrap a string around the object.
Exploration	After the measurements have been recorded, a calculator		As students are working, take note of the results. Push

	can be used to divide the distance around by the distance across. Students should answer both questions on the worksheet.		students to note any numbers in the column that seem to be irregular, and have them check their measurements for these rows.
Share findings	When all of the groups have completed the measurements and calculations, conduct a whole-class discussion. Rather than present each individual object, students should discuss the average and note any interesting findings. Students should also compare their averages with those of other groups.		You may find it helpful to use the **Circle Ratios** applet as a demonstration tool. This applet allows students to see many other circles of various sizes, as well as the corresponding ratio of circumference to diameter. Explain that each group has found an approximation for the ratio of the distance around to the distance across, and this ratio has a special name: π. Be sure that your students know that the "distance across" is the *diameter* and the distance around is the *circumference*. Because of this relationship, algebraic notation can be used to write: **circumference ÷ diameter = π** or, said another way: $\pi = C/d$

			which leads to the following formula for circumference: $$C = \pi d$$