Contact Information	*Cathy Spencer* *cspence2@lane.k12.or.us* *Westridge Middle School* *Oakridge School District*
School	*Westridge Middle School*
District	*Oakridge School District*
Unit Title	*Sir Cumference and Pi*
Grade level with which unit is aligned to state standards.	*6,7,8*
Grade level(s) at which unit may be taught.	*6-8*
Duration	*2-3 weeks*
Unit Overview	*Students explore circumference and pi through exploration, directed teaching, and projects both on and off the internet.*
Subject(s)	*Math with extensions for writing*
Strand(s)	*Geometry and measurement*

Common Curriculum Goal(s)	***6th Grade:*** *Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.* *Use visualization, spatial reasoning, and geometric modeling to solve problems.* ***8th Grade:*** *Specify locations and describe spatial relationships using coordinate geometry and other representational systems.* *Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.* ***6th, 7th, 8th Grades:*** ***Mathematical Problem Solving:*** *Select, apply, and translate among mathematical representations to solve problems.* *Apply and adapt a variety of appropriate strategies to solve problems.* *Monitor and reflect on the process of mathematical problem solving.* *Communicate mathematical thinking coherently and clearly; use the language of mathematics to express mathematical ideas precisely.* *Accurately solve problems that arise in mathematics and other contexts.*

Academic Standards Addressed	.

6th grade:

Model, sketch, draw, and label polygons, circles (including the center, radius, and diameter), complementary angles, supplementary angles, vertical angles, and adjacent angles.

Identify and represent the radius, center, diameter, chord, and circumference of a circle.

Calculate the area and circumference of a circle using pi as well as common approximations of pi (e.g., 3.14, 22 / 7).

8th grade:

Determine the distance between two points on a coordinate graph using right triangles and the Pythagorean theorem

Create and critique inductive and deductive arguments to verify the Pythagorean theorem.

Use the Pythagorean theorem to determine if triangles are right triangles and determine the lengths of missing sides in right triangles.

Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

6th. 7th, 8th grades:

CONCEPTUAL UNDERSTANDING

Interpret the concepts of a problem-solving task and translate them into mathematics.

PROCESSES AND STRATEGIES

Choose strategies that can work and then carry out the strategies chosen.

VERIFICATION

Produce identifiable evidence of a second look at the concepts/strategies/calculations to defend a solution.

COMMUNICATION

Use pictures, symbols, and/or vocabulary to convey the path to the identified solution.

ACCURACY

Accurately solve problems using mathematics.

Instructional Technology Common Curriculum Goals (CCG) Addressed	1. *Demonstrate proficiency in the use of technological tools and devices.* 2. *Select and use technology to enhance learning and problem solving.* 3. *Access, organize and analyze information to make informed decisions, using one or more technologies.* 4. *Design, prepare and present unique works using technology to communicate information and ideas.*
Career Related Learning Standards Addressed:	*Exhibit appropriate work ethic and behaviors in school, community, and workplace.* *Apply decision-making and problem-solving techniques in school, community, and workplace.* *Demonstrate effective communication skills to give and receive information in school, community,, and workplace.* *Demonstrate academic, technical and organizational knowledge and skils required for successful employment.*
How will student use the technology as a tool to enhance their learning?	*The use of technology engages and facilitates knowledge construction: (a) essential to the activity; (b) seamless integration; (c) gain essential knowledge; (d) communicate with a wide audience; (e) develop meaningful products; (f) analyze data.*
Objective	*Student will learn about Pi. They will understand its relationship to circles/diameter.*
Prerequisites	*Basic knowledge of internet search techniques, keyboarding skills,*
Non-Technology Materials	*Six or more round objects, large sheets of 1-inch graph paper (24 inches by 36 inches), reference materials regarding the history of Pi, and time to complete the project.* *1 copy of the book: "Sir Cumference and the Dragon of Pi, a math adventure" by Cindy Neuschwander*
Does this unit involve the use of technology	*Yes*
Required Hardware	*Computer with internet access.*
Required Software	*None*

Links to relevant web sites and Other Technology	http://www.mathwithmrherte.com/pi_day.htm Pi Day (do the activity titled: Round and Round. Choose more for extra credit! http://library.thinkquest.org/26342/sections/math_lessons/lessons/pi.htm History of Pi http://archive.ncsa.uiuc.edu/Edu/RSE/RSEorange/buttons.html Pi Mathematics http://www.mathgoodies.com/puzzles2004/ crossword puzzles about circles *http://mathforum.org/dr.math/faq/faq.pi.html*
Preparation	*Visit web links to check current availability. Collect materials.*

Instruction	***Introduction:*** *Help! Sir Cumference has turned into a dragon! His son, Radius, has found a cure with the following riddle on the label: "**The Circle's Measure**: Measure the middle and circle around, divide so a number can be found. Every circle, great and small-The number is the same for all. It's also the dose, so be clever, Or a dragon he will stay…forever." Help Radius solve the riddle and save his father. (from "Sir Cumference and the Dragon of Pi, a math adventure" by Cindy Neuschwander)* ***Task:*** *Follow the links and explore circles. Can you solve the riddle and save Sir Circumference?* ***Process:*** *a) Visit the first web site. Do the activity described and record your results. In "Rolling Along" you will need to gather several (use 6 or more) round objects and a piece of the large graph paper. Describe your results in a paragraph. Explain what pattern you see (if there is one).* ***b*** *Go to the "Math Forum" site and explore the definitions of pi. Find and try out two activities, research the history of pi* ***c)*** *Choose one of the following "products." Develop an ad campaign that embodies the true meaning of Pi. Your ad campaign must show the history of Pi as well as be visually attractive and attention grabbing. (Product list: Pi, a Perfume by the Smell Good Perfume Company, Pi, a portable DVD player by the No Corners Electronics Company, and Pi, a line of clothing, by the Shapes of the Future clothing company). Use the second set of web sites as a starting place for your investigations .**c)** Make a small display of the history of pi. Youy may choose to do a power point presentation, a mini poster, or some other form of visual and verbal presentation **d)** Demonstrate your knowledge of vocabulary surrounding Circles by visiting the math goodies web site and doing one of the crossword puzzles. Submit your answers by sending them to your teacher's email. **e)** Read the picture book "Sir Cumference and the Dragon of Pi" by Cindy Neuschwander. How much medicine did Radius need to return his father to normal? Find three plays on words, what are the dual definitions of each that the author is using.. The whole class will benefit from the wide variety of activities that are presented as well as the wealth of information their peers will find regarding the history of pi.*
Modifications for Special Needs Students:	*This will vary widely depending on the "special needs" of the students. Refer to the individual student's IEP for modifications that are appropriate for the individual.* *Generic modifications may include: work in a group, skip the oral presentation, provide an adult assistant,*

Modifications for Gifted Students:	*This will vary widely depending on the type of "gift" each student brings to the class. An artistically talented student may be able to do an outstanding display, a musically talented student may be able to apply the circle concept to music (i.e. rounds) and may be able to write a song that will help others to remember the concept, talk with individuals to determine their gifts and special abilities.*
Motivation	*The wide variety of activity types and presentations are self motivating. Students can go several paths to accomplish the end goal of learning aobut Pi.*
Assessment	*The two projects, ad campaign and display will make the level of understanding readily apparent to the educator.*