

Backwards Design Unit Planning

Unit's Essential Question: How can geometry help us create artistic designs? What is the difference between Pi and pie?

Mini-Unit Title (each mini-unit is approx 1 week long)	Big ideas of the mini-unit / concept statement (macro) What is the big idea of this mini-unit?	Key Content /Knowledge (Important Content to Know about, vocabulary, the specifics) (Micro)	Skills What should the students be able to do? (rule of thumb - skills are verbs – knowledge is a noun)	List of Topical / Content Based Questions (make sure to amend the essential question so that it becomes topical for this mini-unit)	Mini-Unit Assessment (must be aligned to the NYS / NYC exams. It can be a test or a quiz - i.e.: DBQ Essay; 10 multiple choice questions; or 3 constructed response questions)	Scaffolding towards the culminating project (what can be done during this mini-unit to develop the stage 2 culminating assessment (grasp)
Graphing on the coordinate plane	Pattern	Coordinate, coordinate plane	To identify and plot points in all four quadrants	How do you place points on the coordinate plane?	Selected-response-formal-quiz (10 short answer questions) Informal ,ongoing observations of students, Peer reviews and peer response groups, Test prep skills	Students will listen to read out loud of <i>Sir Cumference and the Dragon of Pi</i> by Cindy Neuschwander (background knowledge to develop a project).

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<p>Finding circumferences, areas, and perimeters of different figures</p>	<p>Relationship</p>	<p>Area, circle, circumference, perimeter</p>	<p>To understand the relationship between the diameter and radius of a circle</p> <p>To determine the area and circumference of a circle, using the appropriate formula</p> <p>To understand the relationship between the circumference and the diameter of a circle</p> <p>To calculate the radius or diameter, given the circumference or area of a circle</p>	<p>How do you find Pi, circumference, perimeter, and area of different figures?</p>	<p>Selected-response-formal-quiz (10 short answer questions) Informal ,ongoing observations of students, Peer reviews and peer response groups, Test prep skills</p>	<p>Students will write a critique of the class play <i>Sir Cumference and the Dragon of Pie</i></p>
<p>Finding the volume of different shapes</p>	<p>Relationship</p>	<p>Cone, Cylinder, Prism, pyramid, volume,</p>	<p>To calculate the volume of prisms and cylinders, using a given formula</p>	<p>How do you find the volume of different shapes?</p>	<p>Selected-response-formal-test (10 multiple choice questions, 12 short answer</p>	<p>Review the drafting of a poster that demonstrates glass designs</p>

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		shapes (two and three dimensional), solid	and a calculator		questions, 1 essay question); Informal ,ongoing observations of students, Peer reviews and peer response groups, Test prep skills	similar to those that will be required for the final project. This mini unit will help to create student's task
Finding the surface area of different figures	Relationship	Net, Surface area	To identify the two-dimensional shapes that make up the faces and bases of three-dimensional shapes (prisms, cylinders, cones, and pyramids) To determine the surface area of prisms and cylinders, using a calculator and a variety of methods To estimate surface area	How do you find surface area of different figures?	Selected-response-formal-quiz (10 short answer questions) Informal ,ongoing observations of students, Peer reviews and peer response groups, Test prep skills	Create a written response and present your project to the class (GRASP)

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First Week at a Glance

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Content Focus: How can a drinking glass be a work of art? (Setting goals and showing the rubric for the final project)</p> <p>Hook: Sketch a glass that is a work of art (consider shape, color, and design)</p> <p>Daily Assessment: Exit Slip hand in to the teacher (Which section of the project do you have questions about?)</p>	<p>Content Focus: To identify parts of a graph on the coordinate plane (This scaffolds students towards the final project because it will help them understand the concepts of how base and height affect shapes).</p> <p>Hook: Create a picture using coordinate plane</p> <p>Daily Assessment: Selected-response-formal-quiz</p>	<p>Content Focus: To graph on the coordinate plane</p> <p>Hook: Create a picture using coordinate plane</p> <p>Daily Assessment: Assess the picture created for the hook</p>	<p>Content Focus: To graph equations</p> <p>Hook: Why can't we find the volume of a glass by using a coordinate plane? (two and three dimensions)</p> <p>Daily Assessment: Presenting group work in class</p>	<p>Content Focus: Introduction to essential question: What is the difference between Pi and pie? (Moving towards understanding of circles and cylinders)</p> <p>Hook: Students will listen to read aloud of <i>Sir Cumference and the Dragon of Pi</i> by Cindy Neuschwander</p> <p>Daily Assessment: Write a summary of <i>Sir Cumference and the Dragon of Pi</i> (background knowledge to develop a project).</p>
<p>Weekly Assessment (must be aligned to the NYS / NYC exams): Selected-response-formal-quiz; informal ,ongoing observations of students; peer reviews and peer response groups, test prep skills</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)</p> <p>Write a summary of <i>Sir Cumference and the Dragon of Pi</i> by Cindy Neuschwander</p>				

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Second Week at a Glance

<p>WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding</p>			<p>Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement</p>	
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Content Focus: To find circumference</p> <p>Hook: In a group, draw a picture that illustrates the meaning of the word "Circumference" (Have students create their own definition of circumference).</p> <p>Daily Assessment: In journals - write the different ways to represent circumference</p>	<p>Content Focus: To find the perimeter and the area of circles, squares, and rectangles</p> <p>Hook: Teacher will put two pictures on the board. One picture is of a circle and another is a triangle. Students will work in groups to explain why one shows circumference and the other shows perimeter. (Have students compare and contrast circumference and perimeter)</p> <p>Daily Assessment: In the journal- write the comparison of circumference and</p>	<p>Content Focus: To find the perimeter and the area of trapezoids, parallelograms and triangles</p> <p>Hook: What is the difference between the perimeter and the area of different two dimensional figures? How are they related?</p> <p>Daily Assessment: Selected-response-formal-quiz</p>	<p>Content Focus: What is the difference between Pi and pie? How is Pi like a pie?</p> <p>Hook: Rehearsal of the class play</p> <p>Daily Assessment: <i>Saving Sir Cumference</i> hand out</p>	<p>Content Focus: What is the difference between Pi and pie?</p> <p>Hook: Students will present a class play based on <i>Sir Cumference and the Dragon of Pi</i> by Cindy Neuschwander</p> <p>Daily Assessment: Write a written response (critique) for a class play based on <i>Sir Cumference and the Dragon of Pi</i> by Cindy Neuschwander</p>

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Weekly Assessment (must be aligned to the NYS / NYC exams):

Selected-response-formal-quiz; informal ,ongoing observations of students; peer reviews and peer response groups, test prep skills

What have the students produced that scaffolds towards the units culminating assessment?

(for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)

Write a written response for a class play based on *Sir Cumference and the Dragon of Pi* by Cindy Neuschwander

(background knowledge to develop the project)

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Third Week at a Glance

<p>WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding</p>		<p>Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement</p>		
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Content Focus: To find the volume of prisms</p> <p>Hook: How does area relate to volume? (Compare different two and three dimensional shapes)</p> <p>Daily Assessment: In your journal describe the difference between formulas of volume of different prisms.</p>	<p>Content Focus: To find the volume of cones and pyramids</p> <p>Hook: Students will look at two pictures of ice cream cones (one is a large waffle cone and another is a small regular ice cream cone). Are all ice cream cones alike? Which one of these cones would you rather have? (Explain your answer)</p> <p>Daily Assessment: Error analysis- a problem is work-out incorrectly and students are asked to identify the mistakes.</p>	<p>Content Focus: To find volume of cylinders</p> <p>Hook: What is the shape of the regular drinking glass? Are all cylinders the same?</p> <p>Daily Assessment: Calculate the volume of different cylinders</p>	<p>Content Focus: How do the geometric relationships between height, base, and volume affect the “look” of a piece of art?</p> <p>Hook: Show pictures of five different glasses and ask students to determine which glass holds the most liquid (The shortest holds the most liquid)</p> <p>Daily Assessment: Selected-response-formal-test</p>	<p>Content Focus: How can a drinking glass be a work of art?</p> <p>Hook: Sketch glass designs using the assigned dimensions. If all your glasses are similar shapes, what can you do to make them artistic (consider color, materials, designs, etc)</p> <p>Daily Assessment: Review the drafting of a poster that demonstrates glass designs for the project</p>
<p>Weekly Assessment: (must be aligned to the NYS / NYC exams): Selected-response-formal-test; informal ,ongoing observations of students; peer reviews and peer response groups, test prep skills</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit’s culminating assessment is a newspaper – perhaps the students have written an article) Review the drafting of a poster that demonstrates glass designs of a project</p>				

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Fourth Week at a Glance

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Content Focus: To find the surface area of prisms and cubes</p> <p>Hook: How are perimeter and surface area similar and how are they different?</p> <p>Daily Assessment: In your journal describe the meaning and applications of surface area</p>	<p>Content Focus: To find the surface area of cylinders</p> <p>Hook: The materials department of Crate and Barrel needs to know the amount of raw materials to order. Therefore, you need to know how to find the surface area of cylinders in order to get this information.</p> <p>Daily Assessment: Error analysis- a problem is work-out incorrectly and students are asked to identify the mistakes.</p>	<p>Content Focus: To find the surface area of cones and pyramids</p> <p>Hook: Discussion about meaning and applications of surface areas of different figures</p> <p>Daily Assessment: Peer evaluation of discussion's writing</p>	<p>Content Focus: To compare different ways of finding surface area of different figures</p> <p>Hook: Compare and contrast different ways to find surface area</p> <p>Daily Assessment: Selected-response-formal-quiz</p>	<p>Content Focus: How can a drinking glass be a work of art?</p> <p>Hook: Create the written part of the project and present it to the class (GRASP)</p> <p>Daily Assessment: Review and present the project</p>
<p>Weekly Assessment: (must be aligned to the NYS / NYC exams): Selected-response-formal-test; informal ,ongoing observations of students; peer reviews and peer response groups, test prep skills</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)</p>				

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Unit Resources

Books: Impact Mathematics, Course Two, *Glencoe*
Intervention Skills, Course Two, *Glencoe*
Hot Topics, Course Two, *Glencoe*
New York Review Series, Grade Seven Mathematics, *Glencoe*

Websites: www.acuite.com

www.edhelper.com

www.aaamath.com

www.jpeg.com

www.glencoe.com

www.phschool.com

www.teachertube.com

www.youtube.com

www.teachersdomain.org

Teacher Materials: transparencies, overhead projector, rulers, graphing papers, calculators, hand outs, etc.

Other: Sample of works that uses various glass designs.