

Unit 4 Geometry

Content Area: **Math**
Course(s): **Sample Course**
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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Mathematics Grade 6 Accelerated Unit 4

Belleville Board of Education

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Unit Overview

- Identify and label regular polygons
- Apply geometry and spatial sense to interpret and reflect on the physical world
- Reason, analyze, and justify geometric relationships
- Calculate the area of triangles, rectangles, and complex polygons including decomposing using triangles and rectangles
- Determine surface area using nets of polygons
- Plot polygons on the coordinate plane
- Compute the volume of basic polyhedra
- Apply formulae to calculate and reason about perimeter, area, and volume with whole number, fractional, and decimals side lengths

NJSLS

MA.6.G

Geometry

MA.6.G.A

Solve real-world and mathematical problems involving area, surface area, and volume.

MA.6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
MA.6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
MA.6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
MA.6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Exit Skills

By the end of this unit, 6th grade students should:

- **Build on their work with area by reasoning about relationships among shapes to determine area, surface area, and volume:**

Students find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. Students reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths.

Enduring Understanding

- Geometry and spatial sense offer ways to interpret and reflect on our physical environment
- Analyze geometric relationships develops reasoning and justification skills
- Triangles and rectangles can be used to find areas of other polygons
- Use nets of 3D figures that can be used to find the surface area of a figure
- Surface area is related to the wrapping or covering of a surface with square units
- Volume is related to filling of space with cubic units

Essential Questions

- How do geometric models describe spatial relationships?

- How are geometric shapes and objects classified?
- Why would one calculate the area of polygons?
- How does one find the area of polygons?
- How are volume and surface area of a right rectangular prism found?
- Why are volumes represented in cubic units?
- What is the connection between the net and surface area of 3D figures?
- How does one graph polygons on a coordinate plane?

Learning Objectives

Students will be able to:

- Sketch, label, plot, and sort basic geometric figures
- Calculate the area of right triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real world and mathematical problems
- Determine the the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit of fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism
- Apply formula to find the volume, area, and perimeter of polygons and composite figures in the context of solving real world mathematical problems
- Draw polygons in the coordinate plane given coordinates for the vertices

Action Verbs

Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy. These are useful in writing learning objectives, assignment objectives and exam questions.

If you are utilizing the objective, but want to use rigor, use the chart below.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate

Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				

Interdisciplinary Connections

- Science
- Social Studies
- Health/Nutrition
- Music

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

21st Century/Interdisciplinary Themes

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

21st Century Skills

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

Technology Infusion

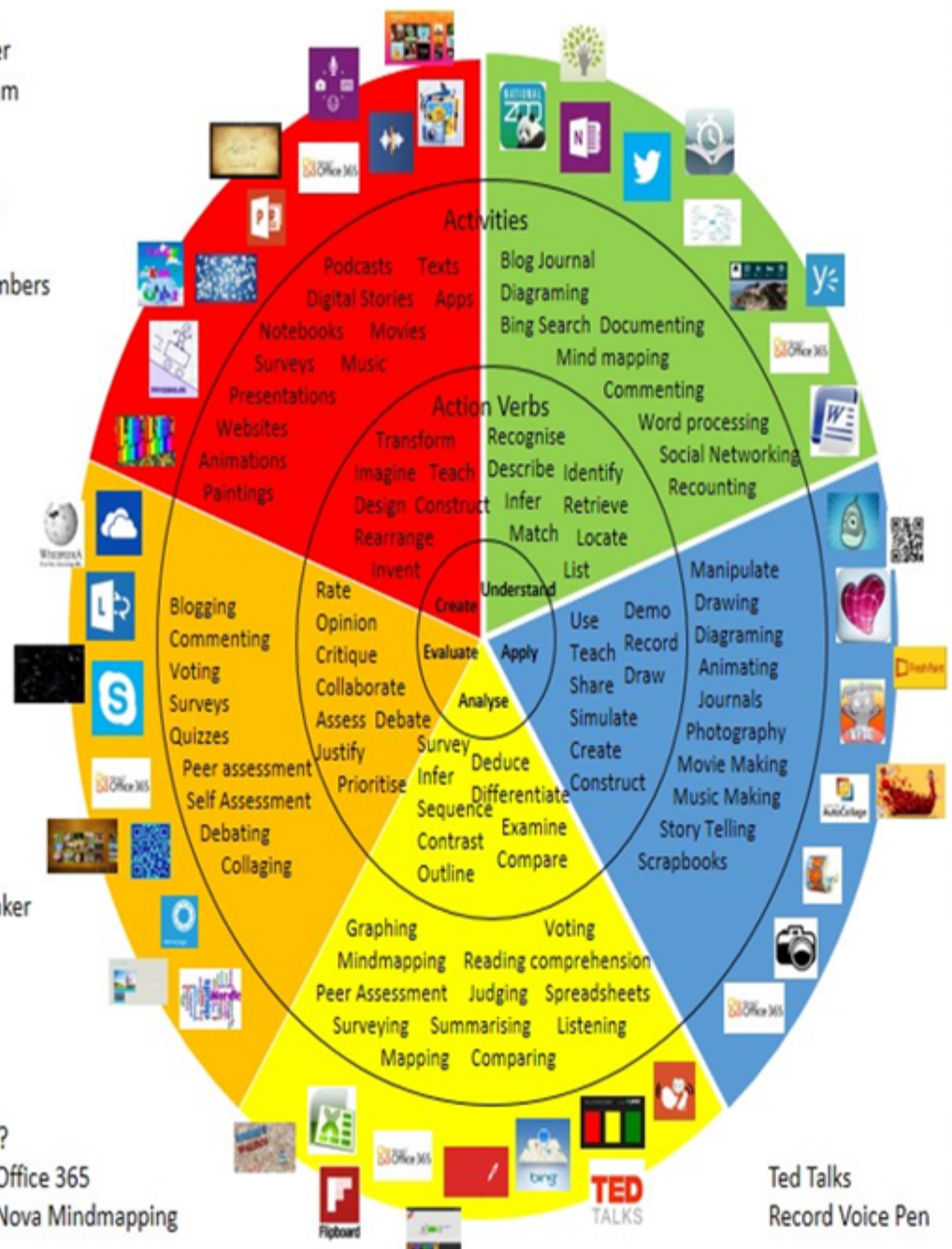
What technology can be used in this unit to enhance learning?

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker

Where's Waldo?
MS Excel
Flipboard
Office 365
Nova Mindmapping



Originally taken from <http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg>
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Differentiation

- Preteach new vocabulary and meaning of symbols
- Connect new vocabulary and symbols to background knowledge for experience
- Break down terms to familiar parts, suffixes, or prefixes

- Make dictionary available to learner
- Increase exposure to academic vocabulary and language
- Provide flash cards
- Incorporate as many of learner's senses as possible to enhance retention
- Brainstorm examples of use of new terms or symbols making real world applications
- Engage students in relevant discussions about conceptual processes
- Post and refer to math guides and anchor charts when applicable
- Clarify the relationships between the operations
- Develop graphic representation of math processes
- Make connections to formulae concepts or structures previously learned
- Utilize manipulatives to display structures
- Offer various ways to solve math problems
- Provide opportunities to integrate math technology & art
- Provide graphic organizers and anchor charts for all symbols and formulas
- Create student math journals for terms, formulas, and symbols
- Develop interactive games and activities to promote retention
- Integrate videos
- Utilize graphics, diagrams, and charts

Special Education

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments

- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

ELL

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments

- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Evidence of Student Learning-CFU's

Please list ways educators may effectively check for understanding in this section.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Self- assessments
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Unit tests

Primary Resources

Carnegie Learning Math Series - Course 1

resouces.carnegielearning.com

Ancillary Resources

www.AAAMath.com

www.ixl.com

www.khanacademy.com

www.coolmath.com