

Understanding by Design: School _____

Designer Name(s): _____ Date: _____
 Subject Area: math Grade Level(s): 7
 Unit Title/Focus: geometry
 Estimated Amount of Instructional Time: 3rd quarter

Stage 1 – (Desired Results)

State Content and Skill Standards:

7.G.A 7.G1., 7.G2, &.G3;7.RP.A, 7.RP.1, 7.RP.2, 7.RP.3; 7.NS.2

- Claim 1 — Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.
- Claim 2 — Students can solve a range of complex, well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.
- Claim 3 — Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
- Claim 4 — Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

1. Ratios and Proportional Relationships 7.RP

Analyze proportional relationships and use them to solve real-world and mathematical problems.

2. The Number System 7.NS

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

3. Geometry 7.G **Draw, construct, and describe geometrical figures and describe the relationships between them.**

Enduring Understandings: (what are the big ideas, what are the specific understandings desired)

Students will understand that proportion can be used to solve a multitude of mathematical problems

Students will understand that scale can be used to reproduce drawings or models of geometric figures such as the Egyptian Pyramids.

Students will understand that two-dimensional plane sections result when slicing sections of right-rectangular prism and right-rectangular pyramids.

Students will understand operations with fractions are used to solve a multitude of mathematical problems

Essential Questions: (what questions will foster inquiry, understanding, and transfer of learning)

What are proportions and how do we use them?

What is scale?

How do we use scale to reproduce a drawing or model?

What two-dimensional figures result from slicing 3-dimensional figures such as a pyramid?

How do we use fractions to solve scale problems?

Big Idea(s)

Geometry and proportional reasoning can be applied to the Egyptian Pyramids

What Students will know: (what knowledge will they acquire)
Students will know how to use proportion.

- The students will know how to use scale drawings
- The students will know how to add, subtract, multiply or divide fractions.
- The students will be able to identify and draw right rectangular prisms and pyramids.

What Students will be able to do: (what will they eventually be able to do as a result of their skills learned/knowledge)

- The students will build a model of the Egyptian Pyramids using proportions and scale
- The students will put a cylinder shaped tunnel in the base of the pyramid
- The students will create a proportional chart
- The students will find volume and surface area of the pyramid and the cylinder

Stage 2 - Assessment Evidence (acceptable assessment evidence that students understand)

Performance Tasks: (what authentic performance task (s) will students demonstrate understanding; by what criteria will it be judged?)

- Complete proportional chart correctly
- Build pyramid model with correct measurements
- Individually write an explanation of how the proportional chart helped build the model

Other Evidence: (quizzes, tasks, academic prompts, homework, observations)

- Performance assessment
- Team working rubric

Stage 3 - Learning Plan (sequence of teaching and learning activities that will produce desired understandings, engagement and development) Use WHERETO elements to help you:

Learning Activities:

The students will create a proportion chart using scale and proportional reasoning based on the actual dimensions of the Egyptian Pyramids. The students will build a model of the pyramids. The students will draw vertical and horizontal cross sections of their model on grid paper
resources: Saxon Math lessons: 37,46, 59, 62, 67,73, 95, 97, 98, 105, 113,117 investigation 11/scale factor in surface area and volume
Standards Success: SFA 8,13

W=help the students know WHERE the unit is going and WHAT is expected/Help teacher to know where the students are coming from (prior knowledge, interests)

H=HOOK all students and hold their interest

E=EQUIP students, help them EXPERIENCE the key ideas and EXPLORE the issue

R=Provide opportunities to RETHINK and REVISE their understanding/work

E (2)=Allow students to EVALUATE their work

T=Be TAILORED (personalized) to different needs, interests, and abilities of learners

O=Be ORGANIZED to maximize initial and sustained engagement as well as effective learning

Assessment Tasks that Provide Evidence for Claims including DOK	X Claim #1/DOK 1, <u>2</u> , 3, 4 (circle one):
	X Claim #2/DOK 1, <u>2</u> , 3, 4 (circle one):
	X Claim #3/DOK <u>1</u> , 2, 3, 4 (circle one):
	X Claim #4/DOK 1, 2, 3, <u>4</u> (circle one):
Achievement Level Descriptors	ALD #1: ALD #2: ALD #3: ALD #4: (circle one):
Materials/Resources	Card stock printed nets of triangular prisms, teacher designed performance assessment, Proportional chart, google Egyptian pyramid measurements Saxon Text, Smarter Balance, Common Core Standards

Commented [DSG1]: