Dell
Algebra 1 UBD
Unit 2: Proportional Reasoning

Goals: · Explore the concepts of ratios and proportional relations. · Review the various methods of describing proportional relations (percent, fractions, decimals, ratios) · Expose students to various applications of proportional relations (such as discounts, scale drawing, percent of change, data sampling, similar figures, etc.). · Review and strengthen students' knowledge of unit conversions.	**Grade Essential ?'s :** Who am I? How do I interact with the environment? How does the environment affect me?
Unit Essential Questions: · What is a ratio versus a proportion and when/why do we use either? · In what ways is it useful to organize real-world data into ratios and proportions?	**Understandings:** *Students will understand that . . .* · Ratio compares two quantities by division. It can be written in multiple forms. · Proportion means having equal ratios. · Knowing ratios can be more helpful than knowing actual measurements/quantities. · Proportion can be used to determine unknown quantities indirectly.
Students will know . . . · The meanings of *ratio* and *proportion* · The concepts of *rate* and *unit rate* · The *cross-product method* for solving proportions · *Scale* and *scale factor* · The meaning of *similar figures* & *corresponding parts* · The relationships between *fractions, decimals,* and *percents*	**Students will be able to…** · Write ratios and proportions in several ways. · Set up correct proportions for various situations and applications (related to cooking, money, geometry, etc.) · Solve proportions using one or more ways. · Apply the concepts of scale and

· *Unit conversion* / dimensional analysis	scale factors. · Convert one form of ratio to other forms (fractions, decimals, percents, etc.) · Convert one unit of measurement into other units of measurements using dimensional analysis. · Apply the concept of percent and percent of change by solving application problems. · Scale drawings
Performance Tasks: · Standards-based assessments (given at least once every three weeks) · Problem sets · Journals · Multiple small-group and individual classwork assignments · Daily warm-up Problems - Mini-project related to number tricks. · Homework assignments reinforcing key concepts in units	**Links/Resources:** Folder with all of the resources (pdfs and Word documents). Individual handouts (pdfs) are linked within the daily learning activities below.

Learning Activities

Daily Learning Activities
65 min. classes, 4 classes per week

Day 1	No homework due Warm-up: Relating art to math Intro to unit Intro to ratios

	Assigned homework #1: Ratios practice (evens of B, C and E) Slides
Day 2	Homework #1: Ratios practice (evens of B, C and E) Warm-up: Ratios practice Review homework Cooking example Unit Rates Practice unit rates practice (part D) No assigned homework - work on quiz corrections (from previous quiz) Slides
Day 3	No Homework due Warm-up: Unit rates Discuss scales Scale practice Introduce Benchmark with video and project description. Benchmark survey requests Assigned homework #2 - quiz corrections Slides
Day 4	Homework #2: Quiz Corrections Warm-up: Scale practice Conversions and practice (part A and B) Communicate benchmark groups to students Assigned homework: Work on benchmark task #1 which is due on day 6. Slides
Day 5	Mural tour Slides
Day 6	Homework #3: Benchmark Task #1: photo/location chosen Warm-up: Calculate actual height and width of wall space example. Discuss Benchmark mural design ideas and work on benchmark. Assigned homework #4: Task #2 Slides
Day 7	Homework #4: Benchmark Deadline 2 - background research on murals / rough sketch / background research on community - all originally in 1 google doc, but uploaded individually Warm-up: Conversion practice CW: Investigation of a specific mural to try out the benchmark tasks. Assigned homework #5: Task #3 Slides
Day 8	Homework #5: Benchmark Deadline 3 - process guide for how to create or a job timeline for making mural / graph sketch (just an outline to be photocopied) / proposal for design Warm-up: Scaling practice Benchmark work time: Choose scale in class, teachers photocopy graph

	paper designs for each group No assigned homework, work on benchmark Slides
Day 9	No homework due Warm-up: Related ratios practice Announce Quiz Work on benchmark Assigned homework #6: Task #4 Slides
Day 10	Homework #6: Benchmark Task #4 - Area estimation Warm-up: Proportional or not? Car Investigation with pull back race cars Assigned homework #7: Task #5 Slides
Day 11	Homework #7: Benchmark Deadline 5 - Scaled length calc Warm-up: Unit rates Benchmark work period Assigned homework #8: Task #6 Slides
Day 12	Homework #8: Benchmark Deadline 6 - Conversions calc Warm-up: fractions Quiz Review stations No assigned homework: work on benchmark and study for the quiz Slides
Day 13	Quiz! Standard 3: Add, subtract, multiply, and divide fractions. Standard 6: Compare numbers (percents, decimals, fractions, or a mixture of the two/three) using symbols. Standard 15: Write ratios to represent situations and be able to simplify these ratios Standard 16: Set up and solve proportions for various situations and applications Standard 17: Understands the concepts of rate and unit rate Standard 18: Convert one unit of measurement into other units of measurements using dimensional analysis. Standard 19: Apply the concepts of scale and scale factors. Slides
Day 14	No Homework due Warm-up: write to-do list for benchmark Benchmark work period Assigned homework: Complete and print benchmark Slides
Day 15	Benchmark Due!

	Warm-up: turn in benchmark and complete reflection Classwork: Quiz Corrections No assigned homework: work on quiz corrections due in 1 week Slides
Day 16	No homework due Warm-up: Halloween ratios, scale problem from PA Keystones Candy guess contest in a jar for Halloween Introduce problems of the week (from the Drexel Math Foum) Cartesian coordinate review Homework #9: Cartesian practice problems Slides

Project Guidelines

Mural Project

Project Summary	Students use their new knowledge about proportional reasoning: scales, ratios, converting measurements, etc, to design a mural for their community in groups of 3.
Inquiry	Students ask questions about what is important to their community and what defines their community. They also ask about how murals are created.
Research	Students then research their communities and the mural-making process.
Collaboration	Students work in groups of 3. They can also collaborate with outside people within their community if it makes sense.
Presentation	Students put their work together in a grant proposal format. Their work will also be displayed for the school to see.
Reflection	Students will reflect in class about how groups connected their art to their communities. They will also reflect about the process.
PA Common Core Standards	CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. CC.2.1.HS.F.5 Choose a level of accuracy appropriate to

	limitations on measurement when reporting quantities.
Acknowledgements	Michael Webster, an SLA student teacher, for the mural idea. The Mural Arts Program of Philadelphia for the tour materials.

Student Examples

Group 1
Group 2
Rubrics for both groups

SLA/PA Specific Information

PA Common Core Standards

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

SLA Standards

15. Write ratios to represent situations and be able to simplify these ratios.
16. Set up and solve proportions for various situations and applications.
17. Understands the concepts of rate and unit rate.
18. Convert one unit of measurement into other units of measurements using dimensional analysis.
19. Apply the concepts of scale and scale factors.
20. Determine percent of a number.
21. Estimate amount of tips, discounts, and commission using ratios, proportions, and percents.
22. Solve word problems about discounts, tips, and commission using the concepts of ratios, proportions, and percents.