Extended Lesson Plan for Future-Focused Learning

Subject Area: Math 6-8
Course Title: 7th Grade Math Intervention
Grade Level(s): 7th Grade
Title of Unit: Ratios and Proportions
Title of Lesson: Scale Drawings
Length of Extended Lesson (Days/Minutes Per Day): 40 minutes a day for 5 days

Overview

Engaging Question(s): How can we use unit conversions to model a large-scale object or building? How can I design a building to meet societal or environmental conditions of the future?

Lesson Summary: Students will complete a project in which they will create a scale drawing of a building designed to meet the needs of the 21st century. They will apply knowledge of ratios and proportions in order to create an accurate, to-scale model that reflects reasonable, realistic dimensions for an actual building. On the first day, they will complete a discovery activity on unit conversions and build their understanding by choosing an activity from a choice board. On the second day, they will read two articles and reflect on how buildings can be designed in creative ways to meet the needs of a changing environment and society. On the third, fourth and fifth days they will create their building and scale drawing through multiple revisions with peer feedback and present their work to the class.

Standards Cluster for this Sequence (Multidisciplinary Emphasis)

Prerequisite: Skills and Concepts	Grade Level Discipline Standards:	BT/DOK	Challenge: Skills and Concepts
• **Ratios** • **Equivalent fractions and equivalent ratios** • **Scale factor** • **Proportional relationships** • **Number sense** • **Multiplication and division facts** • **Units**	NC.7.G.1 Solve problems involving scale drawings of geometric figures by: • Building an understanding that angle measures remain the same and side lengths are proportional. • Using a scale factor to compute actual lengths and areas from a scale drawing. • Creating a scale drawing.	**BT Level 6, Create** **DOK Level 3, Strategic Thinking/Reasoning and DOK Level 4, Extended Thinking**	**Students can extend their knowledge of scale drawings, unit conversions, and ratios and proportions by building a three-dimensional rendering of their building using a different scale factor from their original drawing.**

Supporting Standards From Other Disciplines:
Social Studies: 7.G.1.1 Explain how environmental conditions and human response to those conditions influence modern societies and regions (e.g. natural barriers, scarcity of resources and factors that influence settlement).

Vocabulary Included in this Extended Lesson

Tier 2 (Frequent academic words used across content area):	Tier 3 (Infrequent field-of-study words that occur in specific domains):	**Vocabulary Development Resources:**
Magnitude, length, population, service	Ratio, proportion, equivalent, scale factor	Flocabulary, Quizlet

Formative Evidence of Student Learning

Pre-Assessment:

The proportional relationships summative assessment will be used to assess students' knowledge of prerequisite skills, along with other evidence of student learning from that portion of the unit.

Evidence of Student Learning – Products/Performances (Allow for Multiple Means of Representation):	**Rubrics (Insert a Link):**
• **Choice Board Product** • **Chat Stations** • **Formative Monitoring Checklist (Day 1 and Days 3-4)** • **Scale Drawing with Actual Dimensions and Conversions (Multiple Revisions)** • **Peer-to-Peer Feedback using Sentence Starters** • **Personal Reflection** • **Class Presentation**	Daily Goals Rubric

Teaching & Learning Progression

Progression Description (Include Transversal Competencies, Inquiry, Student Choice and Voice, Authentic Connections, and Formative Learning)	Resources (Texts, Audio/ Visual Materials, Digital Tools, Handouts, etc.)
1. **Inquiry-Based Learning: On the first day, students will complete a discovery activity that immerses them in the concept of unit conversions. They will be in small groups of three or four students. They will be given clues for a "treasure hunt" that tells them where in the room to start and how to move to find the treasure. All of the instructions are given in "groots" (e.g. move 18 groots to the left, move 30 groots forward) and students are given the conversion (3 groots equals 1 foot). Students work with their group to try to find the treasure as they develop their understanding of unit conversions. They will then complete an activity from the choice board to build their understanding of unit conversions to ensure they are ready to move on to scale factors.** 2. **Collaboration: Collaboration will be a key component of the revision process, allowing each student to turn in their highest quality work at the end of the lesson. Students will go through two rounds of peer feedback for a total of three drafts. In each round of feedback, they will trade work with another student and evaluate their work using sentence starters in each of three categories: begin with something positive, ask a question, give a suggestion. This collaborative process will allow students to develop social-emotional skills in addition to providing multiple opportunities for success.** 3. **Read and Write: On the second day, students will read the articles "How Building Design Has Evolved in the Wake of Natural Distasters" and "The Relationship between Skyscrapers and Great Cities". Through chat stations, students will engage in a silent dialogue and reflect on how buildings can be designed in creative ways to meet the needs of a changing environment and society.** 4. **Authentic Connection through Problem/Solution-Based Learning: Students will create a building that addresses true needs of our society. They will be expected to research appropriate dimensions for their building and create a scale drawing that could reasonably be implemented in the real world.** 5. **Showcase: Students will showcase their final product through a presentation to the class. They will explain how their building meets one or more 21st century needs and demonstrate the scale factor they used by presenting some of the dimensions and conversions they calculated to make their scale drawing.**	Choice Board Daily Goals Rubric How Building Design Has Evolved in the Wake of Natural Disasters The Relationship between Skyscrapers and Great Cities How to Make a Scale Drawing How to Interpret a Scale Drawing Brainpop for Students Needing Support Peer Feedback Sentence Starters

Differentiating Instruction		
General Instructional Practices That Support the Teaching and Learning Progression	**Modifications for Students Needing More Support (EL, Special Needs Students)**	**Modifications for Students Needing Additional Challenges**
• Think-Pair-Share during the first day • Use pre-assessment data to flag students who need one-on-one teaching before or during the project to fully understand scale conversions • Teacher Talk Moves • Pull students in small groups to provide guidance on Days 2-4 • Ask questions as students revise their work and provide peer feedback	Supporting ELL students: • Post resources such as Brainpop, Khan Academy videos, and Flocabulary so that students have ample opportunities to see scale conversions being worked out and can return to refer to the examples • Use hand gestures, especially to show differences in magnitude, to convey scaling and comparison • Students needing extra support can be given choices of buildings that have already been laid out with their "real-life" dimensions, and they can make minor modifications to a template of their choice or simply complete the scaling for the dimensions	Students can extend their knowledge of scale drawings, unit conversions, and ratios and proportions by building a three-dimensional rendering of their building using a different scale factor from their original drawing.

Formative Learning	
Student Goal and Action Plan Template (Insert a Link): Daily Goals Rubric	**PLCs' Inquiry, Inferences, and Next Steps:** http://kammsolutions.com/wp-content/uploads/2019/06/Educators%E2%80%99-Metacognition-and-Collaboration-1.pdf Use conclusions from Metacognition Tool to modify the extended lesson as it progresses, if needed, and for future use.