

Understanding by Design

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Students will understand that...

- Many pioneers had naive ideas about the opportunities and difficulties of moving West.
- People move for a variety of reasons -- for new economic opportunities, greater freedoms or to flee something.
- Successful pioneers rely on courage, ingenuity, and collaboration to overcome hardships and challenges.

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- Why do people move? Why did the pioneers leave their homes to head west?
- How do geography and topography affect travel and settlement?
- Why did some pioneers survive and prosper while others did not?
- What is a pioneer? What is "pioneer spirit"?
- What was pioneer life really like?

Students will know..." " " " " "

- key facts about the westward movement and pioneer life on the prairie
- pioneer vocabulary terms
- basic geography (i.e., the travel routes of pioneers and location of their settlements)

Students will be able to...

- recognize, define, and use pioneer vocabulary in context
- use research skills (with guidance) to find out about life on the wagon train and prairie
- express their findings orally and in writing

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- Create a museum display, including artifacts, pictures, and diary entries, depicting "a week in the life" of a family of settlers living on the prairie. (What common misunderstandings do folks today have about prairie life and westward settlement?)
- Write 1 letter a day (each representing a month of travel) to a friend "back east" describing your life on the wagon train and the prairie. Tell about your hopes and dreams, then explain what life on the frontier was really like. (Students may also draw pictures and explain orally.)

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- oral and/or written response to one of the Essential Questions
- drawing(s) showing hardships of pioneer life
- test on facts about westward expansion, life on the prairie, and basic geography
- explanation of the "memory box" contents

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- Use K-W-L to assess students' prior knowledge and identify learning goals for the unit.
- Revise Prairie Day activities (e.g., substitute Oregon Trail 2 computer simulation for "dress the pioneer" and ask for journal entries while the simulation is played).
- Include other fictional readings linked to the identified content standards/understandings (e.g., Little House on the Prairie, Butter in the Well).
- Create a "timeline map" of a pioneer family's journey west.
- Add non-fiction sources to accommodate various reading levels, such as Life on the Oregon Trail, Diaries of Pioneer Women, and Dakota Dugout. Guide students in researching the period using a variety of resources.
- Review the scoring rubrics for "memory box," museum display, letters, and journals before students begin the performance tasks. Include opportunities for students to study examples of these products.

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4a. K-12 Broad Goal: Students will name, describe, model, classify, and compare geometric shapes and their properties with an emphasis on their wide applicability in human activity.

1a. K-12 Broad Goal: Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content.

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Students will understand that...

- The adaptation of mathematical models and ideas to human problems requires careful judgment and sensitivity to impact.
- Mapping three dimensions onto two (or two onto three) may introduce distortions.
- Sometimes the best mathematical answer is not the best solution to "real-world" problems.

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- How well can pure mathematics model messy, real-world situations?
- When is the best mathematical answer not the best solution to a problem?
- How do you design the most economical packaging?

Students will know..."

- formulae for calculating surface area and volume
- Cavalieri's Principle

Students will be able to...

- calculate surface area and volume for various 3-dimensional figures
- use Cavalieri's Principle to compare volumes

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- Packaging problem: what is the ideal container for shipping bulk quantities of M & M's packages cost-effectively to stores? (Note: the "best" mathematical answer - a sphere - is not the best solution to this problem.)
- Consult to the UN on the least controversial 2-dimensional map of the world.

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- odd-numbered problems in full Chapter Review, pp. 516-519
- progress self-test p. 515
- homework: each 3rd question in sub-chapter reviews and completion of the explorations

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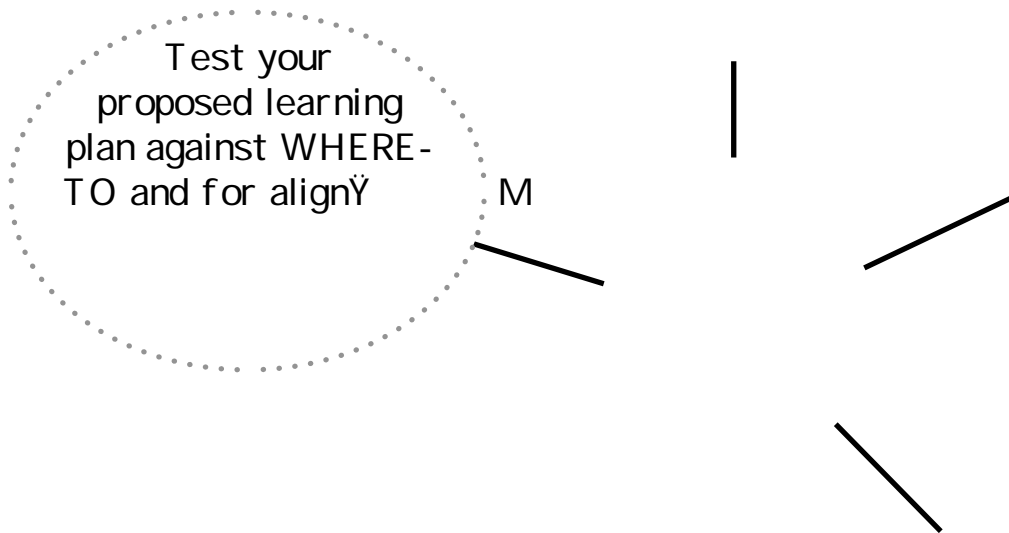
- Investigate the relationship of surface areas of various containers and volume (e.g. tuna fish cans, cereal boxes, Pringles, candy packages, etc.).
 - Investigate different map projections to determine their mathematical accuracy (i.e. degree of distortion).
- Read Chapter 10 in UCSMP Geometry
 - Exploration 22, p. 504
 - Exploration 22, p. 482
 - Exploration 25, p. 509

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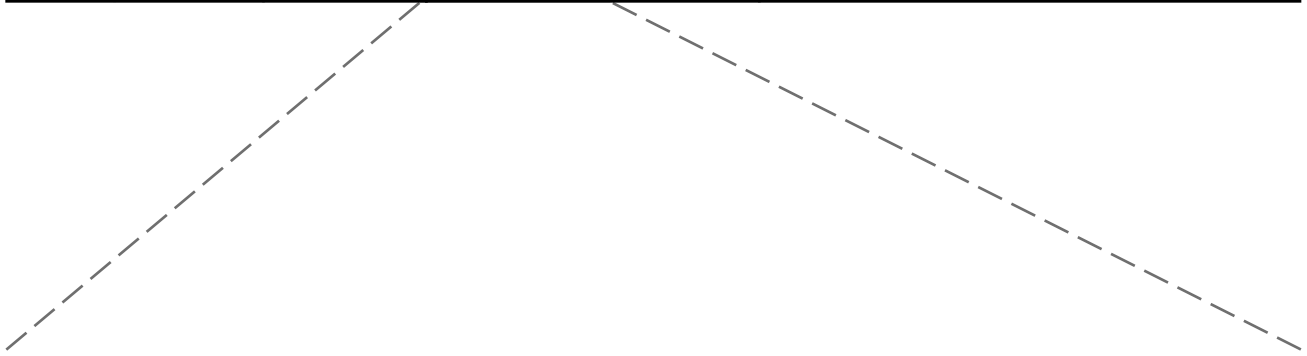




Programs

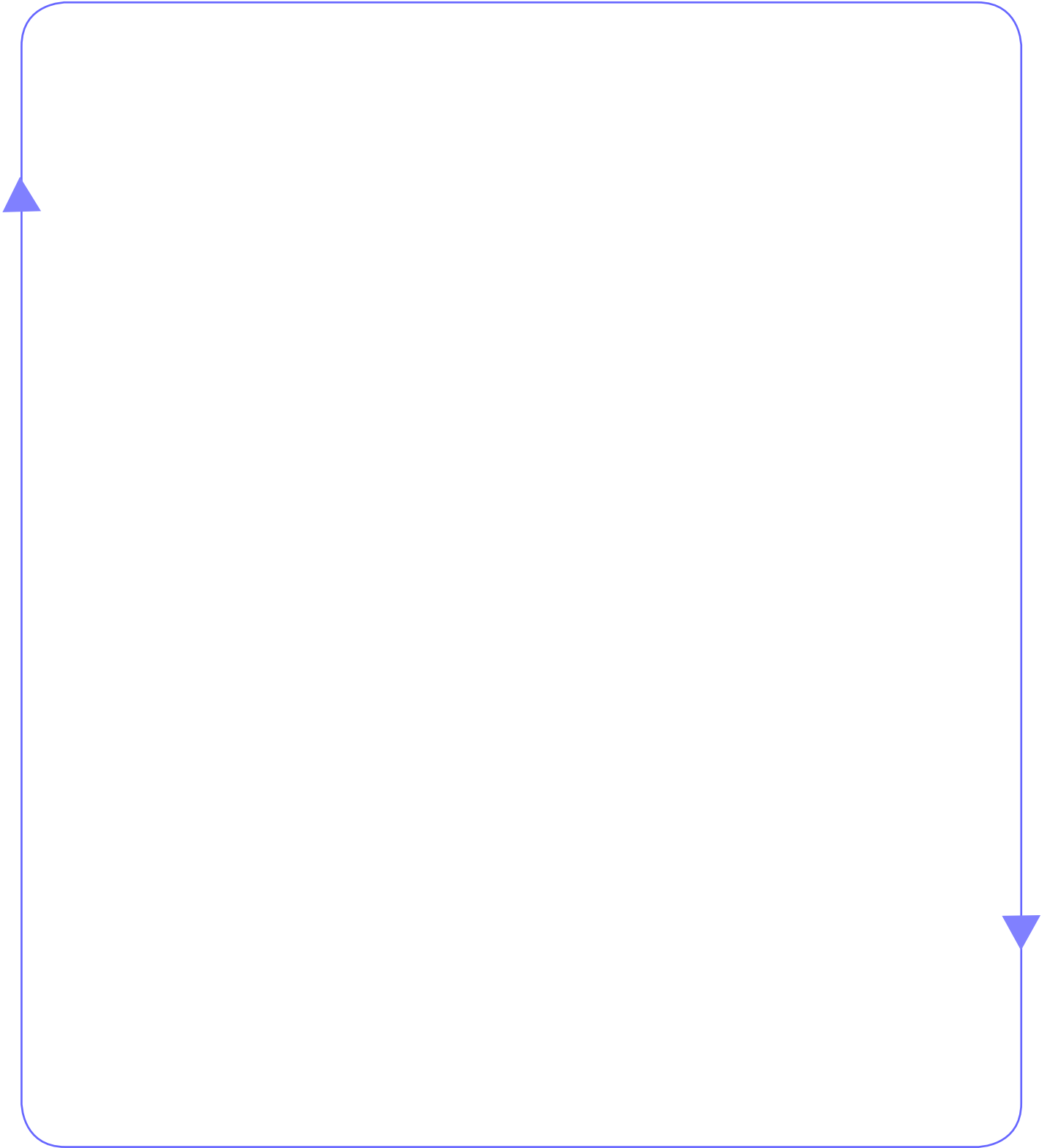
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Courses



Units



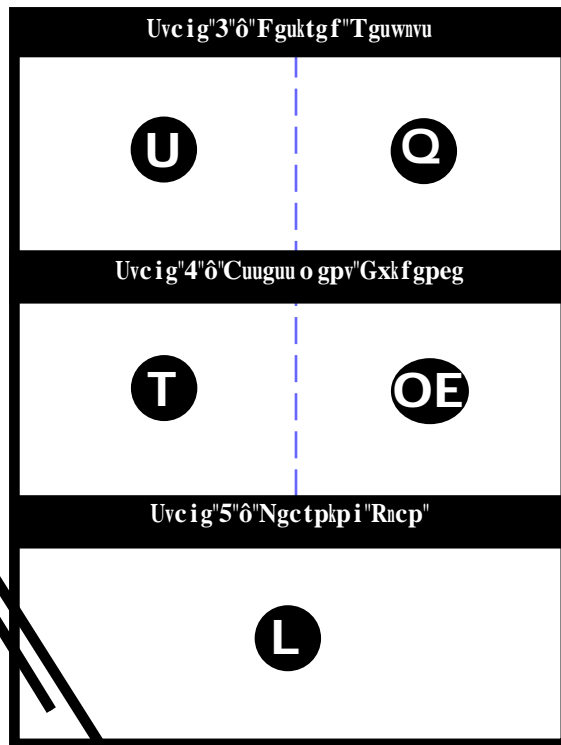


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- What content standard(s) justify or relate to this topic?
- What should students be able to do with the content, if they understand?

• What is the "big idea" (the "moral of the story") that we want students to understand about this topic?

• What kinds of "real-world" performances test understanding of this content?



- What activities and instruction will engage students and help them better grasp the essence and the value of this topic/content?

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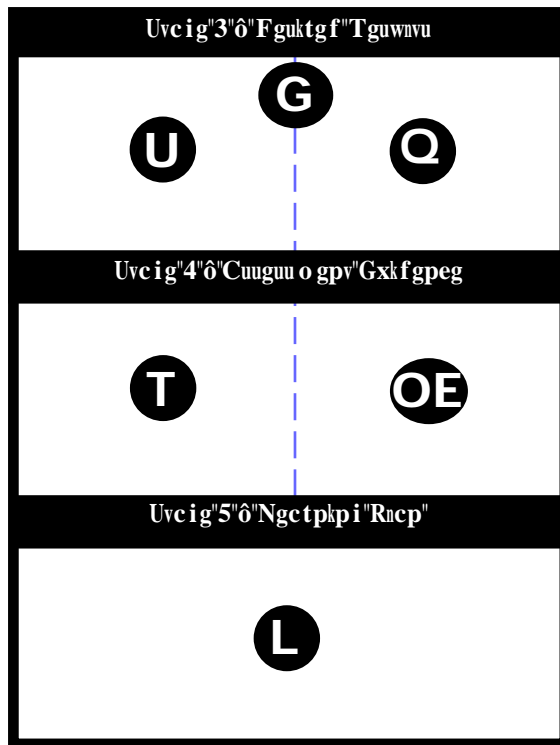
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- What content standard(s) call for, or imply, mastery of this skill/process?
- What is the purpose or value of this skill/process? What important transfer ability does the skill help make possible?



- What understanding(s) will enable students to use the skill wisely?
- What are the strategic understandings needed for effective use?
- What complex, "real-world" performances does this skill enable?



- What important questions are raised when attempting to use/improve this skill?
- What essential questions will guide thoughtful use?
- What evidence will show that students have mastered this skill/process?



- What instruction and learning activities will most effectively help to develop, refine, and make automatic this skill/process?
- What kinds of complex and interesting challenges can make the skill's value more apparent and meaningful?

