

# **UNDERSTANDING BY DESIGN**

## **OVERVIEW OF UBD & THE DESIGN TEMPLATE**



## Stage 1 – Desired Results

UbD Template - with question prompts

### Established Goal(s):

**G**

- What relevant goals (e.g., Content Standards, Course or Program Objectives, Learning Outcomes etc.) will this design address?

### Understanding(s):

**U**

*Students will understand that...*

- What are the “big ideas”?
- What specific understandings about them are desired?
- What misunderstandings are predictable?

### Essential Question(s)

**Q**

- What provocative questions will foster inquiry, understanding, and transfer of learning?

*Students will know...*

**K**

*Students will be able to...*

**S**

- What key knowledge and skills will students acquire as a result of this unit?
- What should they eventually be able to do as a result of such knowledge and skill?

## Stage 2 – Assessment Evidence

### Performance Task(s):

**T**

- Through what authentic performance task(s) will students demonstrate the desired understandings?
- By what criteria will “performances of understanding” be judged?

### Other Evidence:

**OE**

- Through what other evidence (e.g. quizzes, tests, academic prompts, observations, homework, journals, etc.) will students demonstrate achievement of the desired results?
- How will students reflect upon and self-assess their learning?

## Stage 3 – Learning Plan

### Learning Activities:

**L**

- W = help the students know where the unit is going and what is expected? Help the teacher 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 issues?
- R = provide opportunities to rethink and revise their understandings and work?
- E = allow students to evaluate their work and its implications?
- T = be tailored (personalized) to the different needs, interests, abilities of learners
- O = be organized to maximize initial and sustained engagement as well as effective learning?

# #O.1. Unit Design, Before & After

## A Typical 3rd-Grade Social Studies Unit

Prairie Day

### Topic

Topic: Westward Movement and Pioneer Life  
(social studies - 3rd grade)

### Activities

- a. Read textbook section - "life on the prairie." Answer the end-of-chapter questions.
- b. Read and discuss *Sarah Plain and Tall*. Complete a "word search" puzzle of pioneer vocabulary terms contained in the story.
- c. Create a "pioneer life" memory box with artifacts showing what life might be like for a child traveling west or living on the prairie.
- d. PRAIRIE DAY activities: Dress in pioneer clothes and complete seven learning stations:
  1. churn butter
  2. play 19th-century game
  3. send letter home w/ sealing wax
  4. play "dress the pioneer" computer game
  5. make a corn husk doll
  6. quilting
  7. tin punching

### Assessments

- a. quiz on pioneer vocabulary terms from *Sarah Plain and Tall*
- b. answers to end-of-chapter questions on pioneer life
- c. show and tell for Memory Box contents
- d. completion of seven learning stations during Prairie Day
- e. student reflections on the unit

## Stage 1 – Desired Results

**Established Goal(s):** GA SS4H6 The student will explain westward expansion of America between 1801 and 1861. a. describe territorial expansion with emphasis on the Louisiana Purchase, the Lewis & Clark expedition, and the acquisitions of Texas (the Alamo and independence), Oregon (Oregon Trail), and California (Gold Rush and the development of mining towns) b. describe the impact of life in America.

**G**

### Understanding(s):

**U**

*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.

### Essential Question(s)

**Q**

- 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...*

**K**

- 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...*

**S**

- 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

## Stage 2 – Assessment Evidence

### Performance Task(s):

**T**

- 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.)

### Other Evidence:

**OE**

- 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

## Stage 3 – Learning Plan

### Learning Activities:

(selected)

**L**

- 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.

“after” backward design

## #O.2. Unit Design, Before & After

### *A Typical 10th-grade Geometry Unit*

#### *Topic/objectives*

Topic: Surface Area and Volume (HS geometry)

- know how to calculate surface area and volume for various 3-dimensional figures
- know and use Cavalieri's Principle to compare volumes
- know and use other volume and surface area formulae to compare shapes

#### *Lessons/Activities*

- Read Chapter 10 in UCSMP Geometry
- Go through all the formulae and examples
- Exploration 22, p. 482 - "Containers holding small amounts can be made to appear to hold more than they do by making them long and thin. Give some examples."

#### *Assessments*

- 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

## Stage 1 – Desired Results

### Established Goal(s):

### NH Math Standards

G

- 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.

### Understanding(s):

U

*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.

### Essential Question(s)

Q

- 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

K

*Students will be able to...*

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

S

## Stage 2 – Assessment Evidence

### Performance Task(s):

T

- 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.

### Other Evidence:

OE

- 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

## Stage 3 – Learning Plan

### Learning Activities:

(selected)

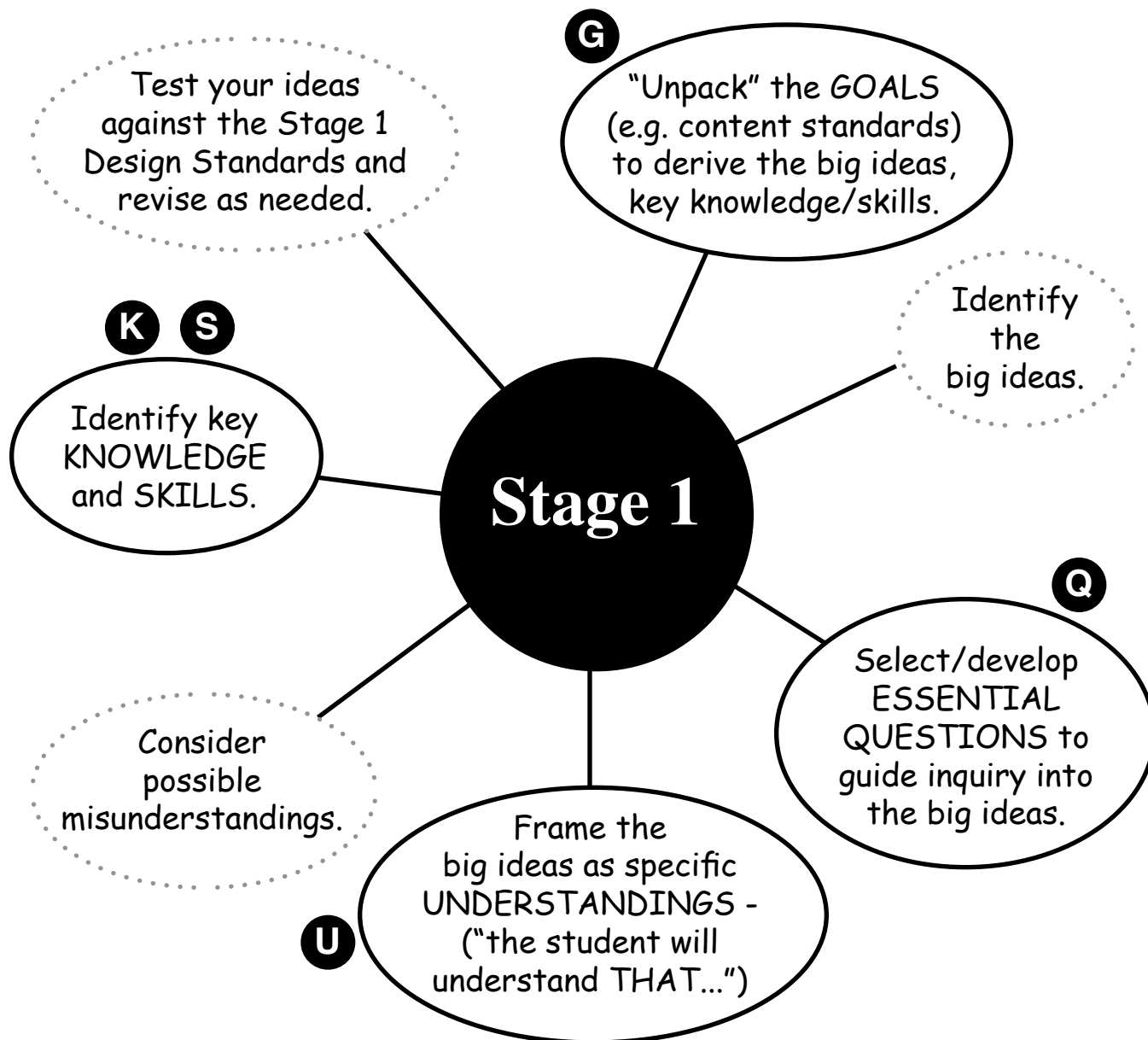
L

- 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

“after” backward design

# Stage 1: Key Design Elements

In Stage 1, designers consider the following elements. A variety of examples and design tools are provided to assist. **Note:** *There is no required sequence to the design process – designers can enter at any point. However, all of the design elements should be considered.*

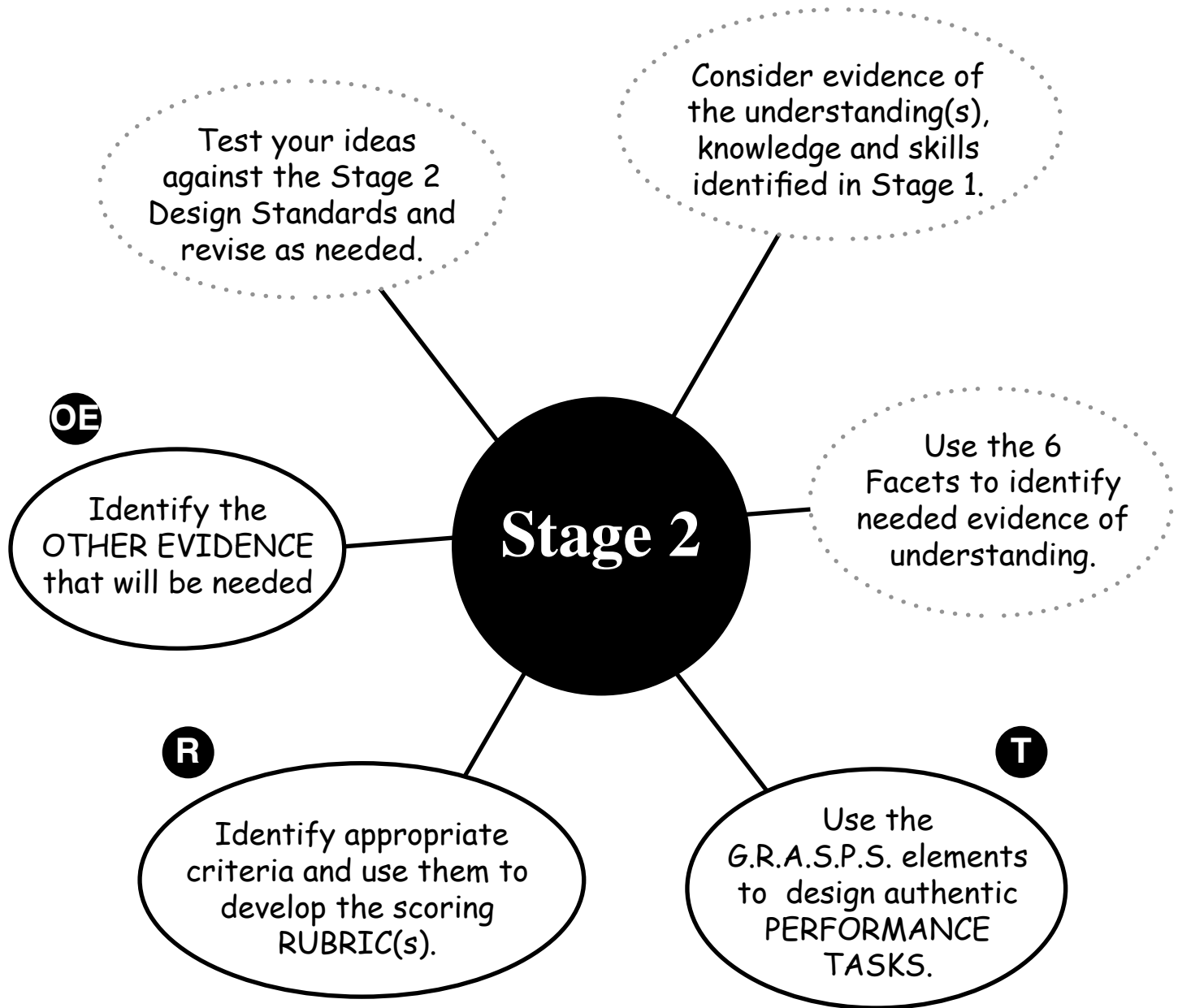


## Essential Questions for Stage 1

- What should students leave able to do, on their own (transfer)?
- What understandings about key ideas should they leave with?
- What do Content Standards imply for learning goals - i.e. what should students know and be able to do, given the content targeted?
- What big ideas should anchor and organize the content, framed as Essential Questions? What do common/predictable misunderstandings suggest what the desired understandings ought to be?

## Stage 2: Key Design Elements

Consider the following elements as you identify the evidence needed to determine the extent to which the desired results (Stage 1) have been achieved. A variety of examples and design tools is provided to assist.



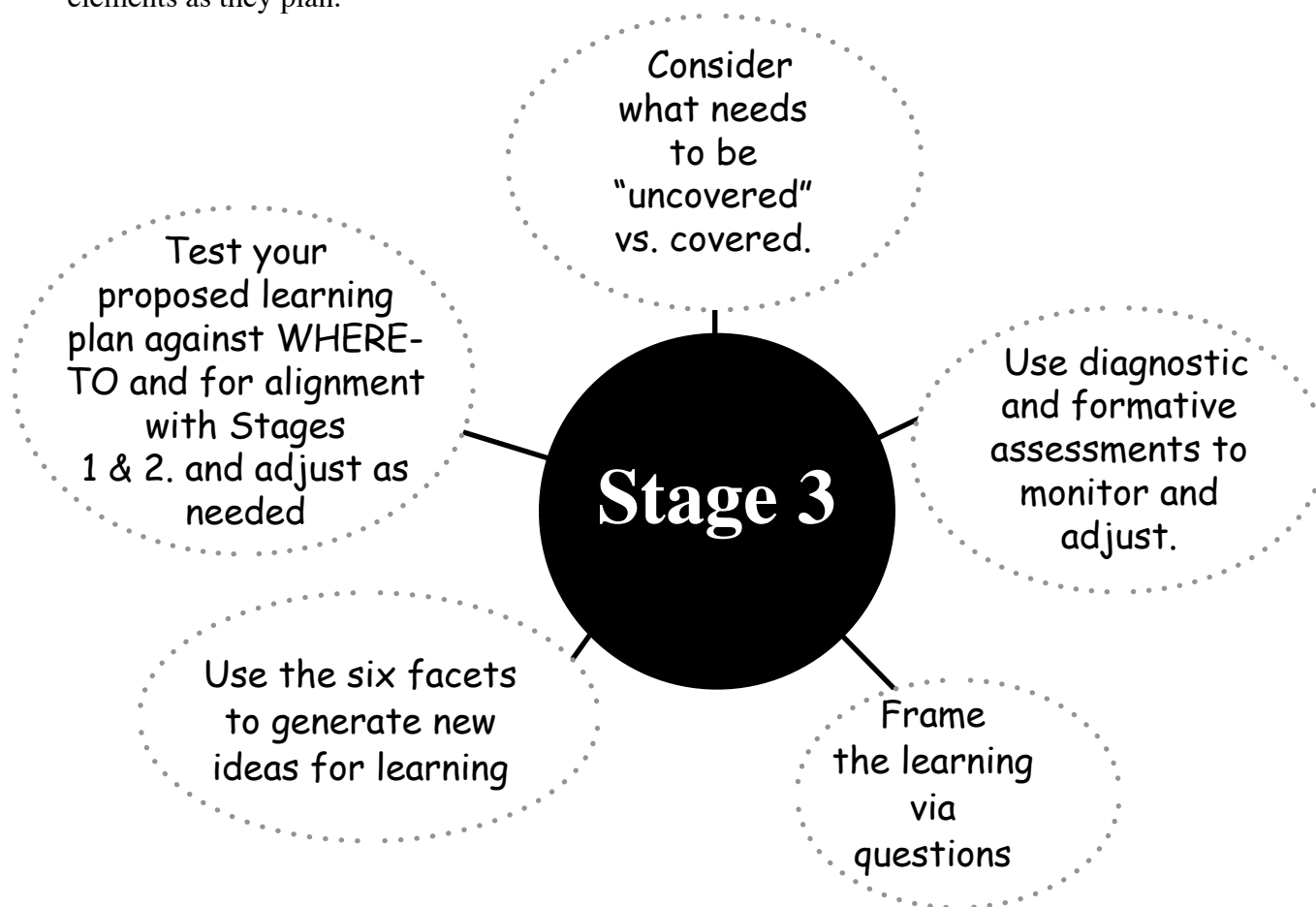
## Essential Questions for Stage 2

- What evidence must be collected and assessed, given the Desired Results of Stage 1?
- What is evidence of understanding (as opposed to recall)?
- What important transfer tasks should anchor the assessment since transfer is the essence of understanding?
- What criteria should be used to assess work related to the Desired Results, not just the particulars of the task?



## Stage 3: Key Design Elements

Consider the following as you develop the learning plan, mindful of the desired results identified in Stage 1 and the needed evidence in Stage 2. There are a variety of ways to “teach for understanding,” and UbD is compatible with many instructional frameworks. Regardless of the instructional approach and specific teaching techniques, designers are encouraged to consider the W.H.E.R.E.T.O. elements as they plan.

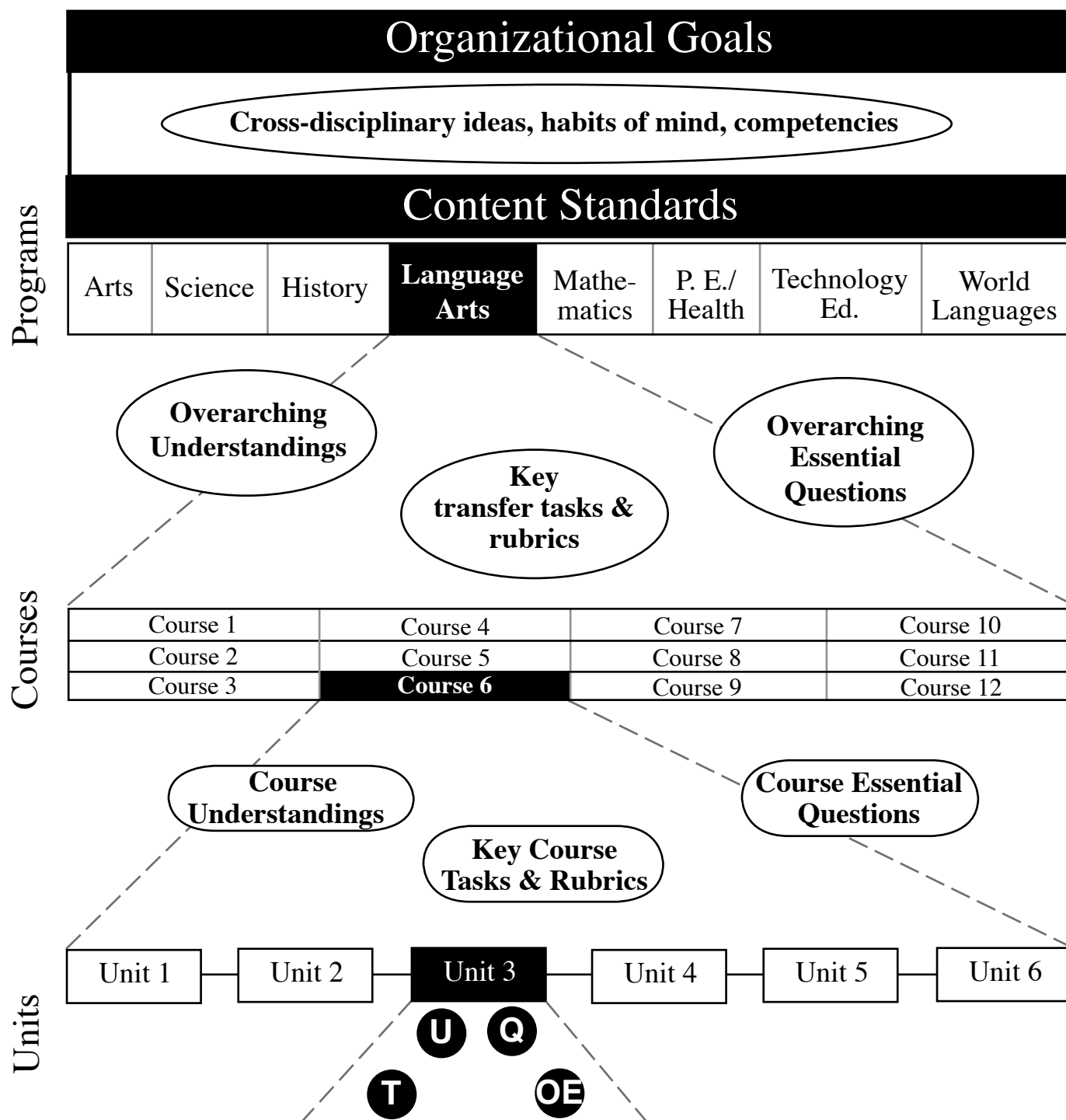


## Essential Questions for Stage 3

- What can I do to make the work maximally engaging and effective?
- If the “content” is the answer, then what were the original questions?
- What content should we cover? What content needs to be “uncovered”?
- When should the “basics” come first? When should they be on a “need to know” basis?
- When should I teach, when should I coach, and when should I facilitate student “discovery”?
- How do I know who and where the learners are?
- What should I do if they *already* know/ can do? What should I do if they don’t?
- In order to truly meet the standard, what should they be able to do *independently* (transfer)? What should I be doing to make them more independent and able to transfer?

# A UbD Curriculum Framework

Understanding by Design offers a 3-stage “backward design” framework for developing units of study (micro level). The same process guides larger-scale curriculum development for courses and programs (macro level). The following visual represents a UbD curriculum structure for building a coherent curriculum, spiraling around “big ideas,” essential questions, and core assessments.



# #G.2.a. Tools: Entry Point – Content Standards

**Content** \_\_\_\_\_

**Standard(s):** \_\_\_\_\_

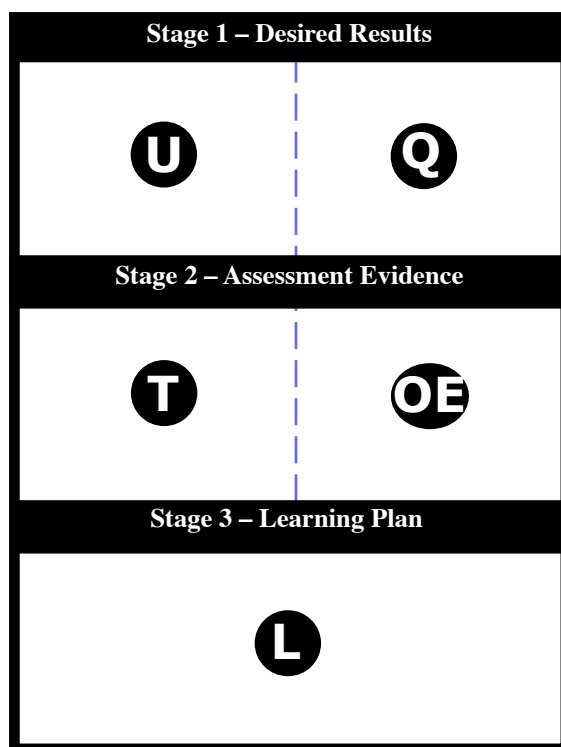
• What big ideas and transfer goals are embedded in this standard? What are the key "nouns" and "verbs"? What should student eventually be able to do on their own if they meet the Standard?



• What will students come to understand if they really learn this content well?



• What specific "real-world" transfer tasks should a student be able to do well if they have met this standard?



• What important questions are raised by this content?  
• What essential questions will guide inquiry into it?



• What evidence of learning is stated or implied in the standard (and its indicators)?  
• What more discrete tests do they suggest?



• What learning experiences will help "uncover" the big ideas in the standard?  
• What instruction is needed to equip students to meet this standard?

## #G.2.b. Entry Point – *Important Topic/Content*

Topic/ \_\_\_\_\_

Content: \_\_\_\_\_

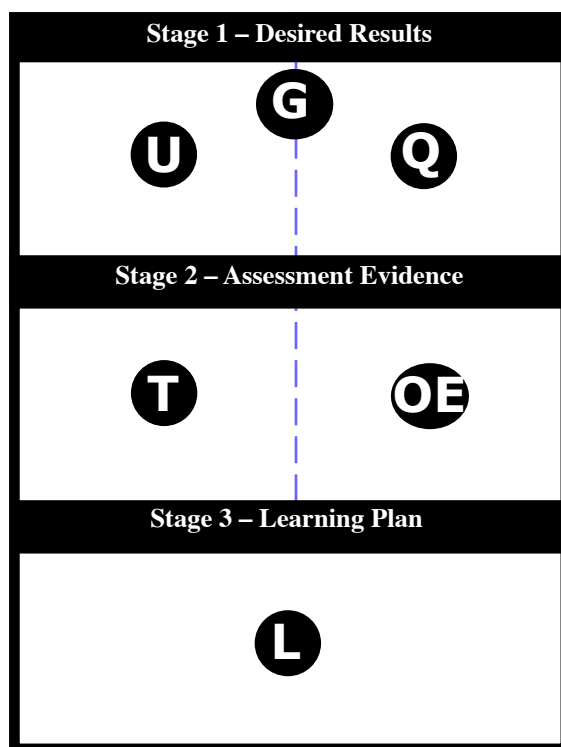
- What content standard(s) justify or relate to this topic?
- What should students be able to do with the content, if they understand?



- 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 important questions are raised by this topic?
- What questions will guide inquiry into the important ideas?



- What evidence will show that students have learned this content?



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

## #G.2.c. Entry Point – *Important Skill/Process*

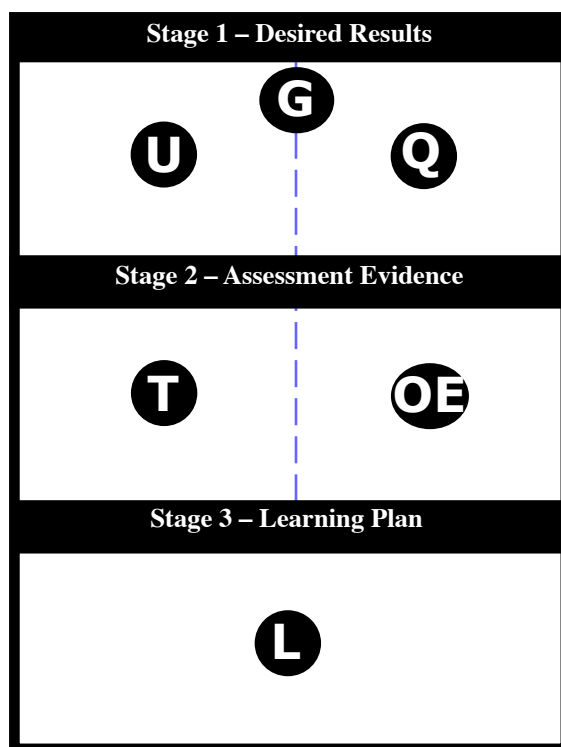
Skill/ \_\_\_\_\_

Process: \_\_\_\_\_

- 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?



# The Big Ideas of *Understanding by Design*

1. UbD is a way of thinking purposefully about curricular planning and school reform, a set of helpful design tools, and design standards -- not a program or recipe.
2. The end goal of UbD is understanding and the ability to transfer learnings – to appropriately connect, make sense of, and use discrete knowledge and skills in context.
3. Evidence of understanding is revealed through performance – when learners transfer knowledge and skills effectively, using one or more “facets” (explain, interpret, apply, shift perspective, empathize, and self-assess).
4. Educators are coaches of understanding, not mere purveyors of content or activity.
5. Planning is best done “backward” from the desired results and the transfer tasks that embody the goals.
6. UbD transforms Content Standards and other goals into focused learning targets based on “big ideas” and transfer tasks.
7. Design Standards guide self-assessment and peer reviews of curriculum, instruction, and assessment for quality control.
8. UbD reflects a “continuous improvement” approach to design and learning. The results of our curriculum designs (e.g., assessment results, quality of student work, degree of learner engagement) inform needed adjustments.