



research on
Learning and Cognition 

“We turn now to the questions of how experts’ knowledge is organized... Their knowledge is not simply a list of facts and formulas that are relevant to the domain; instead, their knowledge is organized around core concepts or ‘big ideas’ that guide their thinking about the domain.”

- Bransford, et. Al., [How People Learn](#), p 24

research on
Learning and Cognition 

“Learning with understanding is more likely to promote transfer than simply memorizing information from a text or a lecture

- Bransford, et. Al., [How People Learn](#), p 224

Essential Question ?

To what extent do we have a coherent curriculum... from the learner's perspective?

3 Stages of Backward Design

1. Identify desired results.

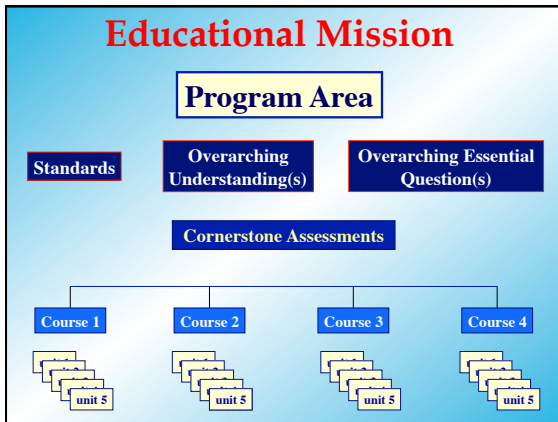
2. Determine acceptable evidence.

3. Plan learning experiences & instruction.

Applying Backward Design


| | |
|---------------------|---------------------|
| Goal(s): | |
| Understandings | Essential Questions |
| | |
| Assessment Evidence | |
| | |
| Action Plan | |

to curriculum mapping



Common Core Standards
Mathematics

Model with mathematics.

Mathematical modeling 

'Big Idea' Understandings:

- **Mathematicians create models to interpret and predict the behavior of real world phenomena.**
- **Mathematical models have limits and sometimes they distort or misrepresent.**

Mathematical modeling



Essential Questions:

- *How can we best model this (real world phenomena)?*
- *What are the limits of this model?*
- *How reliable are its predictions?*

**Common Core Standards
Mathematics**

Look for and make use of structure.

Structures in Mathematics



'Big Idea' Understandings:

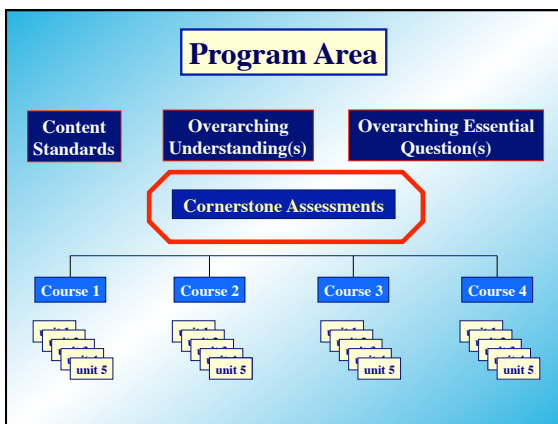
- **Recognizing predictable patterns allows the creation of functional relationships.**
- **Statistical analysis and display often reveal patterns in data, enabling us to make predictions with degrees of confidence.**

Structures in Mathematics



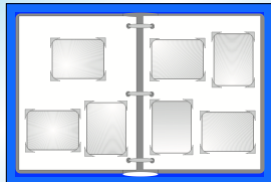
Essential Questions:

- *What's the pattern?*
- *What will happen next?*
- *How sure are you?*



Think "Photo Album" versus "Snapshot"

Sound assessment requires multiple sources of evidence, collected over time.



Gather evidence from a Range of Assessments



- ✓ authentic tasks and projects
- ✓ academic exam questions, prompts, and problems
- ✓ quizzes and test items
- ✓ informal checks for understanding
- ✓ student self-assessments

Match the Assessment Evidence with the Learning Goals



Evidence of Understanding...

requires the student to:



Explain

*support, justify
theorize, defend*

Apply

*to novel situation
(‘authentic’ context)*

Authenticity Matters...



Therefore:

- ✓ Understanding is revealed through contextualized performance.
- ✓ Students apply knowledge in meaningful, "real-world" contexts to show that they *really* understand.

inauthentic vs. authentic (examples)



- | | |
|--|--|
| <p><i>inauthentic</i></p> <ul style="list-style-type: none"> ✗ fill in the blank ✗ select an answer from a set of given choices ✗ answer the ?s at end of chapter ✗ solve contrived problems | <p><i>authentic</i></p> <ul style="list-style-type: none"> ✓ purposeful writing ✓ scientific investigation ✓ issues debate ✓ primary research ✓ interpret literature ✓ solve "real-world" problems |
|--|--|

Important Distinction!

Practice

- Drill and practice:
- discrete skills
 - de-contextualized
 - intervention by the coach




The Game

- Requires "putting it all together"
- authentic
 - contextualized
 - on your own


“authentic” assessment 

The term, **authentic**, refers to assessment tasks that elicit demonstrations of knowledge and skills in ways that they are applied in the “real world.” An authentic assessment task also reflects students’ interests and experiences, and engages students in meaningful learning.

something to think about... 

“We cannot have rigor without relevance.”


Willard Daggett

example: **Teach a Lesson** 

You have been asked to help a third grader understand the economic concept of “supply and demand”. Design a plan for a 5 minute lesson. You may wish to use examples (e.g., Beanie Babies or Pokemon cards), visuals, or manipulatives to help them understand.

example:

State Tour




The State Department of Tourism has asked your help in planning a four-day tour of (*your state*) for a group of foreign visitors. Plan the tour to help the visitors understand the state's history, geography and its key economic assets.

You should prepare a written itinerary, including an explanation of *why* each site was included on the tour.

example:


Children's Author



Imagine that you are a writer of childrens' books. Having read the *Three Little Pigs and the Big Bad Wolf*, and *The Real Story of the Three Little Pigs*, re-write a famous story from a different point of view. Then, write a letter to a publisher, to encourage her to publish your new version.

example:

Making the Grade



Your math teacher will allow you to select the method (i.e., *mean, median or mode*) by which your quarterly grade will be calculated.

Review your grades for quizzes, tests, and homework to decide which measure of central tendency will be best for your situation. Write a note to your teacher explaining *why* you selected that method.

Designing Task Scenarios



- G** ♦ What is the **g**oal in the scenario?
- R** ♦ What is your **r**ole?
- A** ♦ Who is the **a**udience?
- S** ♦ What is your **s**ituation (context)?
- P** ♦ What **p**roducts/**p**erformances will you prepare?
- S** ♦ By what **s**tandards (criteria) will your work be judged?

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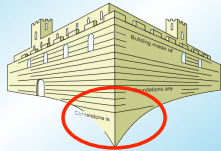
Designing Task Scenarios



- G** ♦ What is the goal in the scenario?
- R** ♦ What is your role?
- A** ♦ Who is the audience?
- S** ♦ What is your situation (context)?
- P** ♦ What **p**roducts/**p**erformances will you prepare?
- S** ♦ By what standards (criteria) will your work be judged?

corner-stone (n):

1. the first stone laid at a corner where two walls begin and form the first part of a new building



2. something that is fundamentally important to something



Cornerstone Assessments



- ✓ Anchor the curriculum around important, recurring tasks.
- ✓ Require understanding and transfer of learning.
- ✓ Provide evidence of authentic accomplishments.
- ✓ Involve “doing the subject” and “playing the game”

A Mission Statement for a Foreign Language Program

“The overarching goal of this program of studies is to develop students who are sufficiently competent in [the target language] so that they can function effectively in the language and culture outside of the confines of the classroom.”

example:

World Languages

You have been selected by the members of the World Languages Club to plan their annual trip to two of the countries whose languages are studied in your school. You must plan an itinerary that will include at least five places of cultural and historic importance. You must include at least one site/activity that might be of particular interest to teenagers (e.g. Euro-Disney, a bull fight or a soccer game). Use public transportation wherever possible. Create a brochure to advertise the trip and be prepared to give a presentation to those students who may be interested in traveling with you.

example:

What's the Trend?

Interpret the data on _____ for the past _____ (time period). Prepare a report (oral, written) for _____ (audience) to help them understand:


- what the data shows
- what patterns or trends are evident
- what might happen in the future

example:

What's the Trend?

Interpret the data on **our changing heights in 2nd grade for the past school year**. Prepare a **chart for the 1st graders** to help them understand:

- how our class grew this year
- how they are likely to grow next year

example: 


What's the Trend?

Interpret the data on **H1N1 infection spread on each continent for the past 12 months**. Prepare a **website, Podcast, or newspaper article** to help them understand:

- spread rates and seasonal variation
- spread rates and intl. travel patterns
- spread rates and govt. policies

GIPS K-12 Social Studies Program Beliefs

- We live in a culturally diverse society.
Therefore, we will develop student understanding of diverse cultures that honors equality and human dignity.
- Assessment should be ongoing, diagnostic, and aligned with instruction.
Therefore, we will provide multiple authentic assessment tools.
- The use of community resources is essential for effective instruction.
Therefore, we will use the rich history and ethnic diversity of our community to enhance learning.
- **Active and informed citizen participation is essential to democracy.**
Therefore, we will provide instruction and curriculum designed to develop students who will be informed, active problem solvers, and willing participants in the democratic process.

Task Frame: 


Involved Citizen

Identify a situation (e.g., **issue or problem**) that needs a solution.

- ◆ Analyze the issue. – OR – Define the problem.
- ◆ Consider and evaluate options/possible solutions.
- ◆ Present your position/solution.
- ◆ Address (rebut) alternative positions/solutions.
- ◆ Attempt to convince a target audience to adopt your position or solution though a _____.

example:

Involved Citizen




After investigating a current political issue, prepare a position paper/presentation for a public policy maker (e.g., Congress person) or group (e.g., school board, legislative committee). Assume that the policy maker or group is opposed to your position. Your position statement should provide an analysis of the issue, consider options, present your position, rebut opposing positions, and attempt to persuade the public policy maker or group to vote accordingly.

Your position can be communicated in a written report, via a web blog, or delivered as a presentation.

example:

Involved Citizen




You have an idea that you believe will make your school better, and you want to convince school leaders that they should act on your idea. Identify your audience (e.g., principal, PTSA Board, students) and:

1. Describe your idea.
2. Explain why & how it will improve the school.
3. Develop a plan for acting on your idea.

Your idea and plan can be communicated to your target audience in a letter, e-mail, or presentation.




Examining Student Work




- ✓ common assessments or assignments linked to important content standards

Examining Student Work

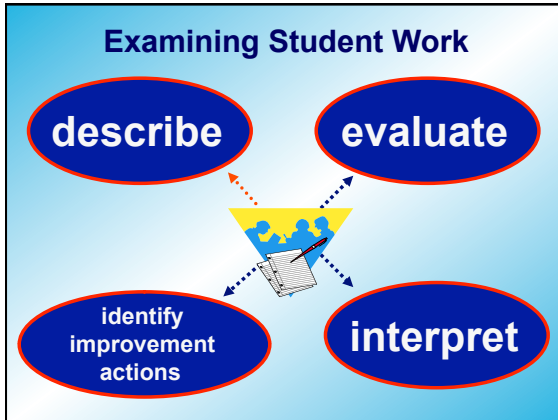


- ✓ common assessments or assignments linked to important content standards
- ✓ agreed-upon evaluative criteria

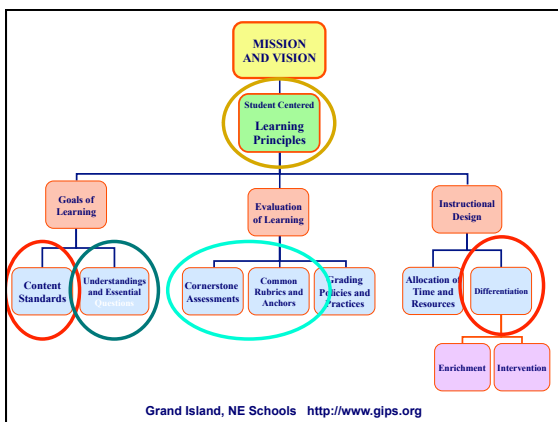
Examining Student Work



- ✓ common assessments or assignments linked to important content standards
- ✓ agreed-upon evaluative criteria
- ✓ time to meet in teams to:
 1. examine student work using a structured protocol
 2. select exemplars (“anchors”)
 3. plan improvement actions








3 Stages of Backward Design

1. Identify desired results.



2. Determine acceptable evidence.

3. Plan learning experiences & instruction.



Freedom Within Structure

| | |
|---|---|
| <p style="font-size: small; margin: 0;">Stage 1 - Desired Results</p> <ul style="list-style-type: none"> • School Mission • Program Goals • Content Standards | <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; color: red;"> <p><i>Agree to agree. This is our job!</i></p> </div> |
| <p style="font-size: small; margin: 0;">Stage 2 - Assessment Evidence</p> <ul style="list-style-type: none"> • Cornerstone Assessments • Common Rubrics & Performance Standards | <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; color: red;"> <p><i>Agree on some common evidence.</i></p> </div> |
| <p style="font-size: small; margin: 0;">Stage 3 - Learning Plan</p> <ul style="list-style-type: none"> • Instruction (lesson plans, instructional strategies, sequence, grouping, resources) | <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; color: red;"> <p><i>Academic freedom & teacher autonomy</i></p> </div> |
