

CURRICULUM MAPPING

Refining Maps (Learning and Instruction) Through the Incorporation of Essential Questions

**Learning is not attained by chance,
it must be sought for with ardor and
attended to with diligence.**

--Abigail Adams

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Essential Question

How does inquiry affect knowledge?



Supporting Questions

How may designing learning based on conceptual questions affect student learning over time?

How may essential and support questions influence instruction practices including instructional delivery and assessment methods?



Refine is defined as:
*to use precise distinctions
in thought, speech, or text.*



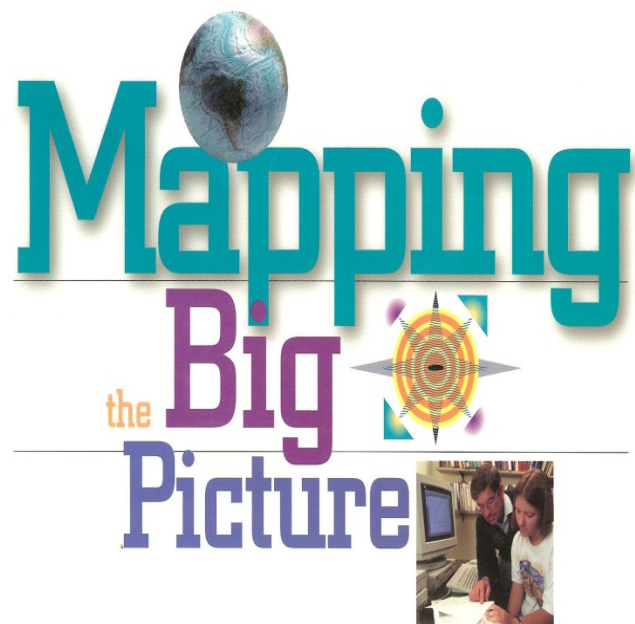
**Refine Maps
Equals**

Refine Current Curriculum Design and Practice

**There are a variety of ways curriculum
may become more precise or distinctive.**

**In today's session the refinement focus
pertains to the distinctive features regarding
**essential and supporting
conceptual-based questions.****

Dr. Heidi Hayes Jacobs has a chapter dedicated to **Essential Questions** in...



Integrating Curriculum & Assessment K-12



Mapping the Big Picture: Integrating Curriculum and Assessments K-12. ASCD, 1997.

Chapter 4: Refining Maps Through Essential Questions

*The key word here is **refining!** Beginning mapping does not ask for or often include EQs **unless teachers have been extensively trained** in this type of unit design and **are already using** EQs in curriculum design and instruction.*

CAUTION!

Essential Questions

What is an even number? What is an odd number?

What is the position of the hour hand and the minute hand at "half-past" an hour? Can you show "half-past" on an analog clock?

Just because essential questions **appear** on maps, it does not necessarily mean the questions are *truly essential!*

CONTENT AND ESSENTIAL QUESTIONS

ART 8

ORIENTATION - CLASSROOM EXPECTATIONS

ESSENTIAL QUESTIONS:

What will we "DO" in art 8?

How is the art room organized for locating materials/supplies and what are proper clean-up procedures?

What are guidelines for classroom safety with use of tools?

Essential Questions

What is the length of the field of view (in mm's) when looking through the lowest power on the microscope?

Recommended Reading



Concept-Based Curriculum and Instruction for the Thinking Classroom

--H. Lynn Erickson

Corwin Press

Concept-Based Curriculum and Instruction: Teaching Beyond the Facts

--H. Lynn Erickson

Corwin Press

Understanding by Design

--Grant Wiggins & Jay McTighe

ASCD

The Understanding by Design Handbook

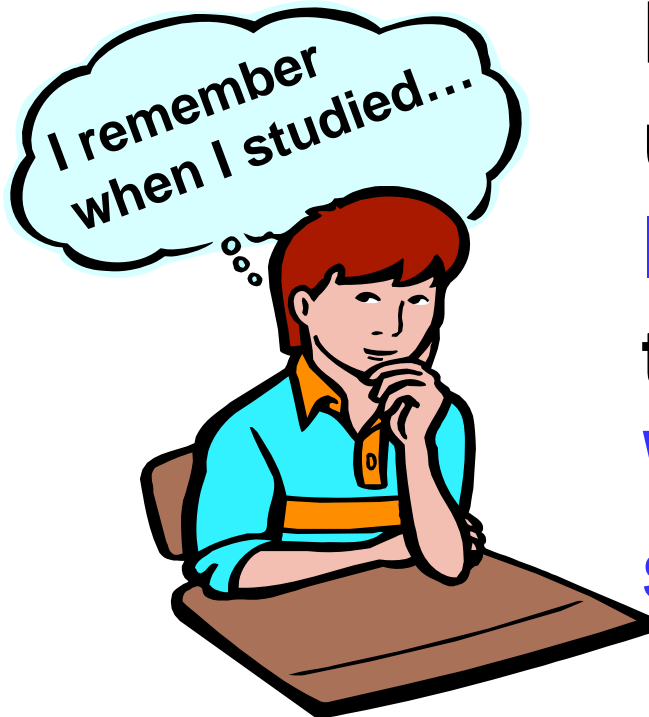
--Jay McTighe & Grant Wiggins

ASCD

Note: These books focus on unit design that embraces conceptual learning. You do not have to embrace the authors' entire unit-design process.

I am recommending these books to aid in gaining a deeper insight into the reasoning behind incorporating essential questions when refining your curriculum (maps and student learning).

The term **enduring** refers to the big ideas, or the important understandings, that we want students to "get inside of" and **retain after they've forgotten many of the details.**



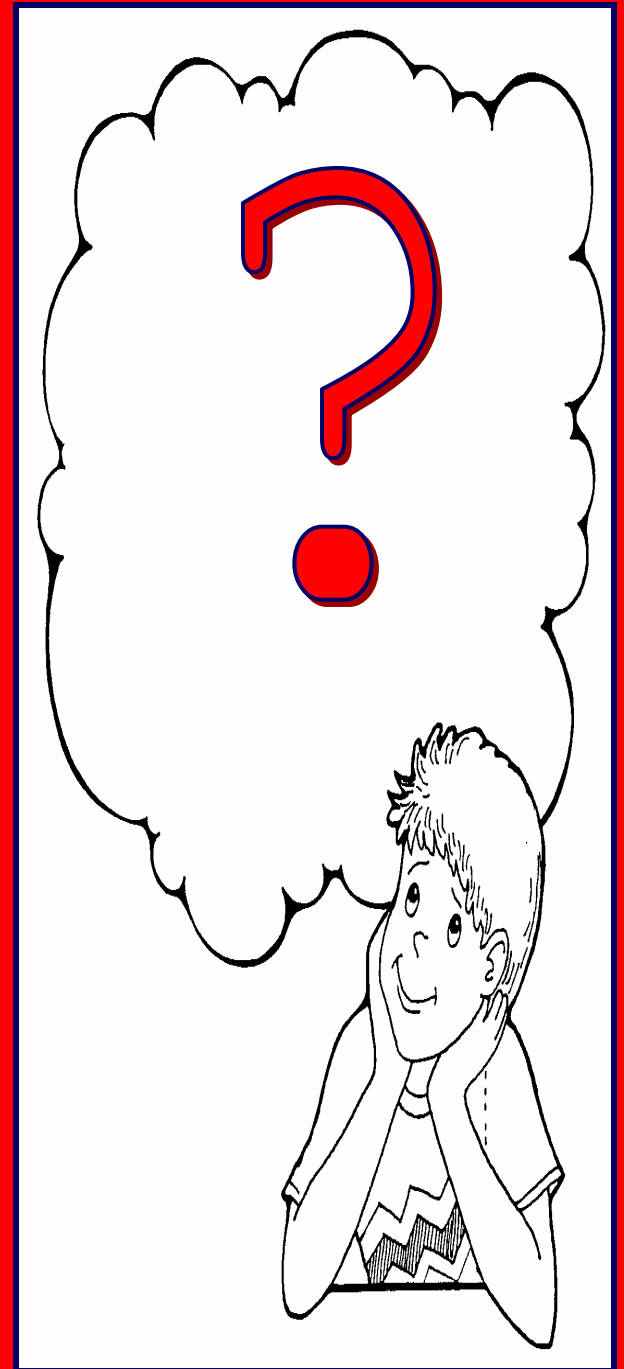
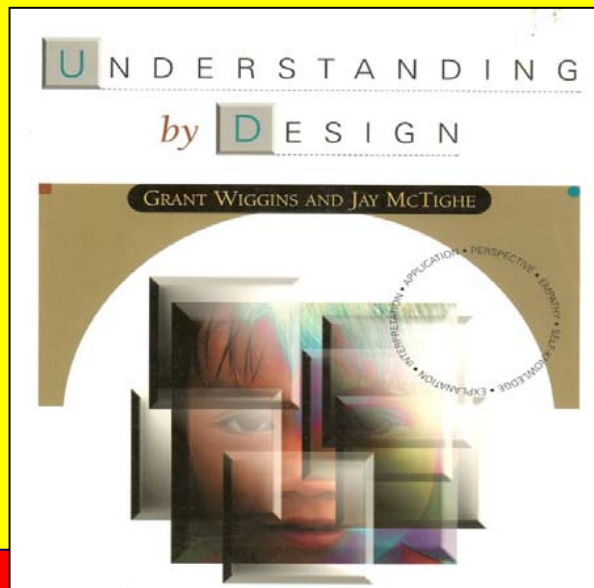
Put differently, the enduring understandings provide a **larger purpose** for learning the targeted content

Why is this topic worth studying?

The Understanding by Design Handbook (Ch. 4)

(Big Ideas / Enduring Understandings)

Essential Questions
are broader, timeless
concept-based questions
that are not answered easily.
A student must synthesize
multiple facets of understanding
to adequately answer
Essential and Supporting
Questions.



U

**Well-written Essential Questions/
Supporting Questions cause students to
experience / explore / evaluate
learning via**

Six Facets of Understanding

b

**...a *multi-faceted view* of what makes up
understanding (p. 44)**

D

Can Explain ...
Can Interpret ...
Can Apply ...
Have Perspective ...
Can Empathize ...
Have Self-Knowledge ...

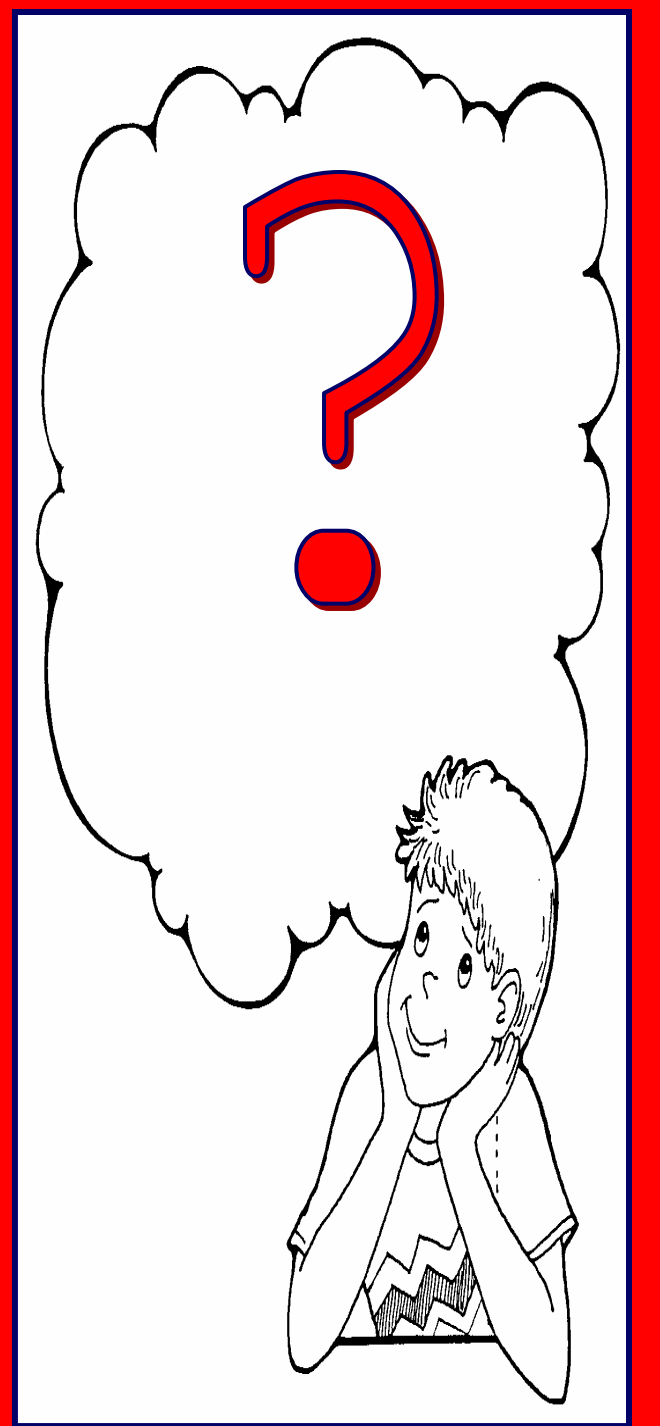
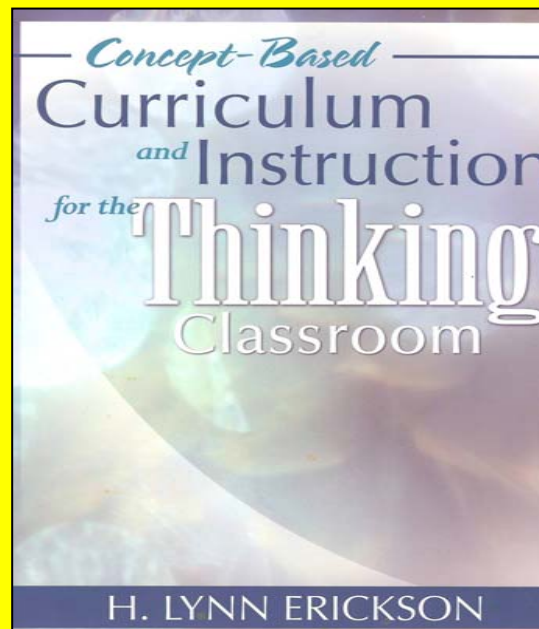
(Big Ideas / Enduring Understandings)

Essential/Supporting questions are conceptual-based questions based on transferable generalizations.

Examples

Authors choose certain words to express emotions.

The population of a species will grow to fill any available habitat to which it can adapt.



Essential questions are meant to serve as *Mental Velcro** for the learner...

- EQs ***define* concept-based** big ideas or enduring understandings
- EQs ***set direction*** for a unit of study's content-skill sets and intra-aligned assessments
- EQs ***create depth rather than breadth*** given time constraints
- EQs ***increase interaction and retention*** of what students must know, be able to do, and how the various cognition levels (Bloom) and perspectives (Wiggins/McTighe; Erickson) of learning are accurately measured



*Mental Velcro Analogy, Jacobs, H. H., Curriculum Mapping Institute, Santa Fe, New Mexico, 2006.

EQs serve as a *framework* for a unit of study's learning...

- EQs and SQs are similar to a **Table of Contents** in that they inform learners of what is yet to come. (Jacobs, CMI 2003)
- EQs and SQs inform learners of what the **conceptual focus or focuses** will be in the unit learning.
- Conceptual focuses are visited and revisited over time—both horizontally and vertically—to allow learners to **transfer knowledge** and expand their ability to **generalize** the conceptual focuses.



EQs serve as a *framework* for a unit of study's learning...



The **wording** of EQs **greatly impacts** the conceptual focus(es) and the topic-based focuses (SQs) in a given unit of study. For example, think of the **variety of learning** that could take place given the **slight wording changes** below by (a) using **how** versus **why**, and (b) by switching the **two nouns** within the EQs:

How does **movement** influence **motion**?

Why does **movement** influence **motion**?

How does **motion** influence **movement**?

Why does **motion** influence **movement**?

So, I want to make certain I am getting this right...

A well-written Essential Question is not simply “a question.” It is a question based on broad concepts and can be answered quite differently based on personal viewpoints and perspectives.

**Get ready for a
“light bulb” moment!**

- 1. Grab a blank piece of paper and writing utensil.**
- 2. Listen for the verbal directions.**



Consider yourselves divided!

LEFT

**Simple
tools
are found
in the
kitchen.**

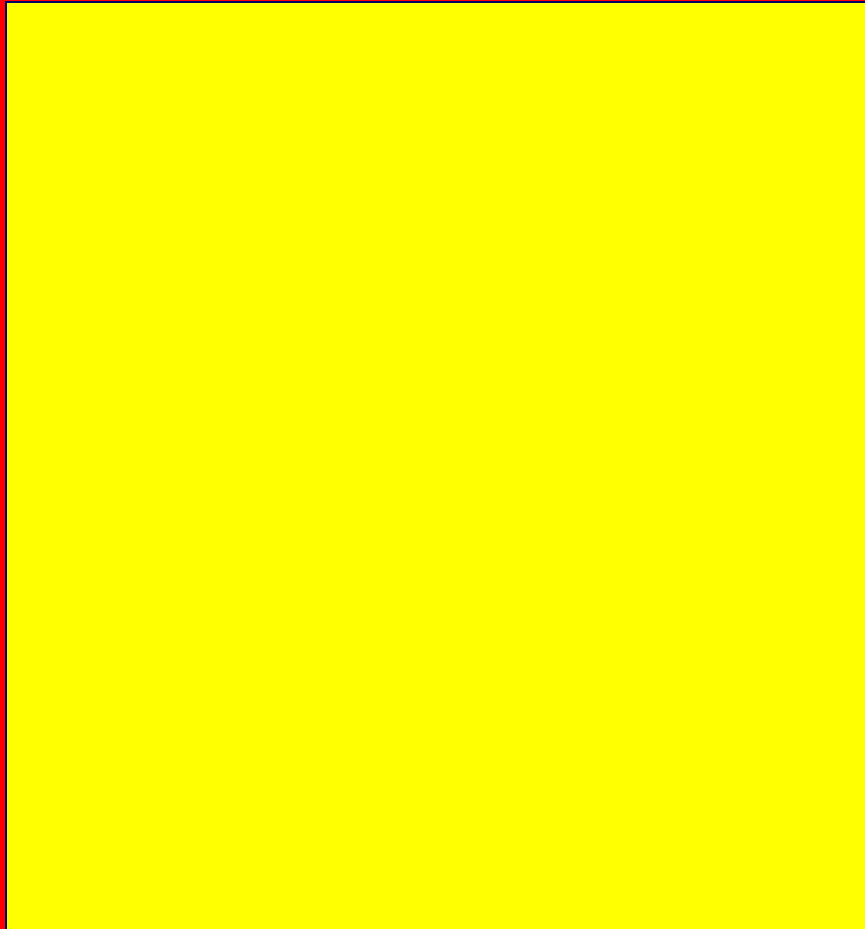
RIGHT

Draw illustrations...

Consider yourselves divided!

LEFT

RIGHT



**Simple
tools
solve
problems.**

Draw illustrations...

Do both statements have nouns or noun phrases
and connecting verb or verb phrases?

**Simple
tools
are found
in the
kitchen.**

**Fact/
Topic-Based**

**Simple
tools
solve
problems.**

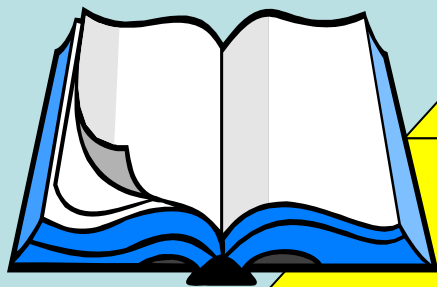
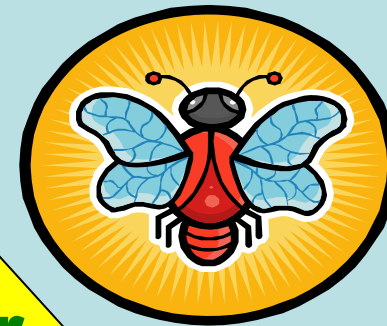
**Concept-
Based**

Conceptual-Based
Big Ideas
Cause Your Brain To

"GENERALIZE!"



Technically, there is great variety to the types of questions asked in the classroom...



Isolated Questions

Direct-Answer Questions

Foundational Yes/No/Factual

Supporting Questions

Unit-Specific Factual & Concept-based Related Learning

Essential Questions

Concept-Based Big Ideas/Enduring Understandings

What Type of Question? EQ, SQ, or D-AQ?

1. Why do businesses think critically about customer service?
2. What will happen when we put the seed in the pot with soil and water it daily?
3. Why do choices alter results?
4. Why do rains affect ecosystem interactions?
5. How did the first people arrive in North America?
6. How does algebra prove number tricks work?
7. How do revolutions repeat in structures?

Questions 3 and 7 are Essential Questions.
Questions 1, 4, and 6 are Supporting Questions.
Questions 2 and 5 are Direct-Answer Questions.

Conceptual-Based Learning

A concept
is an organizing idea;
a mental construct that is...

- **Universal**
- **Timeless**
- **Broad / Abstract**



GENERALIZATION

= Enduring Understanding

Two or more concepts
combined to make
a relationship...



“CONCEPTUAL BIG IDEAS” CAN TRANSFER
TO DEVELOP OR EXPAND GENERALIZATIONS

Concept-based **generalization statements** can be transformed into essential questions.



**I
M
P
O
R
T
A
N
T**



Generalization Statements

- Culture **exhibits** both change and continuity through time.
- Line **defines** shape and adds meaning.

Find the two concepts and connecting verb in each enduring understanding.

Government establishes rules that people are expected to live by.

The capacity of available tools affects the quality and specificity of information that scientists can collect.

Prior knowledge, reading experience, and life experience shape how readers read and respond to text.

Grand Island, NB

Whether an enduring understanding, an essential question, or a supporting question, **two concepts** form a **relational statement**.

Example: Grade 9

Generalized Concept/Enduring Understanding =

A country's geography has a direct impact on its economy.

Essential Question = How does geography impact an economy?

Supporting Questions (Foreign Trade) =

How does Japan's land and sea trade routes impact global economies?

How may changes in United States trade routes impact global economies?

**B
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F
I
C**

Example: Grade 2

Generalized Concept/Enduring Understanding =
A country's climate has a direct impact on its agriculture.

Essential Question = How does weather help or hurt growth?

Supporting Question

(Arizona Geography/Science) =

How does Tucson's weather help or hurt our city's food crop?

**B
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I
C**



Essential questions and supporting questions must be written with consideration for the **unit of study and **student population**.***

*** Age group or groups and interests**
Language acquisition
School and local community connections

***Important: Stage of maturational and cognitive development (grade level) affects wording/word choice.**

Grade 3 EQ

How does direction affect movement?

Grade 5 EQ

How does movement affect lifestyle?

Grade 7 EQ

How does lifestyle affect movement?

How does learning affect growth?

How does eating healthy foods affect your growth?

Grade 1

EQS

"FRAME"

How does learning affect growth?

How do farming practices affect crop production?

Grade 7

How does learning affect growth?

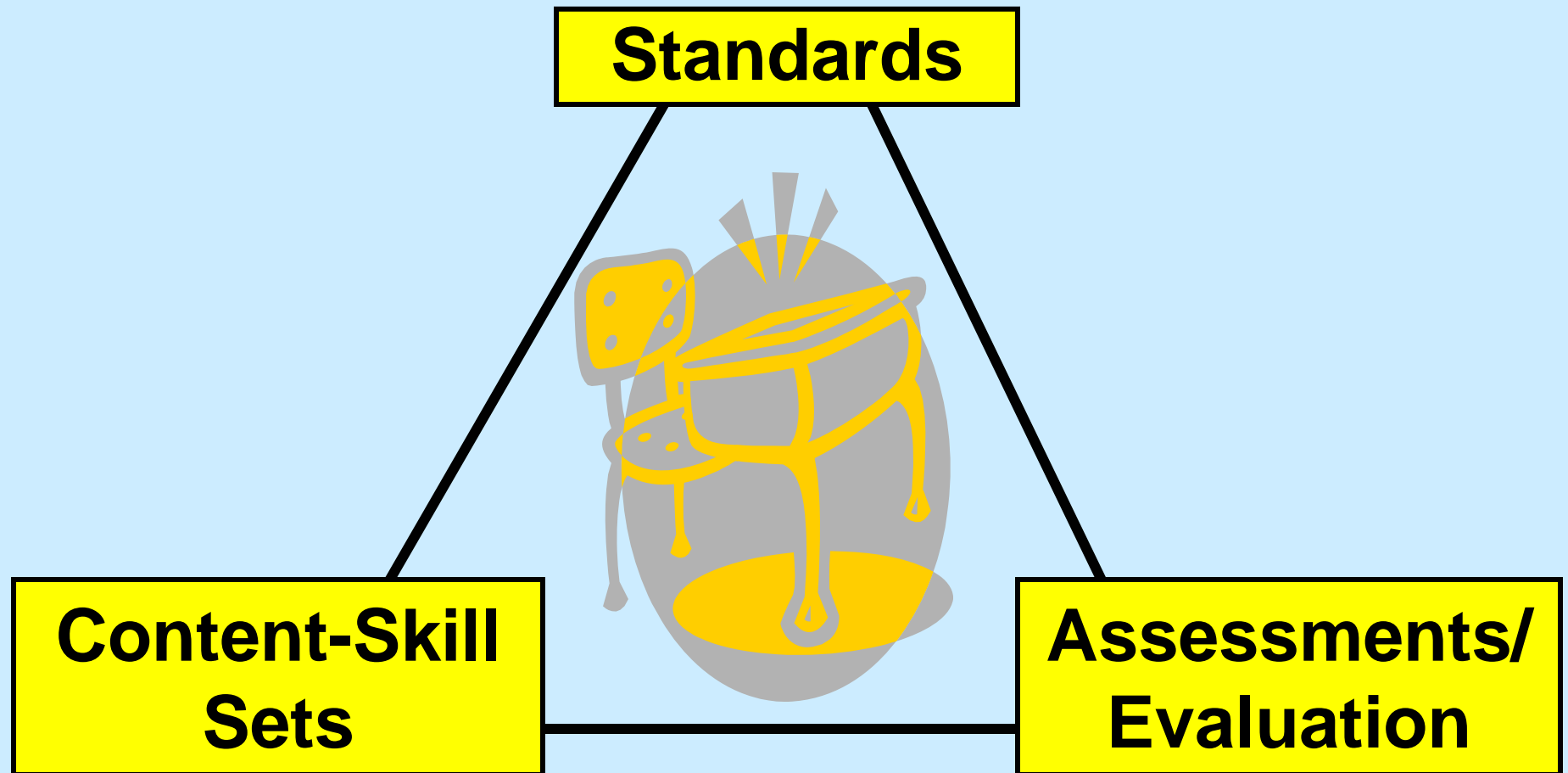
How does AIDS research affect rates of infection?

Grade 11

SQS

What can we do to improve students' retention and desire to learn?

Essential question-driven units of study are most often designed based on a combination of standard statements, content-skills sets, and assessments.



What can we do to improve students' retention and desire to learn?

Standard Statement

Students investigate (observe, record, describe) characteristics in daily weather and seasonal cycles.

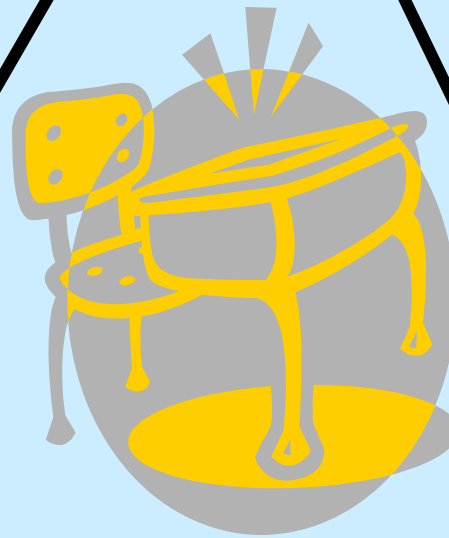
Standards

Essential Question

Why do people dress in different ways?

SQ

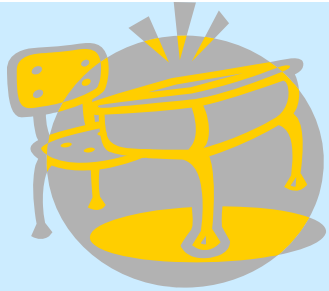
Why do families dress in different ways in different seasons?



Curriculum Content-Skill Sets

Grade 1 Earth Science

Assessments/Evaluation



What can we do to improve students' retention and desire to learn?

Standard Statements

- 1. Represent quantitative relationships graphically and use the graphs to solve real-world and mathematical problems.**
- 2. Generate a table of values from a formula and graph the resulting ordered pairs on a grid.**

Essential Question

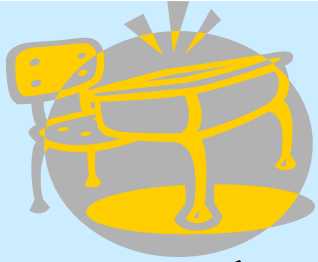
How do trends influence production?

SQ

How can mathematical statistics influence Arizona's economy?

Grade 8

Patterns, Functions, and Algebra



What can we do to improve students' retention and desire to learn?

Standard Statement

**Analyze and explain the impact on American society and culture of the new immigration policies after 1965 that led to a new wave of immigration.
(Individuals, Society, and Culture)**

Essential Question

How does equality generate policy?

SQ

How do formal and informal leaders generate immigration policies?

**High School US History Unit
United States in Troubled Times:
1960 to 1980**

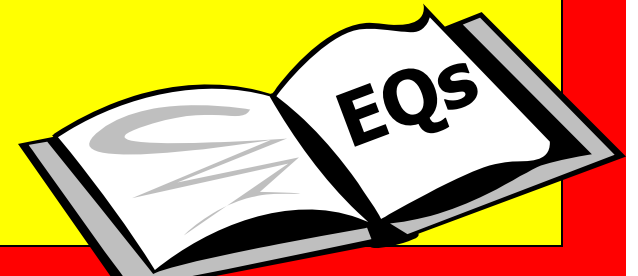


How Many EQs Per Unit? One (or Two)

- In order to make a unit of study **manageable** given the need for **depth rather than breadth**, it is recommended there be **one (no more than two)** essential question per unit.
- Beyond the unit's essential question, it is recommended that **two to four unit-specific supporting questions** are designed to aid students' conceptual *and* topic-specific learning.
- The wording of both essential questions and supporting questions should be written with respect to the language acquisition of the students.
(Note: There may be **one word** in a question that will be a part of the unit's learning.)

Jacobs (Mapping the Big Picture, 1997) outlines eight criteria when generating student-friendly essential questions:

1. Each child should be able to understand the question.
2. The language of the questions should be written in broad, organizational terms.
3. The question should reflect your conceptual priorities.
4. Each question should be distinct and substantial.
5. Questions should not be repetitious. (SQs)
6. The questions should be realistic given the amount of time allocated for the unit or course.
7. There should be a logical sequence to a set of essential questions.
8. **The questions should be posted in the classroom.** (pp. 30-32)



A Visual Reminder!

- Post EQs and SQs where all students can **see them easily**
- Refer to them **often** during every **day / period's** learning experiences
- Include them textually on **handouts** and **assessments**
- Connect previous learning to new learning **in relationship** to EQs and SQs

Essential Questions and Supporting Questions should be **clearly posted** at the beginning and throughout a unit of study!



Essential Question

How does text influence readers?

Unit Focus: Leisure Reading

Some teachers prefer to design essential or topic-based SQs that

***do not using a
noun-verb-noun
pattern,***

but still cause students to think broad and from multiple perspectives.

SQ: What makes a book a book?

SQ: What makes a good book "good?"

SQ: If you owned a children's bookstore and could only carry five genres of books, which would you carry and why?

Unit Supporting Questions Literally SUPPORT EQs!

Physical Science Standard Proficiencies:
Recognize basic Earth materials. / Observe and describe **rocks**, soils, water and air.

EQ

How can attributes define cycles?

How can rock cycles be interrelated?

SQS

Do rock cycles have to have sequential changes or steps?

What causes attributes in rocks?

Foundational Lesson Questions

How are rocks officially classified?

What does the term attribute mean?

What does a geologist study?

**Physical Science Standard Proficiencies:
Recognize basic Earth materials.
Observe and describe rocks, soils, water and air.**

**How can
attributes
define cycles?**

*Culminating assessment(s) and
periodic formative assessments
incorporate the EQ and SQs relational
knowledge based on foundational
learning and prior knowledge.*

Lesson Plans

**How can rock cycles
be interrelated?**

**Activity
#4**

**Activity
#5**

**Activity
#6**

**What causes
attributes in rocks?**

**Activity
#2**

**Activity
#3**

Activities
Include
Direct-Answer
Foundational
Questions
(Yes/No/
Factual)

**What does the term
attribute mean?**

**Activity
#1**

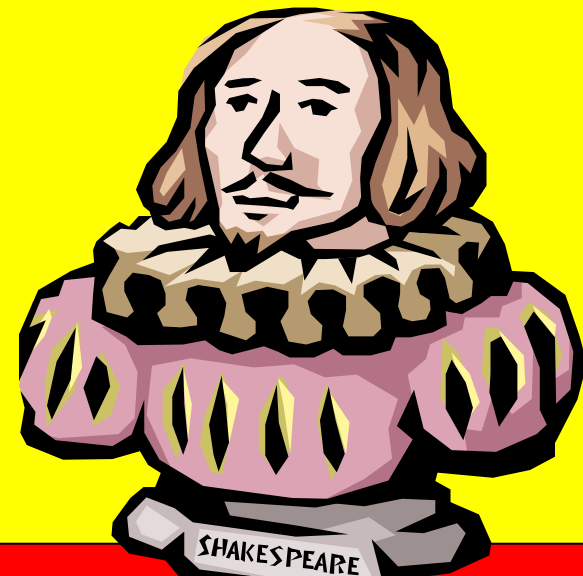
In learning environments wherein

Interdisciplinary Units

are the norm for instructional practice, teachers from *different disciplines* may choose to not only plan a unit of study's based on the *same* EQ(s), each discipline's teachers' SQs based on the disciplines' course-specific content-skill learning. Oftentimes, the teacher team designs a final or culminating unit assessment that measures learning involving **all** the disciplines!

Shakespeare

- Language Arts
- Social Studies
- Math
- Science
- Art
- Music



4 Ps For Writing EQs/SQs

1. Plan

Based on standard statement(s), design learning based on desired depth of knowledge & 6 Facets of Understanding **appropriate for student population.**

2. Practice

Write/rewrite questions so that they accurately reflect the desired conceptual focus (EQs) and topic-focus (SQs) given the planned content-skills-assessments.

3. Prepare

A unit's **Essential Question** needs **Supporting Questions and Foundational Questions.** Plan lessons and resources accordingly.

4. Perform

Activities (Lesson Plans) must be **realistic given the time allotted** for the unit of study and EQ/SQs.

A Unit of Study

Remember a unit of study's *EQs and SQs must connect directly to the *specific learning* within the unit.*

Students must be able to cognitively experience a direct correlation between a unit's content, skills, and assessments *and* the unit's EQ(s) and SQs.



EQ/SQs Development Technique

The following slides provide an overview of a manner in which teachers can design essential questions based on concepts that are based on a current unit's planned learning (content, skills, assessments) and aligned standard statements.



Earth Science Weather Unit of Study

Some Sample

NOUNS

Concepts

Condition

Behavior

Outcome

Observation

VERBS

Action

Change

Result

Inform

Cause

BIG IDEAS = EQs FORMULA

Try different combinations (by manipulating the **sticky notes**) in the formula framework:



Decide which conceptual-based combinations you/your team believe “fits best” given the theme, topic, and facts in the unit of study.

(Note: You may need to add –s to your nouns or verbs and/or may need additional words.)

Quality Control: If a combination is truly conceptual, you can generalize and easily think of learning beyond the key facts and topics of the given unit!

Earth Science Weather Unit of Study

(teachers wanted to add in ELA connections)

Conditions	Change	Outcomes
Information	Creates	Outcomes
Media	Informs	Behavior
Outcomes	Create	Behaviors
Media	Informs	Occupations
Outcomes	Influence	Information

Important Note:

With any of the combinations, learning can
extend outside of the Science discipline.

**The bridge to “cross over” from
a conceptual-based statement (big idea)
Noun + Verb + Noun
to a conceptual-based EQ is the
*introduction terms...***



Translating BIs Into EQs

Try your **conceptual-based big idea(s)** with *both* introduction terms **How** _____ and **Why** _____ in front of the big ideas.

How _____ + _____ + _____ ?

Why _____ + _____ + _____ ?

*Important: Notice the use of **how** versus **why** will often times **change the direction of learning!***



How do conditions change outcomes?

Why do conditions change outcomes?

Once the desired EQ has been selected...

How do conditions change outcomes?

Why do conditions change outcomes?



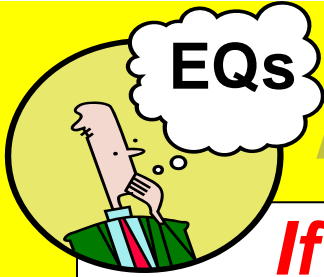
How does media inform behavior?

Why does media inform behavior?

How do outcomes influence information?

Why do outcomes influence information?

Next steps include designing topic-specific Supporting Questions, fact-based Foundational Questions, Summative/ Formative **Assessments, Activities, and Resources; discuss Instructional Methods.**



A Conceptual Learning Model

If it seems overwhelming ... Start slow!

Begin by revising ***one*** current unit's content-skills-assessments-resources-standards to reflect the ***larger purpose*** within the learning by designing one EQ and one or two SQs.

Based on the conceptual demands,
revise the unit's current elements:

- *New Content needed?*
- *Revise measurable verb(s) in skill statements?*
 - *Add new skill statement(s)?*
- *Analyze current assessments? Do they truly measure student's ability to independently answer the to be added EQ and SQs?*

Let's Give It A Try!

Essential Questions?



Supporting Questions?

Do I Have Any Volunteers?

MAPPING THE CURRICULUM

Essential Question



How does inquiry affect knowledge?



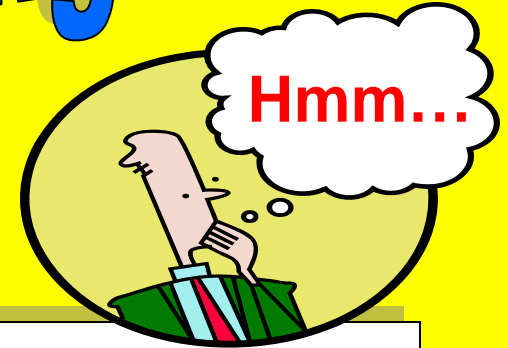
Supporting Questions

How may designing learning based on conceptual questions affect student learning over time?

How may essential and support questions influence instruction practices including instructional delivery and assessment methods?

EQs

A Conceptual Learning Model



How do you perceive your learning organization's desire to refine current or future learning expectations and instructional practices to reflect a commitment to student learning based on conceptual essential and supporting questions?

We have not succeeded in
answering all of your problems.
The answers we have found
only serve to raise
a whole set of new questions.
In some ways we feel we are
as confused as ever,
but we believe
we are confused on a higher level
and
about more important things.

--OMNI Magazine