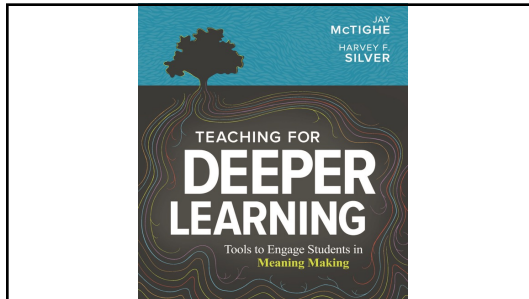


Teaching for Deeper Learning



1

Topic Agenda

- ✓ What is Deep Learning?
- ✓ Why Focus on Deeper Learning?
- ✓ What is Worth Learning Deeply?
- ✓ How Should We Teach for Deep Learning?
- ✓ How Will We Know if Students are Learning Deeply?

2

Teaching for Deeper Learning

1. What is deep learning and how does it occur?
2. What is worth learning deeply?
3. How can we teach for deeper learning?
4. How will we know that students are learning deeply?

3

Does Deep Learning mean...
acquiring more content?

4

Does Deep Learning mean...
a focus on 21st Century
Skills and PBL?

- Critical Thinking
- Creativity
- Communication
- Collaboration
- Citizenship
- Character Development

5

DEEPER LEARNING

Deeper learning is a “process through which an individual becomes capable of taking what was learned in one situation and applying it to a new situation.”

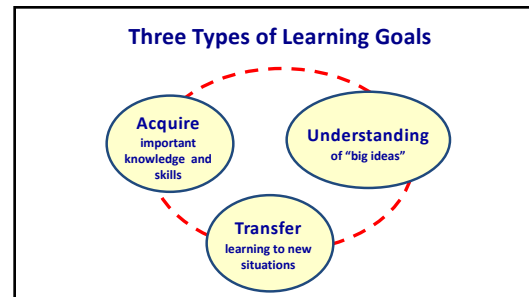
— National Research Council

7

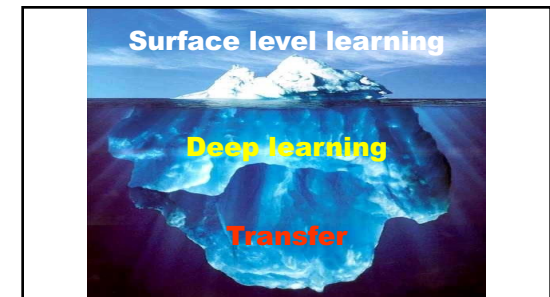
The world is changing at lightning speed. Digitalization, globalization and demographic changes are having a profound impact on our lives, on our cultures, on our societies...
Disruption is the new normal.

OECD The Future of Work, 2019

8



9



10

Teaching for Deeper Learning

I can explain it to you, but I can't understand it for you.



Understanding must be earned.


11

Deep learning requires active **meaning making** by the learner.




12

Meaning making involves... linking prior knowledge with new information via **thinking**.



13

A Kaleidoscope Analogy



Colored bits = content

Rotation = making meaning


14

The Knowledge Doubling Curve
— Buckminster Fuller and IBM

Knowledge doubling curve

- 1900s, knowledge doubled every century
- 1940s, knowledge doubled every 25 years
- Currently, knowledge doubling every 13 months
- Soon, every 12 hours?

“Transition from the linear growth of human knowledge to the exponential growth of human knowledge has taken place.”




15

Access to the world's information has never been greater.



16



17

Research Finding ...


A “guaranteed and **viable** curriculum is the #1 school-level factor impacting student achievement.”

— Marzano



18

When there is too much content to cover, there is less opportunity for: **active meaning making by learners**



19

Teaching for Deeper Learning



21st Century Skills

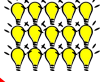


- critical thinking
- creative thinking
- communication
- collaboration
- citizenship


20

Priority #1: WHAT we teach

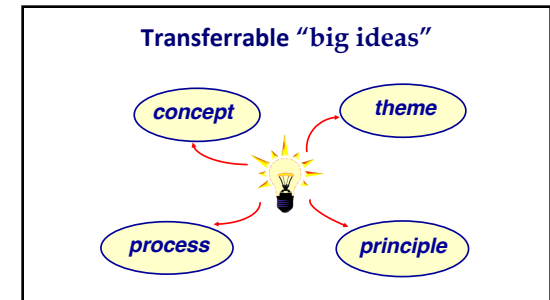
Reduced focus on “covering”
lots of **individual facts**



Greater focus on transferable
“big” ideas & processes
worth understanding deeply




21



22

Transferable ‘big ideas’ examples...



adaptation	justice
change	migration
energy	patterns
exploration	power
freedom	symbol
interaction	systems

23

Crosscutting Concepts

Which crosscutting concepts have you used today?

BIG IDEAS in the NGSS

- PATTERNS**
Observing patterns helps us think about relationships and make predictions. What patterns do you see? How can you explain them? What predictions can they help you make?
- CAUSE AND EFFECT: MECHANISM AND EXPLANATION**
Figuring out what causes what can help us explain and predict. Why did that happen? What did that cause?
- SCALE, PROPORTION, AND QUANTITY**
We can observe, compare, and model phenomena at different scales of size, time and energy, knowing or understanding how much time did this take? How does it compare to...?
- SYSTEMS AND SYSTEM MODELS**
Thinking about the parts of a system and how they affect each other helps us understand and test ideas. What are the parts of the system? How do they affect each other?
- ENERGY AND MATTER: FLOWS, CYCLES, AND CONSERVATION**
Tracking how energy and matter move can help us understand systems. Where did the matter or energy come from? Where did it go? Why?
- STRUCTURE AND FUNCTION**
How something is shaped or made can affect its properties and how it works. What is its shape or how is it made? How does that affect how it works?
- STABILITY AND CHANGE**
Observing when a system changes and when it stays the same can help us understand how this system works. What is staying the same? What is changing? Why?

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BIG IDEAS in SCIENCE

- PATTERNS**
- CAUSE AND EFFECT: MECHANISM AND EXPLANATION**
- SCALE, PROPORTION, AND QUANTITY**
- SYSTEMS AND SYSTEM MODELS**
- ENERGY AND MATTER: FLOWS, CYCLES, AND CONSERVATION**
- STRUCTURE AND FUNCTION**
- STABILITY AND CHANGE**


25

Frame the Curriculum...

as **A Study In...**





via **Essential Questions**



26

Unit Topic = A Study In...




The rainforest = A study in a complex ecosystem

World War I = A study in unintended consequences

27

Unit Topic = A Study In...




Decimals, Fractions, Percents = A study in equivalence

Native Peoples = A study in identity and survival

28

Teaching for Deeper Learning

Unit Topic = A Study In... 

Social Media = A study in
critical thinking

Linear Equations = A study in
mathematical modeling

29

Unit Topic = A Study In... 

Insects = A study in
structure and function

Sculpture = A study in
craftsmanship


30

Unit Topic = A Study In... 

Frog and Toad are Friends = A
study in relationships

The Catcher in the Rye = A
study in author's style

31

Unit Topic = A Study In... 

Calculus = A study in
changing relationships

Martin Luther King = A study
in courage

32


A Cautionary Note 

Don't just list:

- > a topic: weather
- > a skill: free-throw shooting
- > a reading: *The Giver*

 **Make sure that your "study in" focuses on a BIG idea: a concept, theme or process**

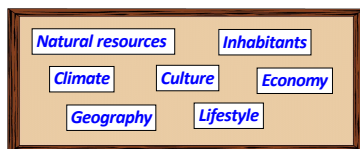
33

A Study In... should identify a concept, theme or process 

Unit Topic	A Study In = a BIG Idea
weather	prediction
free-throw shooting	proper technique
<i>The Giver</i>	the individual vs. society

34

Create a Concept Word Wall



35

Combine Concepts to Identify UNDERSTANDINGS

The **geography, climate, and resources** of a region influence the **economy, culture and lifestyle** of its inhabitants.



36

A Design Tip... 


✓ **State understandings as full-sentence generalizations.**

Students will understand that...

adaptation

37

Teaching for Deeper Learning

 From concept to understanding...

Adaptation

↓

Students will understand that...

Understanding:
Living organisms adapt to survive harsh and changing environments.

38

A Full Sentence Generalization

<u>BIG IDEAS (Concepts)</u>		<u>UNDERSTANDING</u>
adaptation	→	Living organisms adapt to survive
survival	→	harsh or changing environments.
environment	→	

39

Use Linking Words to Connect Concepts

aid	enable	provoke
address	enhance	reduce
allow	establish	reflect
cause	explain	regulate
change	express	reveal
challenge	follow	represent
change	forecast	require
characterize	force	shape
clarify	foreshadows	show
color	guides	solve
contradict	increase	suggest
contribute to	influence	support
cooperate	lead to	symbolize
create	make	regulate
depend on	oppose	represent
determine	precede	transform
diminish	promote	trigger

Source: The Thoughtful Classroom

40

Types of Questions

Leading
What are the names of the four food groups?

Guiding
What do we mean by a "balanced" diet?

Hook
Can what you eat help prevent zits?

Essential
What should we eat?

41

Sample Essential Questions:

- *How does art reflect, as well as shape, culture?*
- *In what ways do effective writers hook and hold their readers?*
- *How do I know what to believe about a scientific claim?*

42

Overarching EQs for E/LA

What "truths" can we learn from fiction?

How do effective writers hook and hold their readers?

How does what your read influence how you should read it?

43

Overarching EQs for History

Whose "story" is this?

How do you know what to believe about a historical claim?

What can patterns of history teach us today?

44

Overarching EQs for Mathematics

How do we communicate mathematically?

How is mathematics used to measure, model and predict change?

What do effective problem solvers do when they get stuck?

45

Overarching EQs for Critical Thinking

How do I know what to believe in what I read, hear and view?

What other perspectives should I consider?

Is this source credible?

46

Teaching for Deeper Learning

Overarching EQs for the Arts



What makes art great?

Where do artists get their ideas?

Is the medium the message?

47

Overarching EQs for H/PE



What is wellness?

Who is a "winner"?

How can I hit with greatest power without losing control?

48

Essential Questions for the Primary Grades



- *What is it like?*
- *Why is it that way?*
- *How does it work?*
- *How is it changing?*
- *How is it connected to other things?*
- *How do we know?*

49



relationships



'Big Idea' Understanding:
True friendship is revealed during hard times, not happy times.

Essential Question:
Who is a 'true friend' and how will you know?

50



adaptation



'Big Idea' Understanding:
Living organisms have developed adaptive mechanisms to enable them to survive in harsh environments.

Essential Question:
In what ways do organisms adapt to survive in harsh environments?

51



world literature



'Big Idea' Understanding:
Great literature from various cultures explores enduring themes and reveals recurrent aspects of the human condition.

Essential Question:
How can stories from other places and times be about me?

52

Critical Thinking



'Big Idea' Understandings:

A critical thinker does not simply believe whatever they read, hear or view. They remain skeptical, ask critical questions, and seek alternative points of view.

53

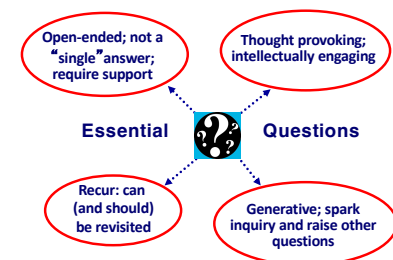
Critical Thinking



Essential Questions:

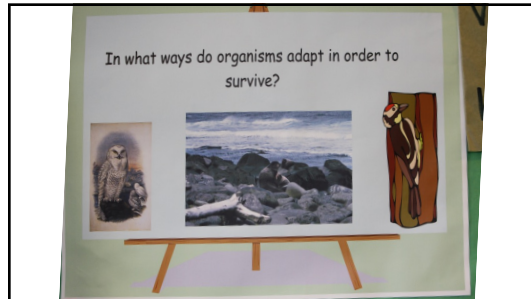
How do I know what to believe in what I read, hear and see?
Is this a credible and unbiased source?
What other perspectives should I consider?

54



55

Teaching for Deeper Learning



56

A Place Called School
(1984)

The most comprehensive study of U.S. schools ever conducted.

One must infer that careful probing of students' thinking is not a high priority." Coverage of content within subjects is a priority.
—Sizer, 1985

Students fail "... to apply or think critically ... because the curriculum fails to address topics in depth."
—Caweltt, 1989

57

Excessive Teacher Talk

- 80% of class time
- students are passive receptors
- meaning making requires active learning

58

Low-level Learning

- Depth of Knowledge Levels 1 & 2
- worksheets, call & response ?s
- Deep learning requires thinking at DOK Levels 3 & 4.

59

Priority #2: How we TEACH

Reduced teacher talk and content "coverage"

Greater focus on engaging students in **active thinking** and **meaning making**

60

Deep and enduring learning requires:

~~passive reception~~ **active meaning making**

61

Meaning making involves... linking **prior knowledge** with **new information** via *thinking*.

Info.

62

Research Finding ...

"Your memory is not a product of what you want to remember or what you try to remember; it's a product of **what you think about**. The cognitive principle... is memory is the residue of thought."

— Daniel Willingham

63

Seven Sets of Meaning-Making Skills and 35 Associated Tools

1. Conceptualizing
2. Comparing
3. Note Making & Summarizing
4. Reading for Meaning
5. Predicting & Hypothesizing
6. Visualizing & Graphic Representation
7. Perspective Taking & Empathizing

64

Teaching for Deeper Learning

CONCEPT ATTAINMENT



Concept Attainment is a process based on the work of Jerome Bruner and Hilda Taba (19.) that helps students develop an understanding of a concept by presenting them with examples and non-examples of the concept and challenging students to identify its critical attributes.

65

CONCEPT ATTAINMENT



Concept Attainment involves presenting learners with examples & non examples of a concept. The learner then compares the two sets, trying to determine the essential characteristics of the concept and develop a conceptual definition.

66

Concept Attainment

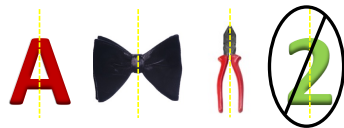


How does it work?

1. Compare examples (+) and non-examples (-) of a concept.
2. Identify the distinguishing characteristics of each.
3. Test your working definition against new cases.
4. Refine your concept definition.

67

Which one of these things is not like the other?



If we cut or fold each item in half vertically, all the points on one side would be **identical** to the points on the other side, except for the number 2.

68

Concept Attainment



YES	NO	YES	NO	YES	YES	NO	NO

Concept: **Symmetrical Figures** = exactly similar parts facing each other around an axis.

69

CONCEPT ATTAINMENT Tips



Choose concepts that:

- ✓ Are worth learning deeply.
- ✓ Contain critical attributes.



A predator is an organism that...

- eats other animals;
- kills its prey; and
- has features to help it hunt and kill.

70

CONCEPT ATTAINMENT Tips



Select "YES" examples that contain all critical attributes of the concept.

Clear examples:



less obvious examples:



71

CONCEPT ATTAINMENT Tips



"NO" examples do not contain any of the critical attributes of the concept.



A potential "headscratcher"

72

CONCEPT ATTAINMENT Tips



Then, add some questionable examples and ask students to explain their reasoning.



73

Teaching for Deeper Learning

CONCEPT ATTAINMENT Tips

Present the examples in “rounds.”

Round 1 = all clear “YES” examples.



Round 2 = all clear “NO” examples.



Round 3 = mix of “YES” and “NO”.



Round 4 = less obvious examples.

74

Have students find their own examples of the concept.



- ✓ encourages further research
- ✓ calls for hypothesis generation
- ✓ requires reasoning & explanation
- ✓ provides assessment evidence

Such active meaning making deepens learning!

75

ADDING UP the FACTS

Students collect a set of facts related to the content and then “add up the facts” to construct a generalization, make an inference or arrive at a conclusion.

— McTighe, 1996

76

Adding Up the Facts Graphic Organizer

Adding Up the Facts

Use the following guidelines to look at a set of facts or data together. What inferences can you make or conclusions can you draw from “adding up the facts”?

+

77

A Social Studies Example: Generalizing

What we learned about pioneer life:

- Many pioneers died from disease.
- The pioneers had to grow, or hunt for, their food. Often, they went hungry.
- Much hard work was required to settle new land—clearing fields, constructing shelter, etc.
- Settlers faced attacks by Native American tribes on whose lands they travelled or settled.



The pioneers faced many hardships in the settlement of the west.

78

Transfer = Broaden the Generalization

From topic specific:

Pioneers settling the west faced hardships.



To broader understandings that apply to other contexts. For example:

Pioneers face challenges and hardships.



Sports



Technology



Explorers



Social Movements

79

Elementary Science Example: Generating a Hypothesis

Here's what we learned from our experiment on plant growth:

- The plant in the cabinet died.
- The plant near the window grew very well.
- The plant we put under the light grew.
- The plant in the dark corner of the room didn't grow very much at all.



Plants need light to grow.

80

Transfer = Broaden the Generalization

From topic specific:

Plants need light to grow.



To broader understandings that apply to other contexts. For example:

Living things must have basic needs met in order to survive and thrive.



81

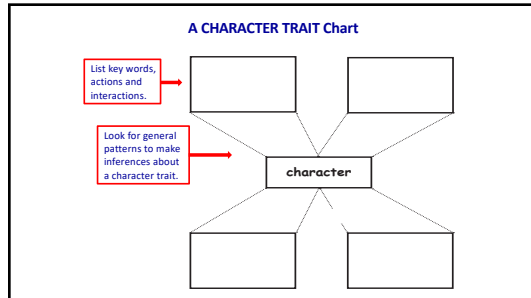
A CHARACTER TRAIT Chart

A Character Trait chart helps students make inferences about a character based on an analysis of their words, actions and interactions.

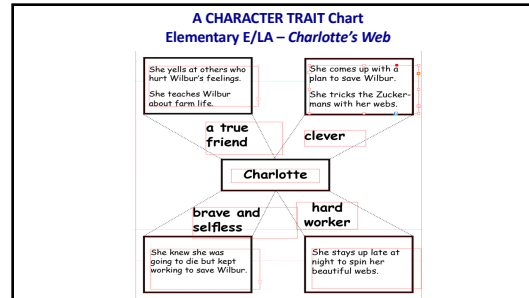
— McTighe, 1996

82

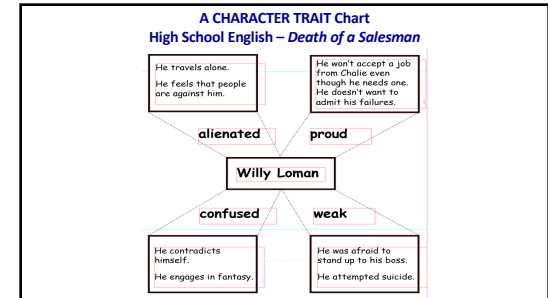
Teaching for Deeper Learning



83



84



85

COMPARISON

Comparison is an analytical skill that involves finding similarities and differences among two or more things.

Comparison helps us better understand the key features of things and make informed choices.

86

Nine Research-Based Strategies

Teaching Strategy	% Gain
Identifying Similarities & Differences	45
Summarizing & Note-Taking	34
Reinforcing Effort & Providing Recognition	29
Homework & Practice	28
Non-Linguistic Representation	27
Cooperative Learning	27
Setting Objectives & Providing Feedback	23
Generating & Testing Hypotheses	23
Questions, Cues, & Advance Organizers	22

— Marzano, et. al. *What Works in Classrooms*

87

Emphasis on Comparison in Reading Standards
— applied in both literary and informational texts.

Pre-Kindergarten
With prompting and support, students will **compare and contrast** two stories relating to the same topic.

1st Grade
Compare and contrast the adventures and experiences of characters in stories.

4th Grade
Compare and contrast the treatment of similar themes and topics (e.g. opposition of good and evil) and patterns of events (e.g. the quest) in stories, myths, and traditional literature from different cultures.

7th Grade
Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.

11th Grade
Compare and contrast findings presented in a source to those from other sources noting when the findings support or contradict previous explanations or accounts.

88

**Sample Released Item (Elementary)
Writing Task – Science/ELA**

Select one animal from the article, "How Animals Protect Themselves" and one animal from the multimedia presentation, "Animals Play Strong Defense to Survive." In your blog article, be sure to identify the two animals, explain how each animal defends itself from enemies, and explain how the two animals' defenses are **similar and different** from each other.

89

**Sample Released Item (Intermediate)
Social Studies**

Shelters of Native Americans

Longhouse

Tepee

Pueblo

Hogan

a. How are the kinds of shelters different?
b. Why did different groups of Native Americans have different kinds of shelters?

90

**Sample Released Item (High School)
Mathematics**

Juan starts working for an advertising company this year. His first-year salary is \$50,000. According to the company's employee handbook each following year of his employment, he is eligible for a 2% to 5% raise.

He calculated the range of his raise on his first year salary and added that amount as his raise for each following year. Juan thinks in year two of his employment that his salary would fall between \$51,000 and \$52,500 and in his third year he would be earning a salary between \$52,200 and \$54,810.

A. Is Juan's calculation correct? Show with diagrams, equations, expressions, or words what his salary range would be in year 2 and year 3.
B. Create a table of values to **compare and contrast** Juan's starting salary to the salary range he could expect if he stays with the company 4 years, 6 years, and 8 years.

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Teaching for Deeper Learning

Three Purposes for Using Comparison

1. To create clarity between commonly confused concepts
 - Fruits/Vegetables
 - Capitalism/Socialism
 - Correlation/Causation
2. To make abstract concepts more concrete
 - Balanced diet
 - Ecosystem
 - Linear vs. Exponential Growth
3. To help students discover the "ingredients" of quality in a product or process; to induce "success criteria"
 - What are the qualities of an effective speech?
 - What makes an argument convincing?
 - How do you design a valid experiment?

92

Both of these famous paintings depict starry nights.
How do they compare?



The Starry Night
Vincent van Gogh

Starry Night
Edward Munch

93

How does the act of comparing help you notice more about each painting's . . .

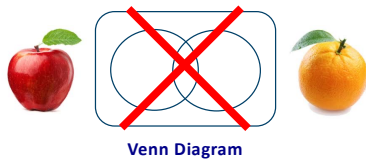
- techniques?
- use of color?
- tone or mood?
- meaning or message?



Which painting do you prefer? Why?

94

Problem: Comparing unequal dimensions.



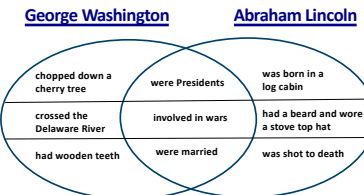
95

TIP: Use a Comparison Matrix

Dimensions for Comparison:	TUNDRA		DESERT	
	Unique Characteristics	Similar to Both	Unique Characteristics	
CLIMATE	frigid temperatures	harsh, inhospitable	hot and dry	
TOPOGRAPHY	perma frost	treeless plain	sand	
VEGETATION		minimal (unable to survive)		
NATURAL RESOURCES		oil, natural gas		
POPULATION		few permanent residents, nomads		

96

Problem: Citing trivial similarities and differences.



97

TIP: A Comparison Process



1. Determine the **purpose** for comparing; e.g., to better understand, to reach a decision. *then*
2. Identify the **most relevant dimensions** to compare.

98



Establishing Purpose



People sometimes confuse bacteria with viruses.

Today, we will compare bacteria and viruses so that we can better understand how they are similar, how they are different, and how they impact our lives.

99

Identifying Dimensions for Comparison



Bacteria




Viruses

- Living/Nonliving
- Structure
- Reproduction
- Survival Needs
- Benefit to humans
- Harm to humans
- Treatment if infected
- Preventive measures


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Teaching for Deeper Learning

So what? What have we learned? 

	TUNDRA	DESERT
Dimensions for Comparison:	Unique Characteristics	Similar to Both
CLIMATE	frigid temperatures	harsh, inhospitable
TOPOGRAPHY	perma frost	treeless plain
VEGETATION		minimal (unable to survive)
NATURAL RESOURCES		oil, natural gas
POPULATION		few permanent residents, nomads

101

TIP: A Comparison Process 

1. Determine the **purpose** for comparing; e.g., to better understand, to reach a decision. *then*
2. Identify the most **relevant dimensions** to compare. *then*
3. Ask students to **generalize** or draw a conclusion.

102

	TUNDRA	DESERT
Dimensions for Comparison:	Unique Characteristics	Similar to Both
CLIMATE	frigid temperatures	harsh, inhospitable
TOPOGRAPHY	perma frost	treeless plain
VEGETATION		minimal (unable to survive)
NATURAL RESOURCES		oil, natural gas
POPULATION		few permanent residents, nomads

Conclusion: Harsh environments are not hospitable to many living things. Inhabitants of these environments have adapted in order to survive the harsh conditions.

104

Comparing Related Stories

Criteria	"The Tortoise and the Hare"	"The Tortoise and the Antelope"
Characters	A tortoise A hare	A tortoise Antelope
Why they decide to race	Because the hare makes fun of the tortoise.	Because they argue who can go faster.
How the tortoise wins	The hare goes to sleep by accident.	The tortoise and some friends trick the antelope.
Lesson	"slow and steady wins the race"	"Team work works"

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105

Comparing Volume and Surface Area

Volume	Surface Area
Volume is the measurement of space a three-dimensional figure occupies.	Surface area is the sum of all the surfaces of a three-dimensional figure.
Always involves multiplying area of the base by height of the figure.	Always involves adding up the areas of the individual surfaces.
Expressed in cubic units	Expressed in square units
Often used to figure out how much container can hold (e.g., water in a swimming pool)	Often used to figure out how much coating is needed (e.g., paint or wallpaper)
Similarities	
Both apply to three-dimensional shapes.	
Both require you to know how to find two-dimensional area.	

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Comparisons in Health/P.E.

ANAEROBIC	AEROBIC
• short bursts of energy	• moderate intensity
• sprints, basketball	• endurance activities
• uses PCr for immediate energy	• uses O ₂ for long-term energy
• energy from ATP and CP	• energy from carbohydrates and fats
• increases power and builds stronger muscles	• increases endurance and cardiovascular function
SIMILARITIES	
• both burn calories	
• both improve body function and lead to a healthy body	
• both produce energy through glycolysis	
• almost all types of sports and training activities involve both types of exercise	

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Questions to Deepen Understanding when Comparing 

- Are these things more alike or more different?
- What is the most important difference & why?
- What might be the causes for or effects of the differences?
- What conclusions or generalizations can you make based on your comparison?

108


Comparing Problem Solving Processes

What do good problem solvers do?

Let's compare different solution methods to help us find examples of:

- accurate computation
- effective mathematical representations
- sound reasoning
- clear explanations

109

Camping Trip 

A group of 8 people are going camping for 3 days and need to carry their own water. They read in a guidebook that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guidebook's recommendation, what is the minimum amount of water the 8 people should have for 3 days? Explain your answer.

110

Teaching for Deeper Learning

A PILE of WORDS: An Inductive Learning Strategy

Inductive thinking is the process of forming generalizations based on a series of observations or a collection of facts. Rather than simply *presenting* new information, teachers can use inductive thinking to engage students in active meaning making.



111

A PILE of WORDS

How does it work?

1. Distribute 10–20 specific terms or phrases related to your BIG ideas.
2. Distribute the terms to students and ask them to explore different ways of grouping them.
3. In small groups, ask students to organize all the terms into groups and name the categories.
4. Ask them to come up with a generalization or make a prediction.



112

A PILE of WORDS for Inductive Learning

The following terms were commonly used during the pioneer era. What can you infer about pioneer life (i.e., the journey west and settlement on the prairie)? By examining these terms?

Common pioneer terms:		
stockade	windmill	buffalo chips
mud	trails	scow
fording	wagon circle	lean to
wagon train	fertile land	oxen
bonnet	draw knife	covered wagon
squall	illness	mush
berries	weather	churn
leather	augers	hailstones
petticoat	grinding stone	harvest
tumbleweed	mountain pass	churn
pitchfork	biscuit	suspenders
lantern	kettle	plow
corn seeder	axe	rain
Indian tribes	overalls	horses

113

A PILE of WORDS for *The Giver*

Behaviors	Mental Model
Choice	Pain
Community	Ritual
Consequences	Role
Control	Structure
Feelings	System
Ignorance	Thoughts
Memory	Utopia



114

Previewing a Text

Step 1: Your Pile of Words for This Week's Readings

performance task	projects	authentic tasks	transfer
application	communication	collaboration	critical thinking
concepts	relevance	efficacy	assessing
evaluation	design	tools	equity

Step 2: Discuss + Sort the Pile

- In breakout rooms, discuss the following:
- Which words would you group together? Why? How are they similar?
 - What would you label each group of words that indicates WHY you put them together?

On our Jamboard, group the words based on shared characteristics then give each group a label. Feel free to add groups or adjust the formatting on the Jamboard slide



115

The Research is Clear

Multiple studies “indicate that students who employ summarizing and note-taking strategies consistently perform better on academic assessments than do students who do not use these techniques.”

— Dean, Hubbell, Pitter, & Stone (2012)



116

Notemaking and Summarizing

Notemaking (in contrast to note taking) involves the active processing of information.

Summarizing (in contrast to copying) involves highlighting the “big ideas” and encapsulating the most salient information.



117

What's the Problem?

- No prioritizing of the content
- No synthesizing nor summarizing in one's own words
- Unlikely to result in retention nor deep understanding

Alexander's Great Empire

No leader had ever ruled over all the Greek city-states. Alexander the Great changed all that. In time, young Alexander the Great would control the lands that stretched from the Greek peninsula to northern India. Alexander created the largest empire the world had known.

The Conquest of Greece

Conflict and distrust grew across Greece after the Peloponnesian War. City-states formed alliances and agreed to help one other, but most of these alliances broke down before long. Side-switching was common. A friend at one conflict became an enemy in the next conflict. Each city-state put its own interests above the common good of Greece.

During this period, Athens became the leader of a second Delian League. Sparta, on the other hand, lost nearly all its power. Meanwhile, in Macedonia, an area north of Greek city-states on the Balkan Peninsula, Philip II took the throne. Philip II was a strong leader who had brought his own people together under one rule. ...



118

Note Taking versus NOTE MAKING



A lecturer presents information.



Are the students functioning like court stenographers trying to capture every word?



119

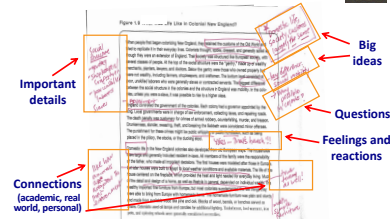
Teaching for Deeper Learning

Note Taking versus NOTE MAKING

NOTE TAKING	NOTE MAKING
<ul style="list-style-type: none"> Passive Copying verbatim; little processing of information Information is recorded in the words of other people Notes are a finished product residing in a notebook or computer file 	<ul style="list-style-type: none"> An active process Prioritizing information Information is translated into the learners' own words Notes are a work in progress; revisited and refined to deepen understanding

120

Note Taking versus NOTE MAKING



121

These important skills must be taught!

"In reality, notemaking and summarizing don't come naturally to most students; they are skills that need to be explicitly taught, modeled, and practiced."

— Silver, Ables, Burtz, & Perini (2018)

122

WINDOW NOTES A Tool for Note Making

A tool that makes the note-making process more engaging by encouraging students to record questions, personal reactions, and interesting connections in addition to simply recording facts.

123

WINDOW NOTES

Key Facts and Big Ideas	Questions
What are the key ideas and important details?	What questions do you have about this?
Feelings	Connections
What feelings or emotions does this evoke?	How does this connect to something you know? What new connections can you make?

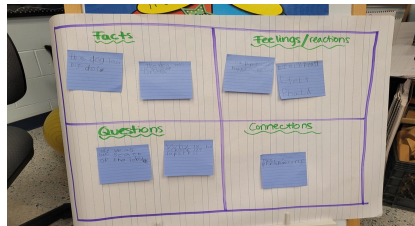
124

Using Window Notes for a poem, THE CAGED BIRD, by Maya Angelou

FACTS	FEELINGS & REACTIONS
<ul style="list-style-type: none"> The poem is a look at a bird in a cage. The bird is happy and free and the cage is sad. The bird is not a bird, it is a soul. The bird is not a bird, it is a soul. The bird is not a bird, it is a soul. 	<ul style="list-style-type: none"> The poem is a look at a bird in a cage. The bird is happy and free and the cage is sad. The bird is not a bird, it is a soul. The bird is not a bird, it is a soul. The bird is not a bird, it is a soul.
QUESTIONS	CONNECTIONS
What questions do you have about this?	How does this connect to something you know? What new connections can you make?

125

Window Notes in Kindergarten



126



Math Notes

A variation on Window Notes that encourages students to slow down and try to understand word problems instead of rushing to try to solve them. It encourages strategic thinking; e.g., *What is known? What is missing? What questions need to be answered? How might the situation be visually represented?*

127



Math Notes

FACTS	FEELINGS & REACTIONS
<ul style="list-style-type: none"> The problem is a word problem. The problem is a word problem. The problem is a word problem. The problem is a word problem. The problem is a word problem. 	<ul style="list-style-type: none"> The problem is a word problem. The problem is a word problem. The problem is a word problem. The problem is a word problem. The problem is a word problem.
QUESTIONS	CONNECTIONS
What questions do you have about this?	How does this connect to something you know? What new connections can you make?

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Teaching for Deeper Learning



Using Window Notes



Part 1 – Individually, watch the video and use the Window Notes worksheet to record your thoughts and questions.

Part 2 – In groups, share your Window Notes, and listen to the ideas of others. Add key points to your Notes worksheet.

129



A General Teaching Procedure

1. Introduce the process or tool and describe its purpose.
2. Explain and demonstrate the use of the tool with familiar information. "Think aloud" as you model how to apply the process/tool. Offer tips for effective use.
3. Guide students in applying their application of the process/tool for a specified purpose to familiar material and then to new material. Provide feedback as they work.
4. Have students reflect on the use of the process/tool; e.g., how it helped them.
5. Provide multiple opportunities for the students to practice using the tool.
6. Encourage students to customize and personalize the tool for different purposes.

130

NOTE MAKING *versus* SUMMARIZING



"Note making focuses on capturing and organizing input received through listening, reading, or viewing, while summarizing is typically used *after* a particular body of content has been received."

"The goal of each is to capture, organize, and synthesize important information in order to clarify big ideas and important details."

— McTighe and Silver (2020)

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4-2-1 Summarize

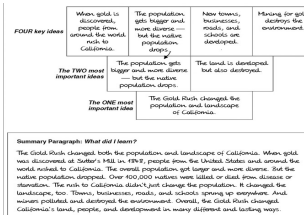


A collaborative note-making and summarizing tool that teaches students how to separate essential information from nonessential information, synthesize ideas, and summarize their learning in writing.

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A 4-2-1 Summary for *The Gold Rush*



133

READING STANCES



Dr. Judith Langer developed the Reading Stances as a framework for students to use in interacting with, and responding to, both literary and informational texts.

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READING STANCES



The four Reading Stances provide conceptual lenses to use in helping students make meaning from both literary and informational texts. Teachers can use the Stances to pose comprehension questions and prompt discussions around texts.

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READING STANCES



The four Reading Stances provide conceptual lenses to use in helping students make meaning from both literary and informational texts. Teachers can use the Stances to pose comprehension questions and prompt discussions around texts.

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Reading for Understanding – Reading Stances

STANCES	Fiction	Non-Fiction
Literal	What is the (main, first, last) event? What is the main idea or message? What is the setting? – the time, place? What are the key facts? What are the key details? What is the author's purpose? What are the key words or phrases?	What is the topic or the "gist" of the text? What is the main idea or message? What are the key facts? What are the key details? What is the author's purpose? What are the key words or phrases?
Interpretive	What is the meaning of the text? What is the author's purpose? What is the significance of the text? What are the key words or phrases? What are the key details?	What is the meaning of the text? What is the author's purpose? What is the significance of the text? What are the key words or phrases? What are the key details?
Personal	How do you relate to the text? What are the key words or phrases? What are the key details?	How do you relate to the text? What are the key words or phrases? What are the key details?
Critical	What are the author's strengths and weaknesses? How effectively did the author convey the message? What are the key words or phrases? What are the key details?	What are the author's strengths and weaknesses? How effectively did the author convey the message? What are the key words or phrases? What are the key details?

137

Teaching for Deeper Learning

Story: *Frog and Toad Are Friends*

A Study in... Relationships
Essential Question: *Who is a true friend?*

Literal – Who are the main characters in the story? Where does the story take place?

Interpretive – Were there times in the story when one character was acting like a true friend to the other? Were there times in the story when one character was not acting like a true friend?

Give examples from the story to explain and support your responses.

138

Story: *Frog and Toad Are Friends*

A Study in... Relationships
Essential Question: *Who is a true friend?*

Personal – What kind of person do you want as a friend. What are they like (i.e., qualities and traits)?

Critical – The author included pictures (illustrations). Did these help you understand the story better?

Explain: Should there have been more pictures? If so, of what? ... fewer? If so, which ones? Why?

139

Story: *To Build a Fire*

A Study in... Survival and Resignation
Essential Question: *Man versus nature?*

Literal – Where does this story take place? What happened to the man in the story? What happened to the dog?

Interpretive – What clues did the author give that the man will not survive? At what point in the story did you know the man would not survive?

Cite evidence from the text to support your response.

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Story: *To Build a Fire*

A Study in... Survival and Resignation
Essential Question: *Man versus nature?*

Personal – Imagine that you knew the man in the story. How would you feel when you learned his fate?

Critical – "The man's attitude toward the old-timer changed during the story." Do you agree with this statement?

Cite examples from the story to support your response.

141

Article: "Preventing Hypothermia"



Literal – According to the article, what are two ways that people can prevent hypothermia?

Interpretive – The man in the story "To Build a Fire" did not follow several pieces of advice given in the article, "Preventing Hypothermia." Select one of those pieces of advice. How might the story have changed if the man had followed that piece of advice?

142

Article: "Preventing Hypothermia"



Personal – Did the article on hypothermia help you to have a better understanding of the problems faced by the man in the story? Explain.

Critical – In what ways do the article and the story differ?

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Window Notes + Reading Stances

Literal (Global) Stance:	Interpretive Stance:
Personal Stance:	Critical Stance:

144

Graphic Organizers



Graphic organizers provide a visual, holistic representation of facts and concepts and their relationships within an organized frame. They can help both teachers and students represent abstract information in more concrete form, depict relationships among facts and concepts, relate new information to prior knowledge, and organize thoughts for writing and speaking.

145

Graphic Organizers



Graphic organizers exist in a variety of forms including the *web*, *concept map*, *sequence chain*, *story map*, *main idea table*, *flowchart*, *character map*, *matrix*, and *Venn diagram*.

146

Teaching for Deeper Learning

Graphic Organizers

Graphic organizers may be used **before** new instruction to activate prior knowledge, check for misconceptions, and provide an advance organizer for new material.



147

A Graphic Organizer used to Check Prior Knowledge

One thing I know about deserts and cacti	Another thing I know about deserts and cacti
Herds and snakes live in the rain forest.	Cacti grow 100 feet in the ground at the desert.
both habitats have snakes.	In the desert it is very dry.
In the rain forest it is very wet.	Scorpions live in the deserts.



148

Why do plants grow in places where people haven't planted them?



First Response



149

A CONCEPT MAP

A Concept Map is a hierarchical organizer on which the superordinate concept is placed at the top with subordinate concepts placed below. Linking words or phrases specify the connections among the concepts.



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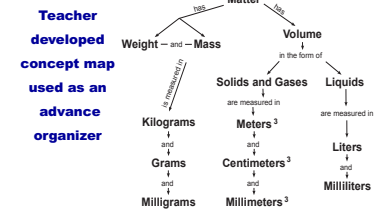
A CONCEPT MAP used as an Advance Organizer

Dr. Joseph Novak introduced the use of Concept Maps as **advance organizers**. These are presented to students at the start of a new unit or course to help students see how new information is organized around "big ideas."

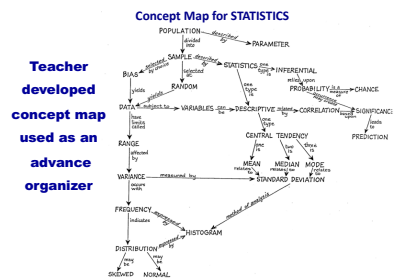


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Concept Map on Metric Measurement



152



153

Have students create Concept Maps to check for understanding.



- ✓ hierarchical accuracy
- ✓ correct relationships
- ✓ completeness

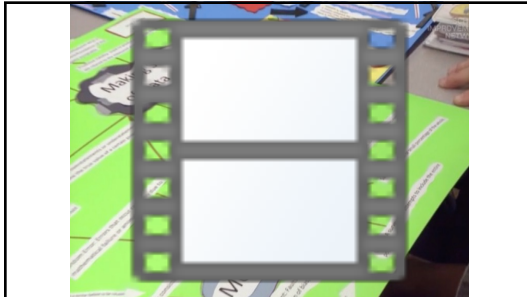
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Using Concept Mapping



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Teaching for Deeper Learning

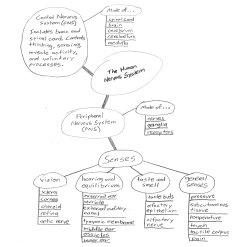


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Graphic Organizers

Graphic organizers may be used **during** instruction to help students to actively process and represent new information.

157



Source: From *The Ten Attributes of Successful Learners: Mastering the Tools of Learning* (p. 43) by H. Silver, M. Perri and J. Gilbert, 2008, Ho Ho Kuo, NJ: Thoughtful Education Press. © 2008 Thoughtful Education Press. Used with permission.

158

Why do plants grow in places where people haven't planted them?

Showing Learning in Process



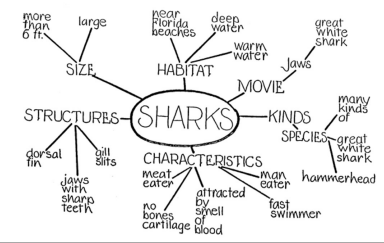
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Graphic Organizers

Graphic organizers may be used **after** new instruction to help students summarize & synthesize learning, help organize their ideas for writing/speaking, review newly-learned material, and assess the degree of student understanding.

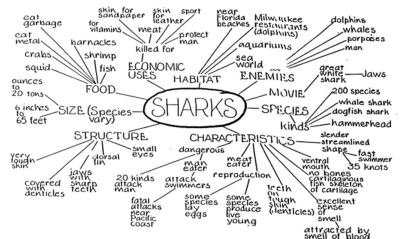
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Web developed by an individual student



161

Web developed by a group to synthesize learning



162

Why do plants grow in places where people haven't planted them?

Deepening Understanding



163

Argumentation



“Big Idea” Understandings

- **A convincing argument requires a clear position, logical reasoning and support with evidence.**
- **An effective argument contains rebuttals to possible objections.**

164

Teaching for Deeper Learning

Argumentation



Essential Questions

- What makes an argument convincing?
- What evidence do I need to support my argument?
- How will I rebut opposing positions?

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ARGUMENTATION Table

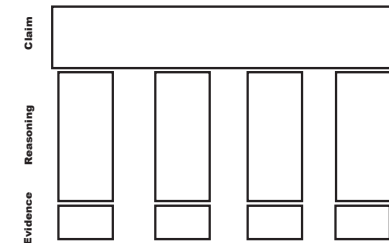


An Argumentation Table provides a tool for helping students construct an argument based on specifying a claim, then supporting it with reasons grounded in evidence.

— McTighe, 2016

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Argumentation Table



167

ARGUMENTATION Table

Claim	Players under 14 years of age should not be allowed to play tackle football.			
Reasoning	American football is one of the most popular sports for young athletes. In the United States, there are more than one million youth football players (ages 6 to 12 years) in Pop Warner leagues.	Tackle football exposes players to repeated blows to the head. The effects are cumulative and can lead to the development of chronic traumatic encephalopathy (CTE), a degenerative brain disease associated with depression, suicidal behavior, dementia and other symptoms.	Since the brains of younger players are still developing, they may be especially susceptible to the ill effects of repeated blows to the head suffered in practices and games.	Younger players can play "flag" football and learn the basics of the games while greatly reducing the chance of injuring their brains.
Evidence	Source: Sports & Fitness Industry Association	Research suggests that repetitive sub-concussive hits contribute to the development of traumatic encephalopathy (CTE). Source: <i>Archives of General Psychiatry</i>	Players under the age of 14 showed "no cerebral atrophy for impairment as well reported neuropsychiatric and executive functions".	The American Academy of Pediatrics recommends the establishment of non-tackle football leagues.

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ARGUMENTATION Stool



claim → We should have a pet hamster for our classroom.

reasons → Other classes have pets. The 4th grade has a turtle.
We can learn about hamsters.
We will become responsible in taking care of our pet.

169

Have students develop their own graphic organizers.



- encourages active meaning making
- provides assessment evidence of their learning and conceptual understanding

170

A PERSPECTIVE Chart



A Perspective chart asks students to identify various audiences who are likely to have different perspectives on an issue and try to identify and understand their point(s) of view.

— Jay McTighe

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Perspective Chart

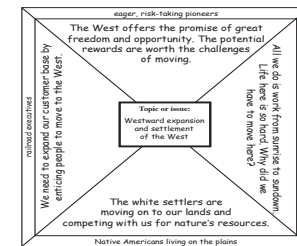


1. Select an issue.
 2. Individually, identify two or more different people or groups that may view the issue differently. Place their names in the chart.
 3. Identify different perspectives on the issue.
 4. Compare your chart with those of your groupmates.
- Consider:
- Whose "story" is this?
 - What different perspectives should be considered?
 - How do the perspectives of others affect my thinking?

172

Perspective Chart

Use the following chart to examine different perspectives on an issue or topic.

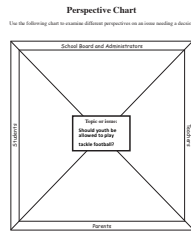


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Teaching for Deeper Learning

Perspective Chart

1. Consider this issue:
Should youth be allowed to play tackle football?
2. Identify different perspectives that various groups might hold.



174

Seven Sets of Meaning-Making Skills

1. Conceptualizing
2. Comparison
3. Note Making & Summarizing
4. Reading for Meaning
5. Predicting & Hypothesizing
6. Visualizing & Graphic Representation
7. Perspective Taking & Empathizing



35 + Associated Tools

175

The Bradley Commission

“Courses in history, geography, and government should be designed to help students to perceive past events and issues as they were experienced by people of the time, to develop **historical empathy** as opposed to present-mindedness.”

176

A DAY in the LIFE



A Day in the Life asks students to try to imagine what it would be like to “walk in someone else’s shoes” and try to imagine their experiences, thoughts and feelings.

177

A DAY in the LIFE



Look at the following photos and read the diary of a fleeing Ukrainian refugee. Think:
How would you feel if you had to leave nearly all of your possessions, survived a harrowing journey and were about to enter a new country where you did not know anyone nor speak the language?

178



179

example:

Tell a Story



Imagine that you are an elderly tribal member who has witnessed the settlement of the plains by the pioneers. Tell a story to your granddaughters to show the impact of the settlers’ incursion on your way of life.

180

example:

Tribal Council



Imagine that you are a member of the council of elders of a Native American tribe living on the plains. Discuss - “What should we do when threatened with relocation – fight, flee, or agree to move (to a reservation)? What impact might each course of action have on our lives?”

181

example:

Romeo and Juliet



Romeo & Juliet, Act 4 –

Imagine you are Juliet. Write your thoughts and feelings explaining why you have decided to take this final desperate action.

– From the British national exam

182

Teaching for Deeper Learning

example:

Death of an Element



Your element has died. Write an obituary for your deceased element in which you explain the effects that its absence will have on the chemical world and the human race.

183

Teaching for Deeper Learning



1. What is deep learning and how does it occur?
2. What is worth learning deeply?
3. How can we teach for deeper learning?
4. How will we know that students are learning deeply?

184



An Assessment Principle

Assessments should align with targeted goals.



185

Gather evidence from a Range of Assessments



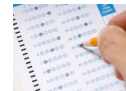
Page 3

- ✓ Tests and quizzes
- ✓ Skill checks
- ✓ Academic exam questions
- ✓ Writing prompts
- ✓ Authentic tasks and projects
- ✓ Informal checks for understanding

186

Priority #3: How we ASSESS

Go beyond “selected-response” assessment formats.



Expand use of performance-based assessments that involve transfer application.



187

DEEP LEARNING



Deep learning is a “process through which an individual becomes capable of taking what was learned in one situation and applying it to a new situation.”

— National Research Council

188

Performance Task



A performance task is any learning activity or assessment that asks students to perform to demonstrate their knowledge, skills, and understanding. Performance tasks yield a tangible product/performance that serves as evidence of learning.



189

example:

Tour of Indonesia



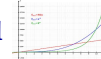
The Department of Tourism has asked your help in planning a five-day tour of Indonesia for a group of visitors. Plan the tour to help the visitors understand the country's history, geography, cultures and its key economic assets.

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

190



Stop the Spread



Create an infographic to help young people understand the exponential spread of Corona Virus infections.

191

Teaching for Deeper Learning

example:

Exchange Student



You are an exchange student in a school in [insert name of country]. A local radio station will be interviewing exchange students to learn how they celebrate holidays in their home countries. You have been asked to speak about your favorite celebration back in the United States. To prepare for the interview, record a five-minute talk in [target language] which you offer a detailed description of the origin of this celebration and describe the major activities, foods, and special memories for your selected celebration.

192

Science Investigation



The Pooper Scooper Kitty Litter Company claims that their litter is 40% more absorbent than other brands.

You are a Consumer Advocates researcher who has been asked to evaluate their claim. Develop a plan for conducting the investigation. Your plan should be specific enough so that the lab investigators could follow it to evaluate the claim.

193

example:

Mail-Order Friend



Imagine that you could order a friend from a Mail-Order Friends catalog. Before ordering, think about the qualities that you value in a true friend. Then, make sure that you speak clearly so that the salesperson will know exactly what type of person to send you.

194

5th Grade Student TED TALKS



195

TED TALKS by secondary students



196

example:

Making the Grade



Your math teacher will allow you to select the measure of central tendency (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.

197

<http://markwise8.wix.com/globalchallenge>



199

Adding It Up...



- application of knowledge
- meaningful context
- genuine purpose
- target audience
- + • product/performance

Authentic Task

200

Designing Authentic Tasks



- 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**uccess criteria will your work be judged?

201

Teaching for Deeper Learning

Possible Roles and Audiences		
actor	filmmaker	radio listener
artist	govt. official	reader
author	historian	reporter
boss	historical figure	researcher
businessperson	interviewer	scientist
candidate	inventor	statistician
carpenter	judge	storyteller
cartoonist	literary critic	student
caterer	museum curator	taxi driver
dancer	newscaster	teacher
designer	novelist	tour guide
detective	nutritionist	travel agent
editor	playwright	tutor
elected official	pollster	web designer

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Possible Products & Performances		
WRITTEN	ORAL	VISUAL
advertisement	audiotape	banner
biography	conversation	cartoon
book review	debate	data display
brochure	dramatization	display
editorial	interview	drawing
historical fiction	radio script	game
lab report	oral	graph
letter	presentation	movie
magazine article	poetry reading	model
memo	podcast	Power Point
proposal	skit	photograph
screen play	speech	poster
Tweet	song	web site

203

Superficial learning doesn't last.






Deep learning endures.



204

Reflection



Review your notes and handout to identify the most interesting or useful idea(s) that you gained from this session. Please enter in the CHATBOX.

205