10 KEY IDEAS about Visualizing Disciplinary Thinking

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K-12 Curriculum = two strands of learning standards

INFORMATION
RELATIONAL UNDERSTANDING
of content subjects

LITERACY
HOW / WHEN / WHY to do things
to solve problems
K-12 Curriculum = two strands of learning standards

- INFORMATION
  - RELATIONAL UNDERSTANDING of content subjects

- LITERACY
  - HOW / WHEN / WHY to do things to solve problems

For example...
- Science
- Social Studies / History
- Economics
- Civics
- Math concepts
- Etc.
KEY IDEA #1 There are different types of literacy.

Literacy
- problem solving ability

Language Literacy
- Basic (generic)
- Information processing strategies (generic)

Content Literacy
- How one applies generic language literacy strategies across the curriculum

Discipline-specific Content Literacy
- How one applies very specific literacy strategies that are unique to a specific discipline
KEY IDEA #1 There are different types of literacy.
KEY IDEA #1 There are different types of literacy.

Literacy

- problem solving ability

Language Literacy

- Basic (generic)
  - Phonemic Awareness
  - Decoding
  - High-frequency Words

Information processing strategies (generic)

- Comprehension strategies
  - Summarizing
  - Questioning
  - Visualizing
  - Predicting
  - Inferencing
- Monitoring & repairing comprehension

Content Literacy

How one applies generic language literacy strategies across the curriculum

- Researching strategies
  - Targeting
  - Screening
  - Prioritizing
  - Synthesizing

- Communication strategies
  - Listening
  - Speaking
  - Writing
KEY IDEA #1 There are different types of literacy.

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  - Phonemic Awareness
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Information processing strategies (generic)
- Summarizing
- Questioning
- Predicting
- Inferencing

Content Literacy
- How one applies *generic* language literacy strategies across the curriculum

Communication strategies
- Listening
- Speaking
- Writing

Discipline-specific Content Literacy
- How one applies *specific* literacy strategies that are unique to a specific discipline

Literature  Science  History  Math

Monitoring & repairing comprehension

Phonemic Awareness  Decoding  High-frequency Words
Summarizing  Questioning  Predicting  Inferencing
Targeting  Screening  Prioritizing  Synthesizing
Listening  Speaking  Writing
KEY IDEA #1 There are different types of literacy.

Literacy
- Problem-solving ability

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Information Processing
- Comprehension strategies
  - Summarizing
  - Questioning
  - Visualizing
  - Predicting
  - Inferencing

- Monitoring & repairing comprehension

Content Literacy
- How one applies generic language literacy strategies across the curriculum

- Discipline-specific Content Literacy
  - How one thinks and goes about understanding SCIENCE is very different from how one thinks about and understands HISTORY

Communication Strategies
- Listening
- Speaking
- Writing
KEY IDEA #1 There are different types of literacy.

Literacy

problem solving ability

Language Literacy

Basic (generic)

Phonemic Awareness  Decoding  High-frequency Words

Comprehension strategies

Summarizing  Questioning  Predicting  Inferencing

Information processing strategies (generic)

Targeting  Screening  Prioritizing  Synthesizing

Researching strategies

„or Listening

„or Speaking

„or Writing

Content Literacy

How one applies generic language literacy strategies across the curriculum

Discipline-specific Content Literacy

The specialized SCIENCE VOCABULARY is very different from the specialized MATH VOCABULARY

…or HISTORY VOCABULARY

…or LITERATURE VOCABULARY
KEY IDEA #1 There are different types of literacy.

INFORMATION
RELATIONAL UNDERSTANDING
of content subjects

LITERACY
HOW / WHEN / WHY to do things
to solve problems

Acquisition
Learning to perform it correctly
(high cognitive load)

Fluency
Learning to perform it smoothly & quickly
(low cognitive load)

Transfer & Generalization
Using skill/strategy to solve a range of problems in different situations & settings
KEY IDEA #1 There are different types of literacy.

INFORMATION

RELATIONAL UNDERSTANDING
of content subjects

SUPERCIFICAL / ERRONEOUS / SURFACE

Relational understanding of knowledge ranges from...

LITERACY

HOW / WHEN / WHY to do things to solve problems
KEY IDEA #1 There are different types of literacy.

INFORMATION

RELATIONAL UNDERSTANDING

of content subjects

SUPERFICIAL / ERRONEOUS / SURFACE

LITERACY

HOW / WHEN / WHY to do things
to solve problems

SOPHISTICATED / BREADTH / DEPTH /
ACCURATE / MANY CONNECTIONS

Relational understanding of knowledge ranges from...
KEY IDEA #1 There are different types of literacy.

**INFORMATION**
RELATIONAL UNDERSTANDING of content subjects

**LITERACY**
HOW / WHEN / WHY to do things to solve problems

SUPERFICIAL / ERRONEOUS / SURFACE

Relational understanding of knowledge ranges from...

SOPHISTICATED / BREADTH / DEPTH / ACCURATE / MANY CONNECTIONS

How do you make this happen?
KEY IDEA #1 There are different types of literacy.

Enable students to SEE how the information is structured

It’s NOT a VISUAL LEARNER thing

It’s a HOW TO REDUCE COGNITIVE LOAD thing

It’s a HOW TO STRUCTURE FOR SUCCESS thing
The same instructional strategies & tools do NOT work equally well for each different type of literacy.

Generic graphic organizers target this level of literacy.

Differentiated Visual Tools target these levels of literacy.
Differentiated Visual Tools target these levels of literacy

S are individually designed to address specific literacy standards.
Literacy Skill: Questioning

CCSS.ELA-Literacy.RI.3.1
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
People vote for who they want to be mayor. The mayor promises to work hard. They work in city hall, and make laws and rules.

In every city and town in the United States
Answer to your question

PERSON

Make up a HOW, WHY or WHEN question about the PERSON

What you LIKED OR did NOT LIKE about the PERSON
Why did Johnny Appleseed plant so many apple trees?

He was a nurseryman. He wanted everyone to have an apple tree. He taught people how to take care if plants and land.

I like him because he cared about animals and the earth.
So what is the difference between these two visual tools?

**HINT:** Here’s the standard....

Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

This visual tool is specifically designed to address THIS specific standard.
Let’s say you are attempting to teach this 3\textsuperscript{rd} grade standard…

Compare and contrast the most important points and key details presented in two texts on the same topic.

Which of these address the standard?

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THING 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>THING 2</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This one compares two different things

This one compares two books about the same thing
Let’s say you are attempting to teach this 3rd grade standard…

Compare and contrast the most important points and key details presented in two texts on the same topic.

This visual tool is specifically designed to address THIS specific standard.
Web generated from a 5th grade guided reading / note taking lesson...
White Star Line owners liked “unsinkable” idea, so they encouraged people to believe it

Titanic promoted as fastest so to prove it, took risks speeding through iceberg zone

Fewer lifeboats so ship seems more attractive = selling more tickets

Used cheaper steel in hull (more brittle & thin) + only 1 hull to save $ on building cost

BIG IDEA Safety always produces the greatest profit in the long run

Builders began to believe the myth; took short-cuts

BIG IDEA Don’t believe it just because somebody said it or wrote it

Newspaper: “Titanic is largest & fastest – probably even unsinkable”

When a myth is treated as truth, people fool themselves

Putting profit over safety puts people’s lives at great risk

Are wealthy people more valuable?

Rich were given priority over poor for spaces on lifeboats

Cabins closest to deck most expensive = rich reach lifeboats 1st

Many of poor were locked below to keep them from taking spaces on the lifeboats

BIG IDEA ALL human life is equally valuable, regardless of wealth!

Fewer lifeboats so ship seems more attractive = selling more tickets

A great disaster can cause society to examine its values and practices so improvements can be made that will save lives in the future

BIG IDEA

Lessons from a Disaster

How the sinking of a great ship led to important lessons that changed society

A great disaster can cause society to examine its values and practices so improvements can be made that will save lives in the future
Titanic Lessons from a Disaster

How the sinking of a great ship led to important lessons that changed society

**Main Idea**

When a myth is treated as truth, people fool themselves

Newspaper: “Titanic is largest & fastest – probably even unsinkable”

White Star Line (owners) liked “unsinkable” idea, so they encouraged people to believe it

Builders began to believe the myth; took short-cuts

**BIG IDEA**

Don’t believe it just because somebody said it or wrote it

**Main Idea**

Putting profit over safety puts people’s lives at great risk

Titanic promoted as fastest ship so, to prove it, took risks speeding through iceberg zone)

Fewer lifeboats so ship seems more attractive = selling more tickets

Used cheap steel in hull – (more brittle & thin) + only 1 hull to save $ on building cost

**BIG IDEA**

Safety always produces the greatest profit in the long run

**Main Idea**

Are wealthy people more valuable?

Cabins closest to deck most expensive = rich reach lifeboats 1st

Rich were given priority over poor for spaces on lifeboats

Many of poor were locked below to keep them from taking spaces on the lifeboats

**BIG IDEA**

ALL human life is equally valuable, regardless of wealth!

So what? What is important to understand about this?

A great disaster can cause society to examine its values and practices so improvements can be made that will save lives in the future
Which would you rather have?

**KEY IDEA #2** Some visual tools are a lot better than others!

**So what?** A graphic's visual design makes a huge difference, especially with struggling learners

<table>
<thead>
<tr>
<th>Titanic Lessons from a Disaster</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Idea</strong></td>
</tr>
<tr>
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Idea is to make it easier (not harder) to process information
They eat fish and use their talons or claws to catch them. They live near lakes, rivers, marshes, and seacoasts. The Bald Eagle has a white head and tail and a blackish body. They create their nests using sticks. The eggs are white.

They are Carnivores. They prey on small rodents and rarely will eat poultry. They live in the open country of various kinds, including farmlands. The Red-tailed Hawk usually has a white chest with a rust-colored tail. Their eggs are white with brown spots. The nest is also made of bark and bits of fresh green vegetation.

Both have white somewhere on their body.

Temperate Deciduous Forest

The females lay two to three eggs at a time. Make nests of sticks in tall trees.
<table>
<thead>
<tr>
<th>Food</th>
<th>Bald Eagle</th>
<th>Red-Tailed Hawk</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFFERENT</td>
<td>They eat fish and use their talons or claws to catch them.</td>
<td>They prey on small rodents and rarely will eat poultry.</td>
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</table>

<table>
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<tr>
<th>Habitat</th>
<th>Bald Eagle</th>
<th>Red-Tailed Hawk</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMILAR</td>
<td>They live near lakes, rivers, marshes, and seacoasts.</td>
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</table>

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<tr>
<th>Color</th>
<th>Bald Eagle</th>
<th>Red-Tailed Hawk</th>
</tr>
</thead>
<tbody>
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<td>DIFFERENT</td>
<td>The Bald Eagle has a white head and tail and a blackish body.</td>
<td>The Red-tailed Hawk usually has a white chest with a rust-colored tail.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Nests</th>
<th>Bald Eagle</th>
<th>Red-Tailed Hawk</th>
</tr>
</thead>
<tbody>
<tr>
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Note the clarity that adding subtopics adds to the visual understanding.
KEY IDEA #2 Some visual tools are a lot better than others!

So what? Adding semantic “essential understanding” prompts makes a huge difference because they focus thinking ...especially important for struggling learners

Which would you rather have?
KEY IDEA #2  Some visual tools are a lot better than others!

Essential understandings are discipline specific

People - literature

Huck Finn

Jim

DIFFERENT

SIMILAR

DIFFERENT

View of Self

View of others

Motivation

Interactions with others

People - history

Washington

Lincoln

DIFFERENT

SIMILAR

DIFFERENT

Goals

Key Decisions

Factors weighed when making those decisions

Impact of decisions

Essential understandings are discipline specific
KEY IDEA #2 Some visual tools are a lot better than others!

Generic, "one-size-fits-all" GOs

...very effective for basic standards

Retell stories, including key details, and demonstrate understanding of their central message or lesson. Compare and contrast the adventures and experiences of characters in stories

BUT

...not so great as standards get more complex

Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning. (8th grade)
As grade levels increase, the nature of content learning changes ...it becomes increasingly more discipline-specific

The WAY one processes information in different subjects is very different

<table>
<thead>
<tr>
<th>SCIENCE</th>
<th>HISTORY</th>
<th>LITERATURE</th>
<th>MATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialized science vocabulary</td>
<td>Specialized history vocabulary</td>
<td>Specialized literature vocabulary</td>
<td>Specialized math vocabulary</td>
</tr>
<tr>
<td>Unique set of science generative ideas</td>
<td>Unique set of history generative ideas</td>
<td>Unique set of literary analysis generative ideas</td>
<td>Unique set of math generative ideas</td>
</tr>
<tr>
<td>How one thinks about &amp; understands science</td>
<td>How one thinks about &amp; understands history</td>
<td>How one thinks about &amp; understands literature</td>
<td>How one thinks about &amp; understands math</td>
</tr>
</tbody>
</table>

generic, one-size-fits-all GOs fail to address these important differences in disciplines
Let’s say you are attempting to teaching this standard…

RL.9-10.2. Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

What’s the difference between…

…and THIS?

KEY IDEA #3  
*Discipline-specific visuals area LOT better than generic GOs when teaching complex standards*
**The Pardoner's Tale** by Geoffrey Chaucer

**TOPIC of the story**

**Loyalty**

**THEME of the story**

Betraying your friends will lead to your own downfall.

**Description of an EVENT, CHARACTER, or SETTING CONNECTIONS TO THE THEME**

**CHARACTER** - The three rioters have been in a bar all night long and are very drunk.

Because they have all gotten drunk together they say they are loyal to each other when they're not. (False friends often turn on each other.)

- Literary device used in the connection: **Irony**
- Explanation: Ironic because it seems like they are really good friends, so you would expect them to help each other out and share stuff, but the reality is, they end up doing the opposite.

**SETTING** - The gold under the tree

When the three rioters find the gold under the tree, each starts thinking about getting rich - selfishness quickly replaces loyalty.

- Literary device used in the connection: **Symbolism**
- Explanation: The gold symbolizes greed and shows how it can make people turn on each other.

**EVENT** - The three robbers end up killing each other

Because they all turned their backs on each other to try and keep more of the gold, they all ended up dead.

- Literary device used in the connection: **Motivation**
- Explanation: Author uses motivation (to get rich) to drive home the theme that “betraying your friends will lead to your downfall - in this case, your death.”
The Pardoner’s Tale
The Pardoner’s Tale by Geoffrey Chaucer is a story about loyalty, or rather the lack of it. I think Chaucer’s message about life is “Betraying your friends will lead to downfall.” For example, one of the ways Chaucer communicates this message is by his use of characters and irony. Three rioters have been in a bar all night and have gotten very drunk. They talk about how loyal they are to each other and how they have become brothers. In reality, they just met each other in a bar and are not loyal to each other at all. They’re just drunk. Basically Chaucer is saying that false friends will turn on each other. Chaucer uses irony to set the stage in this part of the story to establish that the so-called loyal friends are about to betray each other later in the story.

Chaucer also uses the setting of the story and symbolism to communicate the betrayal theme. There’s a particular setting where there is a bag of gold under a tree. The gold symbolizes greed and shows how it can make people turn on each other. The men think that if they take the gold, they will be very happy. In other words, the greed of the rioters will far outweigh any false loyalty they may have toward each other. Each wants the gold for himself.

The three robbers end up killing each other. Here, Chaucer uses an event in the story and motivation as a literary device to illustrate the betrayal theme. Because they all turned their backs on each other to try and keep more of the gold, they all ended up dead.

Chaucer use of irony, symbolism, and motivation all relate to the story’s theme of loyalty. A theme is a message about life, and the message here is that false friends turn on each other. If the thieves were true friends, they wouldn’t have killed each other because of greed for the gold.
KEY IDEA #3  

*Discipline-specific* visuals area LOT better than generic GOs when teaching complex standards

**What’s the difference between**

**...and THIS?**

**This**

It’s all about the prompts!

* Clear & explicit  * Guide thinking  * Simple  * Standard-specific

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KEY IDEA #4  Teaching complex skills is most effective when instruction is scaffolded.

*the same webs & Venns are used in 2nd grade & 11th grade!*
KEY IDEA #4  Teaching complex skills is most effective when instruction is scaffolded.

Playing in the snow

Make a snowman
Throw snowballs
Build a fort
Need warm clothes
Wear mittens
Teaching complex skills is most effective when instruction is scaffolded.
Teaching complex skills is most effective when instruction is scaffolded.

My dog Zoe

1. Zoe has lots of spots.
2. She likes to dig holes.

Draw a picture

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**KEY IDEA #4**  Teaching complex skills is most effective when instruction is scaffolded.

---

**TOPIC**

Thanksgiving is my favorite holiday!

<table>
<thead>
<tr>
<th>ORDER</th>
<th>IDEA</th>
<th>SENTENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Native Americans</td>
<td>We visit Moundville and climb the mounds where the Native Americans lived. We see ceremonies and get our faces painted.</td>
</tr>
<tr>
<td>2</td>
<td>Wearing costumes</td>
<td>At school we dress up like Pilgrims or Native Americans. That is really fun.</td>
</tr>
<tr>
<td>3</td>
<td>The feast!</td>
<td>We have a Thanksgiving feast at school just like the Pilgrims and Native Americans had.</td>
</tr>
<tr>
<td>4</td>
<td>Out of school</td>
<td>I also like to be out of school for a week, and I get to do things with my family.</td>
</tr>
<tr>
<td>Words about the topic</td>
<td>Sentences</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Cats</td>
<td>Marly and Erne are my cats.</td>
<td></td>
</tr>
<tr>
<td>Fuzzy</td>
<td>They are fuzzy.</td>
<td></td>
</tr>
<tr>
<td>Cute</td>
<td>I think they are cute.</td>
<td></td>
</tr>
<tr>
<td>Strips</td>
<td>Erne has stripes.</td>
<td></td>
</tr>
<tr>
<td>Solid</td>
<td>Marly is solid.</td>
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Marly & Erne

Marly and Erne are my cats.
Marly & Erne

Marly and Erne are my cats. I think they are cute.
*Marly & Erne*

*Marly and Erne are my cats. I think they are cute. They are fuzzy.*
Marly & Erne

Marly and Erne are my cats. I think they are cute. They are fuzzy. Erne has stripes. Marly is solid.
Recycling

INTRODUCTION
This is about...

why everyone should recycle the things they use in their homes.

1. Can save money...
   Recycling helps us reuse things we have instead of making new things.

2. Protects wildlife...
   Recycling protects wildlife habitats. Paper recycling alone saves millions of trees.

3. Reduces landfills...
   Recycling cuts down on the need for more landfills. No one wants to live near one.

4. Helps our climate...
   Recycling produces less carbon reducing the amount of greenhouse gas emissions.

When we recycle it helps our climate, the earth, and protects wildlife. Also it is the right thing to do!
Recycling

Everyone should recycle the things they use in their homes. Recycling helps us reuse things we have instead of making new things. It also protects wildlife habitats. Paper recycling alone saves millions of trees. Recycling cuts down on the need for more landfills. No one wants to live near one. Recycling produces less carbon, so it reduces the amount of greenhouse gas emissions we make. In conclusion, when we recycle it helps our climate, the earth, and protects wildlife. Also it is the right thing to do!
What was the message about life in the story?

<table>
<thead>
<tr>
<th>Reason why I think this is the message…</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<table>
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<tr>
<th>Another reason why I think it is the message…</th>
<th>Details</th>
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CONCLUSION: Is the message important? Why?
**CONCLUSION:** Is the message important? Why?

If you are mean to others, you will always be unhappy and just want to be even meaner.
What was the message about life in the story?

I think the message was that being kind and good to people makes you happier and leads to a better life.

Reason why I think this is the message...

Nyasha was kind to everyone.

She did not try to hurt her sister who was mean to her.

She was chosen to be queen because of her kindness.

Another reason why I think it is the message...

Manyara was mean to her sister and everyone.

She was also mean to a little boy who was really the king.

Manyara ended up being a servant to her sister.

CONCLUSION: Is the message important? Why?

If you are mean to others, you will always be unhappy and just want to be even meaner.
STORY

What was the message about life in the story?

Reason why I think this is the message...

Details

Another reason why I think it is the message...

Details

CONCLUSION: Is the message important? Why?
**CONCLUSION:** Is the message important? Why?

<table>
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<tr>
<th>TOPIC of the story</th>
<th>THEME of the story is (author’s unstated opinion or message about the story’s topic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of an EVENT, CHARACTER, or SETTING</td>
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**A Gathering of Days** by Joan W. Blos

**Circle of life**

There are many circles of life that overlap.

**Description of an EVENT, CHARACTER, or SETTING**

Catherine lost her mother & little brother when she was 9 years old. She had to run the household with help from her neighbor & sister. She learned how to cope with the challenges.

**CONNECTIONS TO THE THEME**

One of the “life circles” is about Catherine experiencing challenges or problems, dealing with them, moving on, facing new problems, dealing with them, moving on again, etc.

Father re-maries, new mother & brother. Must adjust to a new mother & brother. Theme of the journal: “Got a problem? Deal with it! Move on.”

**Description of an EVENT, CHARACTER, or SETTING**

One of the “life circles” is about the seasons of life. Catherine’s journal focuses on life on a farm. Each season brings new promises, different jobs, new challenges, and joy. Starts all over each year.

**CONNECTIONS TO THE THEME**

Page 51 - “At mid-day today the storm let up; by dusk a few pale shadows appeared on the hillock’d snow. Father expects that tomorrow with be the day of the breaking out.”

Page 121 - “The sap, they say, is running in the better sheltered trees.”/ “Haying, mowing, gathering in!”

**CONCLUSION: Is the message important? Why?**

Everyone experiences the same basic circles of life, although they happen in different times and ways.
**A Gathering of Days** by Joan W. Blos

<table>
<thead>
<tr>
<th>TOPIC of the story</th>
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</table>
The Brave  by Robert Lipsyte

**TOPIC of the story**

Growth & initiation

**THEME of the story is** (author’s unstated opinion or message about the story’s topic)

You have to experience many trials & tribulations to find your own identity

**Description of an EVENT, CHARACTER, or SETTING**

Sonny's mother is Native American & his white father died in Vietnam. He’s a fighter and has a gift for drawing. He is embarrassed and hides his drawings. He wants to leave the Reservation, and his past.

**CONNECTIONS TO THE THEME**

Sonny does not embrace his Native American or white culture. Both embarrass him. He leaves the Reservation, but also does not want to live with his mother in Phoenix. He eventually realizes that he is an artist and a fighter. He finds value in his heritage and trains as a ‘true running brave’.

**Literary device used in the connection**

- Parody

**Explaination…**

Many people motivate Sonny in his life. His Uncle Jake tries to bring him up as a Running Brave. Jake lets Sonny leave the Reservation, but later follows him to protect him. He encourages Sonny to work with a trainer to improve his boxing. Brooks is a police officer that becomes Sonny’s friend, and father figure. He encourages Sonny to do the right thing.

**Description of an EVENT, CHARACTER, or SETTING**

Sonny is befriended by drug dealers as soon as he gets off the bus in NYC. He is given cash to make runs for them, but does not know they are drugs. He gets caught and sent to prison where he connects to his heritage.

**CONNECTIONS TO THE THEME**

Sonny tries to find his identity with his friendship with Doll and Stick. He thinks they are accepting him for who he is when Stick is really using him. While in prison he refuses to let them cut his hair. He says, “I am Sonny Bear, a member of the Moscondaga Nation. This is how we wear our hair.”

**Literary device used in the connection**

- Symbolism

**Explaination…**

Sonny’s hair becomes a symbol to him of his heritage. When faced with having it cut off, he refuses and proudly says he is a member of the Moscondaga Nation. In prison he also turns to his art. He used his Styrofoam trays to draw. The art symbolizes Native American heritage of using whatever resources are available.

**CONCLUSION: Is the message important? Why?**

I agree with the story’s the theme. You have to learn to be yourself and stop trying to be someone else just because others want you to.
...rather, we build up to it

Thus, we don’t start with something this complex...
KEY IDEA #5

 являются leveled to support differentiated instruction
Some struggling learners in a classroom may be learning to use this DVT because it matches their developmental levels.
KEY IDEA #5

Are leveled to support differentiated instruction

At the same time, typical learners may be learning to use a more advanced version
**KEY IDEA #5**

**DVTs** are leveled to support differentiated instruction

...provides special education teachers a set of powerful tools for co-teaching situations

...while the advanced students in the class are learning to use the more advanced DVTs.
KEY IDEA #6

The Science DVTs target *ACT College Readiness Standards* and *Next Generation Science Standards*

The History DVTs target *ACT College Readiness Standards* and *NGSS History & Social Studies standards*
KEY IDEA #6  

For example, in middle school...

SCIENCE

high-frequency topics by science content standards

Phenomena
Procedures
Discovery
Life Forms
Structures & Systems
Theory
Experiments
Research

"High Frequency" means that it is highly likely that any given science lesson will be mostly about one of these topics.
KEY IDEA #6

Target generative "essential understandings" of content standards within each discipline

For example, in middle school...

SCIENCE
High-frequency topics by science content standards

Phenomena
Procedures
Discovery
Life Forms
Structures & Systems

Theory
Experiments
Research

Each topic has a set of DVTs designed to address its generative essential understandings & thinking patterns.

The Phenomena DVTs are different than the Theory DVTs because their generative essential understandings are different and the thinking patterns for understanding each are different.

Important!

Thus, DVTs are differentiated by complexity, by discipline, by literacy & content standards, by generative essential understandings, and by thinking patterns.
KEY IDEA #6

target generative "essential understandings" of content standards within each discipline

For example, in middle school...

Each topic has a set of DVTs designed to address its generative essential understandings & thinking patterns

The next slide provides an example of a Phenomenon DVT

Thus, DVTs are differentiated by complexity, by discipline, by literacy & content standards, by generative essential understandings, and by thinking patterns
CCSS Standards targeted by this DVT...

**Reading Science**

CCSS.ELA-Literacy.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-Literacy.RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

**Reading Information Text**

CCSS.ELA-Literacy.RI.6.2 Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

CCSS.ELA-Literacy.RI.7.3 Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

**WRITING**

CCSS.ELA-LITERACY.WHST.6-8.2
Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
The phenomenon is connected to this idea...

Because...

The phenomenon is connected to this idea...

Because...

RELATIONSHIPS

EFFECTS (results in...)

AFFECT (influence) the phenomenon

DISTINCTIVE FEATURES

PHENOMENON

ALWAYS

SOMETIMES

NEVER
The phenomenon is connected to this idea…

Because…

Photosynthesis

Because…

Sunlight is captured and converted into chemical compounds.
Energy is stored at each step of Photosynthesis to BUILD organic compounds.

Cell Respiration

Because…

Organic compounds are BROKEN down, releasing energy at every step. This process eventually recycles the components assembled in photosynthesis.
KEY IDEA #6

target generative "essential understandings" of content standards within each discipline

For example, in middle school...

Each topic has a set of DVTs designed to address its generative essential understandings & thinking patterns

SCIENCE

high-frequency topics by science content standards

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The next slide provides an example of a Theory DVT

Thus, DVTs are differentiated by complexity, by discipline, by literacy & content standards, by generative essential understandings, and by thinking patterns
Evolution by Natural Selection

Natural events such as environmental fitness, reproductive fitness, and inter-specific competition favor some organism’s survival in a given environment.

**Key Feature of the Theory**

1. **Differential Survival**
   - Opposable thumb in primates that benefits tool use; allows species to manipulate their environment

2. **Differential Reproduction**
   - An organism must be ‘fit’ enough to survive in its environment long enough to reach sexual maturity.

3. **Inter-specific Competition**
   - Two species cannot exist in the same place at the same time without competing for resources.

**Details, Examples and/or Evidence of Feature**

1. **Opposable thumb in primates**
   - Allows species to manipulate their environment

2. **Level of lipid insulation in seals and penguins**
   - Any seal with lower than expected fatty layers may not live well or very long.

3. **Those organisms who can survive to reproductive age**
   - Have a greater chance of passing on their own genes.

4. **Competition favors the strong and well-suited organisms**
   - The winners have greater chances to reproduce.

**Impact and/or Practical Applications of Theory**

Natural selection can be called survival of the fittest.
Organisms who struggle to survive will be eliminated from the environment or fail to reproduce, limiting the transfer of their genes.

**Controversy / Conflicts associated with the Theory**

Evolution clashes with religious principles: Creation vs. The Big Bang Theory
For example, in middle school...

**SCIENCE**
- High-frequency topics by science content standards
  - Phenomena
  - Procedures
  - Discovery
  - Life Forms
  - Structures & Systems
  - Theory
  - Experiments
  - Research

Thus, **DVTs** are differentiated by **complexity**, by **discipline**, by **literacy & content standards**, by **generative essential understandings**, and by **thinking patterns**.
For example, in middle school...

**SCIENCE**
- high-frequency topics by science content standards

**HISTORY**
- high-frequency topics by history content standards

- Phenomena
- Procedures
- Discovery
- Life Forms
- Structures & Systems
- Theory
- Experiments
- Research
- People
- Event
- Idea / Ideology
- Issue / Conflict
- Era or Movement
- Structures & Systems
- Policy / Law
- Process

*The next slide is an example of a History DVT that focuses on People*

Be sure to notice how the People DVT addresses Core literacy standards (e.g., providing text evidence of key ideas and making comparisons...while at the same time, addresses a key history content standard (impact of specific U.S. presidents)
So what? What is important to understand about this?

The two used their individual differences in opinion to secure the personal rights and freedoms of citizens as well as provide a sense of protection from the government.
For example, in middle school...

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- Event
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**LITERATURE**
- high-frequency topics by literature content standards
- Plot Analysis
- Character Analysis
- Setting Analysis
- Theme Analysis
- Literary Devices Analysis

The next slide is an example of a Literature DVT that focuses on drawing inferences within the context of Character Analysis
**CHARACTER:** Sanger Rainsford

At first, Rainsford is excited about the prospect of hunting with General Zaroff. Then, he finds out that he is going to be hunted by Zaroff.

<table>
<thead>
<tr>
<th>EXPLICIT INFORMATION PROVIDED BY TEXT</th>
<th>Based on the text clues, my INFERENCES about what motivated the character</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLUES about the character’s PERSONALITY</strong></td>
<td>Connections character’s goals or actions</td>
</tr>
<tr>
<td>Who cares how the jaguar feels.</td>
<td>He has no compassion for the animals he hunts. (He does not put himself in another’s position well.)</td>
</tr>
<tr>
<td>Where there are pistol shots, there are men.</td>
<td>Rainsford uses deductive reasoning to direct himself to a safer place than the sea.</td>
</tr>
<tr>
<td><strong>CLUES about the character’s VALUES/BELIEFS about life or self</strong></td>
<td>Connections character’s goals or actions</td>
</tr>
<tr>
<td>The world is made up of two classes—the hunters and the hunted. (p.1)</td>
<td>Rainsford believes that he is strong and in the “hunter” class. (metaphorically, the hunters are the ones in control.)</td>
</tr>
<tr>
<td>I have played the fox. Now I must play the cat of the fable.</td>
<td>Rainsford is a realist. He accepts that he must deal with being hunted.</td>
</tr>
<tr>
<td><strong>CLUES about the character’s PRIOR EXPERIENCES</strong></td>
<td>Connections character’s goals or actions</td>
</tr>
<tr>
<td>I’ve read your book about hunting snow leopards in Tibet. (p.13)</td>
<td>Rainsford wrote a book about hunting and is considered an expert.</td>
</tr>
<tr>
<td>Not many men know how to make a Malay man-catcher. (p.20)</td>
<td>Rainsford made this to try to fatally injure Zaroff. He uses his hunting and travel experiences to save himself from General Zaroff.</td>
</tr>
<tr>
<td><strong>CLUES about the character’s style of INTERACTING with OTHERS</strong></td>
<td>Connections character’s goals or actions</td>
</tr>
<tr>
<td>The weather is making you soft. Be a realist. (p.1)</td>
<td>Rainsford is condescending to his friend.</td>
</tr>
<tr>
<td>I will agree to nothing of the kind. (p.18)</td>
<td>Rainsford will not agree to stay quiet about General Zaroff if he wins the game. He refuses to compromise his integrity.</td>
</tr>
</tbody>
</table>

**My CONCLUSION about the character’s motivation**

General Zaroff began hunting at an early age, and he had no remorse about it. His father fed his desensitization toward pain and death of animals with praise for his marksmanship. Then, he killed people in warfare. His experiences created a belief that the world was made for only strong and victorious people. He feels justified in hunting humans, but we might infer that he is just feeding a terrible addiction.
KEY IDEA #7

Enable teachers to see the structure for addressing unfamiliar complex standards in relatively simple, straightforward ways.

It's all about reducing cognitive load while watering-up the curriculum.

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.

Determine an author’s point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.
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<table>
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<tr>
<th>Portrayal of person’s PERSONAL QUALITIES</th>
<th>LITERARY WORK</th>
<th>HISTORICAL ACCOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portrayal of ISSUE or PROBLEM that concerned the person</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portrayal of ROLE or ACTIONS the person took related to issue or problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portrayal of IMPACT or EFFECTS of person’s actions</td>
<td></td>
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**Conclusion**

How did the author of fiction use or alter history?
# Person: Fictional Portrayal vs. Historical Account

## Henry Mayhew

<table>
<thead>
<tr>
<th>LITERARY WORK</th>
<th>HISTORICAL ACCOUNT</th>
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</thead>
<tbody>
<tr>
<td><strong>Dodger</strong> by Terry Pratchett</td>
<td><strong>London Labour and the London Poor</strong> by Henry Mayhew</td>
</tr>
</tbody>
</table>

- **Portrayal of person’s PERSONAL QUALITIES**
  - Personal qualities: Kind, compassionate, not rich, but not poor, generous
- **Portrayal of ISSUE or PROBLEM that concerned the person**
  - Wanted to improve conditions for London’s poorest
  - Interested in lack of clean water, health care, rats, overflowing sewers
- **Portrayal of ROLE or ACTIONS the person took related to issue or problem**
  - He and others had a project to make the government see how terrible conditions were in the city.
  - Interviewed people about their living conditions and earnings
- **Portrayal of IMPACT or EFFECTS of person’s actions**
  - His kindness to Simplicity helped save her life

## Conclusion

- How did the author of fiction use or alter history?

  **The author described him mainly as a caring and generous gentleman. He did not describe his other occupations such as playwright or journalist.**

  **The author described the conditions in London accurately according to historical accounts particularly the work by the real Henry Mayhew.**

  **This was very similar to history. Henry Mayhew did write his books/articles based on his interviews with the real people of London.**

  **The novel did not talk much about the impact that Henry had on the conditions of society.**
Many of the Core literacy standards require content-area educators to teach skills not previously taught, and thus place considerable cognitive load on teachers in order to figure out effective ways to address them.

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.

Determine an author’s point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.

Since the DVTs are individually designed to address specific literacy standards, they enable teachers to SEE the structure for how to address these standards in relatively simple, straight-forward ways.

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<td>Portrait of ISSUES or PROBLEMS that concerned the period</td>
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<tr>
<td>Portrait of ISSUES or PROBLEMS</td>
<td>Portrait of MAIN ACTION or ACTIONS the PERIOD took related to iSSUE or PROBLEMS</td>
</tr>
<tr>
<td>Portrayal of IMPACT or EFFECTS of period’s action</td>
<td>Portrayal of</td>
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</table>
CCSS Standards targeted by this DVT...

READING INFORMATION TEXT

**CCSS.ELA-Literacy.RI.8.6** Determine an author’s point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.

**Author’s Response to Conflicting Evidence**

- **SOURCE**
  - Define the issue or topic
  - Summarize the issue or topic addressed by the author AND why it is important

- **Explain author’s position (thesis) on the issue and/or purpose for addressing it**
  - The author’s position on this issue is to be... AND/OR The author’s purpose for writing about this issue seems to be...

- **Back up the position with reasoning and/or supporting evidence**
  - Reasoning and/or supporting evidence the author provided

- **Acknowledge conflicting evidence or alternative viewpoint**
  - Original source of information or alternative view of the issue or topic. Conflicting evidence

- **Target a response to the conflicting evidence or alternative viewpoint**
  - Key point regarding the alternative viewpoint or evidence that conflicts with the author’s view. AND how the author responded to the key point of conflicting evidence

- **Evaluate your conclusion**
**Author’s Response to Conflicting Evidence**


<table>
<thead>
<tr>
<th>Define the issue or topic</th>
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<tbody>
<tr>
<td>Whether or not the radiation from cell phones causes multiple forms of brain cancers is really important because so many people use cell phones... a LOT! We could be poisoning ourselves.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expose author’s position (thesis) on the issue and/or purpose for addressing it</th>
</tr>
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<tbody>
<tr>
<td>Danielle Dellorto wrote this article that claims cell phones cause brain cancer in order to warn the audience about these risks.</td>
</tr>
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</table>

<table>
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<tr>
<th>Back-up the position with reasoning and/or supporting evidence</th>
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<tr>
<td>Dellorto → W.H.O. included mobile phones on &quot;carcinogenic hazards&quot; list (same category as lead, engine exhaust &amp; chloroform). Dellorto quoted Dr. K. Black: &quot;What microwave cell phone radiation does is similar to what happens to food in microwaves, essentially cooking the brain,&quot; Dellorto noted that head of a Un. Pitt cancer-research institute sent memo to all employees urging them to limit cell phone use b/c of possible cancer risks.</td>
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</tbody>
</table>

<table>
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<tr>
<th>Acknowledge conflicting evidence or alternative viewpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell phone manufacturers claim cell phones to be safe when used away from the human body. BlackBerry Bold advises users to &quot;keep the BlackBerry device at least 0.98 inch (25 millimeters) from your body when the BlackBerry device is transmitting.&quot;</td>
</tr>
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</table>

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<tr>
<th>Target a response to the conflicting evidence or alternative viewpoint</th>
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<td>Apple iPhone 4 User Manual says “users radiation exposure should not exceed FCC guidelines.” Dellorto recommends using speakerphone or wired headset to avoid contact with the head or body.</td>
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<tr>
<th>Explain your conclusion</th>
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<tbody>
<tr>
<td>My conclusion is that the author (Dellorto) provided enough evidence to convince me to use headphones instead of putting the cell phone up to my ear. Maybe they cause brain cancer, maybe they don’t, but why risk it when it’s so easy to just use headphones?</td>
</tr>
</tbody>
</table>
KEY IDEA #8

DVTs are powerful tools for watering up the curriculum, but how educators teach with them is equally important.

“Stratagems” for using DVTs effectively...

....BEFORE the lesson to review prior learning and/or preview or introduce essential questions that the lesson will address;

....DURING the heart of the lesson to provide clear, explicit instruction that is scaffolded (gradual release);

....AFTER the lesson to facilitate reflective reviews of essential understandings as well as essential questions.

The following slides illustrates the “Rotated Visuals” Stratagem
Let’s start with something like this…. 

Now let’s add some color
Let's add some prompts
WHAT IF...
The teacher identified the key terms for each topic?
FOOD

Is related to the MAIN TOPIC because...

GREENHOUSE GASES

Is related to the MAIN TOPIC because...

CLIMATE CYCLES

Is related to the MAIN TOPIC because...

CLIMATE CHANGE

Is about...

TERRAIN CHANGES

Is related to the MAIN TOPIC because...

STORMS

Is related to the MAIN TOPIC because...

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...
When could something like this be used?

Could students use this to plan an expository writing essay about “Climate Change.”?

Could students use it to plan an in-class debate?
When could something like this be used?

Could it be used at the BEGINNING of a lesson?
   - Review previously taught terms?
   - Pre-teach new terms?

Could it be used DURING the lesson?
   - Guided Reading / Note-taking?

What about at the END of the lesson?
   - Review new vocabulary?

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What if, to review or anchor key terms taught during the lesson, you rotated the visual from team-to-team?
What if you rotated the visual from team-to-team?

Team adds one idea to the visual

Climate change is natural, but can be affected by humans (via pollution, producing methane, burning fossil fuels, etc.).
What if you rotated the visual from team-to-team?

Team adds **one** idea to the visual

Passes it to another team who then has to add **something different**...

**CLIMATE CHANGE**

Is about...

Climate change is natural, but can be affected by humans (via pollution, producing methane, burning fossil fuels, etc.).

By 2100, average world temperatures predicted to increase 4-11 degrees.

**TERRAIN CHANGES**

Is related to the MAIN TOPIC because…

**STORMS**

Is related to the MAIN TOPIC because…

**CYCLES of CHANGING OCEAN CURRENTS**

Is related to the MAIN TOPIC because…
What if you rotated the visual from team-to-team?

Team adds **one** idea to the visual

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---

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Is about...

Climate change is natural, but can be affected by humans (via pollution, producing methane, burning fossil fuels, etc.).

By 2100, average world temperatures predicted to increase 4-11 degrees. Changes will be slow, but will have a HUGE impact on things.

---

**CYCLES of CHANGING OCEAN CURRENTS**

Is related to the MAIN TOPIC because...

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**STORMS**

Is related to the MAIN TOPIC because...
What if you rotated the visual from team-to-team?

Team adds one idea to the visual

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ETC

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Changes will be slow, but will have a HUGE impact on things.

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...

STORMS

Is related to the MAIN TOPIC because...
What if you rotated the visual from team-to-team?

Each time the visual is received from the previous team, the new team has to review what everybody else has already noted on it, and then think about and discuss what they could add to it that would be different, but important... and then note the idea using very concise words.
Each time the visual is received from the previous team, the new team has to review what everybody else has already noted on it, and then think about and discuss what they could add to it that would be different, but important... and then note the idea using very concise words.

**CYCLES of CHANGING OCEAN CURRENTS**

Is related to the MAIN TOPIC because...

Cycling ocean currents (La Nina / El Nino) affect water surface temperatures = weather changes (e.g., severe droughts, hurricanes)

---

**FOOD**

Is related to the MAIN TOPIC because...

At same time population is exploding, food may become more scarce because of global warming's impact on farming.

---

Is related to the MAIN TOPIC because...

Melting arctic ice = rise in sea levels. Some lush areas may convert to deserts = top soil blown away = less farming & less oxygen produced

---

Is related to the MAIN TOPIC because...

Warmer climate = huge increase number & severity of thunderstorms, lightening strikes (= fires!), and especially hurricanes around the world

---

Is related to the MAIN TOPIC because...

World climate has a history of naturally occurring warming / cooling cycles lasting about 40,000 years. Warmer climate = huge increase number & severity of thunderstorms, lightening strikes (= fires!), and especially hurricanes around the world.

---

Natural & man-caused methane, CO2 & other gases rise in atmosphere, trap heat from sunlight. Trapped heat = faster global warming than natural. Melting arctic ice = rise in sea levels. Some lush areas may convert to deserts = top soil blown away = less farming & less oxygen produced.

---

By 2100, average world temperatures predicted to increase 4-11 degrees. Changes will be slow, but will have a HUGE impact on things.
The “Rotated Visuals Stratagem” is one of a series of powerful DVT instructional routines designed for teaching BEFORE, DURING, and AFTER a lesson.
Bottom LINE?

**DVTs have demonstrated effectiveness with**

* Low achieving students
* Low achieving students with learning disabilities
* Typical achieving students
* High achieving students

**DVT-based instruction raises test scores in low-, typical-, and high-performing schools**

Teachers and students like and value DVTs - both groups view DVTs as teaching/learning tools that significantly **REDUCE COGNITIVE LOAD**
The following slides provide a brief overview of specific studies. To read more about DVT theoretical basis and research, see...

This study compared the relative impact of...

Generic Graphic Organizers VS. History Essential Understandings (EU) DVTs VS. History Generative Idea (GI) DVTs VS. "Business as Usual"

...on depth, breadth, and accuracy of new history knowledge

96 11th grade students...

32 high-achieving, 32 typical achieving, 16 low-achieving, & 16 low-achieving w/ LD

KEY IDEA #9 are based on extensive school-based scientific research
Teacher employed a different strategy during each phase of instruction. Pre & Post measures of students’ Breadth of knowledge, Depth of knowledge, and Accuracy of knowledge were used to assess learning measured for each phase.
KEY IDEA #9 are based on extensive school-based scientific research

<table>
<thead>
<tr>
<th>CLASS 1</th>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
<th>PHASE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT RESOURCES</td>
<td>GENERIC GRAPHIC ORGANIZERS</td>
<td>HISTORY GENERATIVE IDEA DVTs</td>
<td>HISTORY ESSENTIAL UNDERSTANDINGS DVTs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS 2</th>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
<th>PHASE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>HISTORY ESSENTIAL UNDERSTANDINGS DVTs</td>
<td>TEXT RESOURCES</td>
<td>GENERIC GRAPHIC ORGANIZERS</td>
<td>HISTORY GENERATIVE IDEA DVTs</td>
<td></td>
</tr>
</tbody>
</table>

2nd teacher used same strategies, but in a different order
KEY IDEA #9 are based on extensive school-based scientific research

PHASE 1

CLASS 1

TEXT RESOURCES

PHASE 2

CLASS 2

HISTORY ESSENTIAL UNDERSTANDINGS DVTs

GENERIC GRAPHIC ORGANIZERS

PHASE 3

CLASS 3

HISTORY ESSENTIAL UNDERSTANDINGS DVTs

GENERIC GRAPHIC ORGANIZERS

PHASE 4

CLASS 4

GENERIC GRAPHIC ORGANIZERS

HISTORY ESSENTIAL UNDERSTANDINGS DVTs

TEXT RESOURCES
KEY IDEA #9

**AVOVA statistical analysis**
Tukeys Post Hoc Analysis

<table>
<thead>
<tr>
<th>Method</th>
<th>High Achieving</th>
<th>Typical Achieving</th>
<th>Low Achieving</th>
<th>Learning Disabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Graphic Organizers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essential DVTs</td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generative Ideas DVTs</td>
<td>1st</td>
<td>EU DVTs</td>
<td>GI DVTs</td>
<td></td>
</tr>
<tr>
<td>EU DVTs</td>
<td></td>
<td>EU DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU DVTs</td>
<td></td>
<td>EU DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic GOs</td>
<td>2nd</td>
<td>Generic GOs</td>
<td>Traditional</td>
<td></td>
</tr>
<tr>
<td>EU DVTs</td>
<td></td>
<td>EU DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU DVTs</td>
<td></td>
<td>EU DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional Discussion / Guided Note Taking</td>
<td>4th</td>
<td>Same results, regardless of student-type</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EU DVTs had the greatest impact on **all students' depth** of relational understanding.
KEY IDEA #9 are based on extensive school-based scientific research

depth / breadth / accuracy of knowledge

<table>
<thead>
<tr>
<th></th>
<th>High Achieving</th>
<th>Typical Achieving</th>
<th>Low Achieving</th>
<th>Learning Disabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Graphic Organizers</td>
<td>2nd</td>
<td>EU DVTs superior to GI DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essential Understanding DVTs</td>
<td>1st</td>
<td>EU DVTs superior to Traditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generative Ideas DVTs</td>
<td>3rd</td>
<td>Generic GOs superior to GI DVTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional Discussion / Guided Note Taking</td>
<td>4th</td>
<td>Same results, regardless of student-type</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Again... EU DVTs had the greatest impact on all students breadth of relational understanding.
KEY IDEA #9  are based on extensive school-based scientific research

depth / breadth / **accuracy** of knowledge

AVOVA statistical analysis

<table>
<thead>
<tr>
<th></th>
<th>High Achieving</th>
<th>Typical Achieving</th>
<th>Low Achieving</th>
<th>Learning Disabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic Graphic Organizers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Differentiated Visual Tools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Essential Understanding DVTs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Generative Ideas DVTs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Traditional Discussion / Guided Note Taking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

... no significant differences

In other words, on measures of **accuracy** of new knowledge, each treatment worked equally
Changes in students’ knowledge about the mini-unit topic are measured at end of each mini-unit.
### Amount of new knowledge

<table>
<thead>
<tr>
<th>Week</th>
<th>Teacher A</th>
<th>Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEEK 1</td>
<td>Teaches 1&lt;sup&gt;st&lt;/sup&gt; mini-unit using traditional guided note-taking / discussion instruction</td>
<td>Teaches same 1&lt;sup&gt;st&lt;/sup&gt; mini-unit using History EU DVts</td>
</tr>
<tr>
<td>WEEK 2</td>
<td>Teaches 2nd mini-unit using History EU DVts</td>
<td>Teaches same 2nd mini-unit using traditional guided note-taking / discussion instruction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 High Achieving</td>
<td>32 Typical Achieving</td>
</tr>
<tr>
<td>32 Low Achieving</td>
<td>16 Students w/LD</td>
</tr>
</tbody>
</table>

Changes in students’ knowledge about the mini-unit topic are measured at end of each mini-unit
Traditional Instruction vs. traditional discussion / guided note-taking instruction

- High Achievers
- Typical Achievers
- Low Achievers
- Low Achievers w/LD

Differentiated Visual Tools™
Impact on writing assessment across schools with different performance histories

% of students meeting or exceeding writing standards

- 9 Schools Extremely Low Performing: 20.6% before DVTs
- 8 Schools Low Performing: 38.83% before DVTs
- 7 Schools Moderate Performing: 58.39% before DVTs
- 2 Schools High Performing: 73.02% before DVTs
- Overall: 82.68%
**Semi-rural 5th grade Alabama Writing Assessment**

% students meeting or exceeding standards

<table>
<thead>
<tr>
<th>School #1</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.1</td>
<td>28.08</td>
<td>51.43</td>
<td>81.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+ 23 pts.</td>
<td>+30 pts.</td>
</tr>
<tr>
<td>School #2</td>
<td>22.0</td>
<td>10.0</td>
<td>62.24</td>
<td>71.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+ 52 pts.</td>
<td>+ 9 pts.</td>
</tr>
</tbody>
</table>
KEY IDEA #10  There are two strands of instructional resources.

**ELEMENTARY**

DVT software programs

K-3 DVTs for Reading and Writing about Literature and Information Text Core Standards

3-5 DVTs for Reading and Writing about Literature and Information Text Core Standards

K-5 Vocabulary DVTs

**SECONDARY**

DVT software programs

Science DVTs for Teaching College Readiness Standards

Literature DVTs for Teaching College Readiness Standards

History DVTs for Teaching College Readiness Standards

6-12 Vocabulary DVTs

**COURSE-SPECIFIC DVTs**

Eng 9-10 DVTs

Eng 11-12 DVTs (under development)

Algebra DVTs (under development)

Biology DVTs (under development)

Civics DVTs (under development)

Geography DVTs (under development)

DVTs in the Elementary strand are also appropriate for use when teaching struggling learners in secondary schools.
Visualizing Disciplinary Thinking

10 KEY IDEAS about

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Research Scientist Partner
University of Kansas Center for Research on Learning

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