## Visualizing Disciplinary Thinking

## 10 KEY IDEAS about



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K-12 Curriculum = two strands of learning standards

**INFORMATION** 

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

For example...

Science

**Social Studies / History** 

**Economics** 

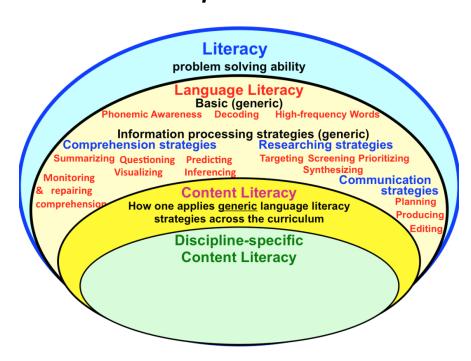
**Civics** 

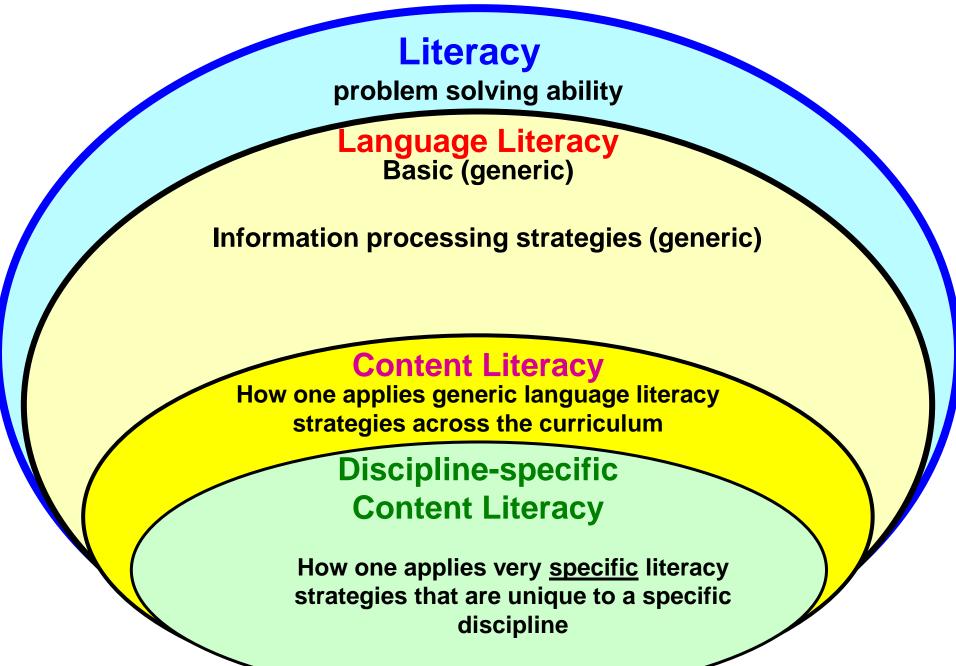
Math concepts

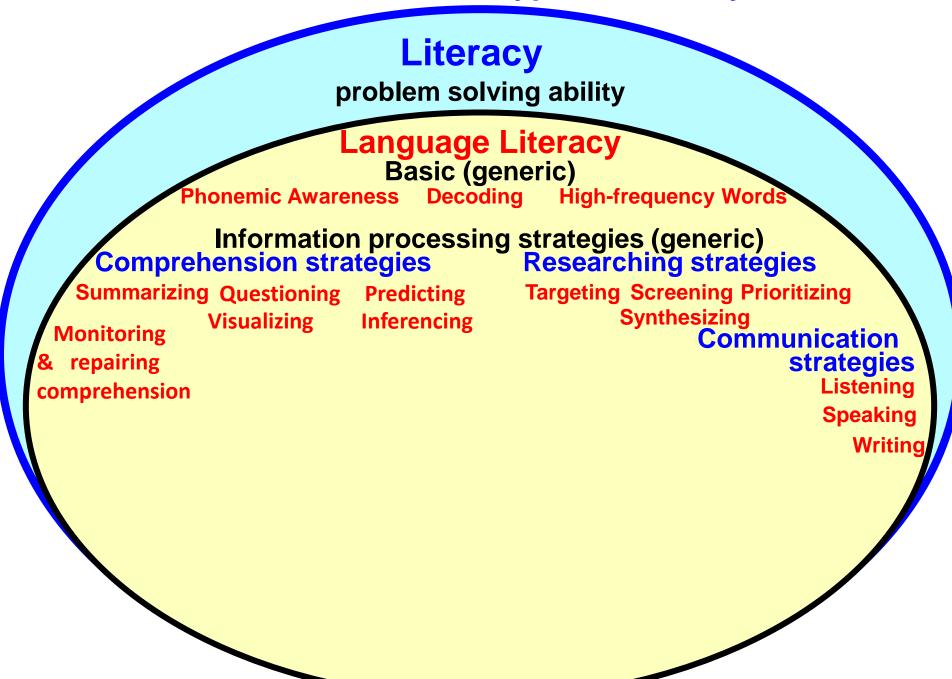
Etc.

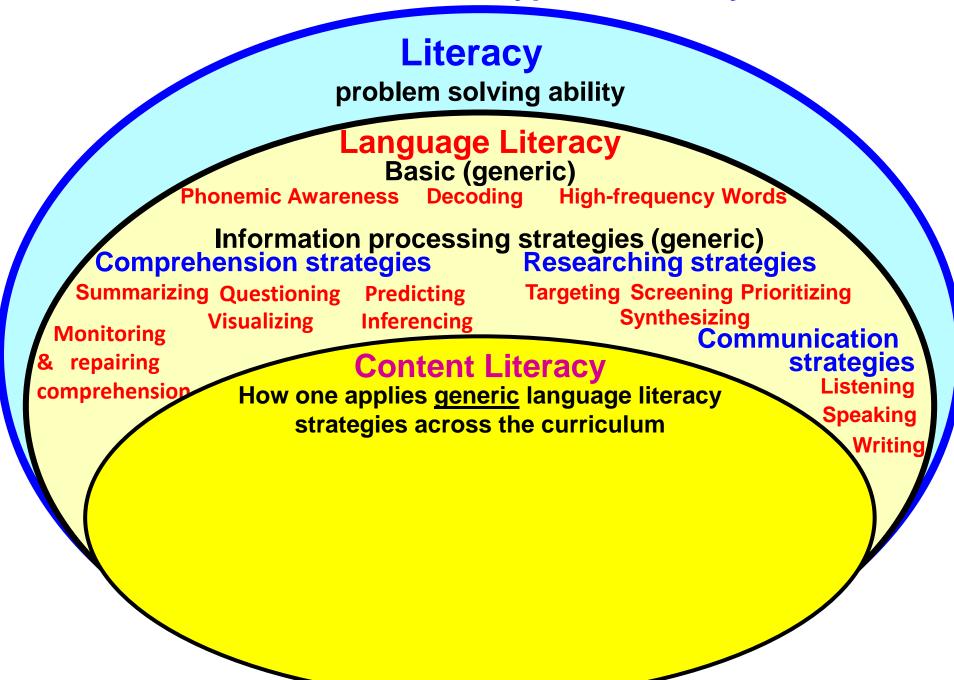
#### **LITERACY**

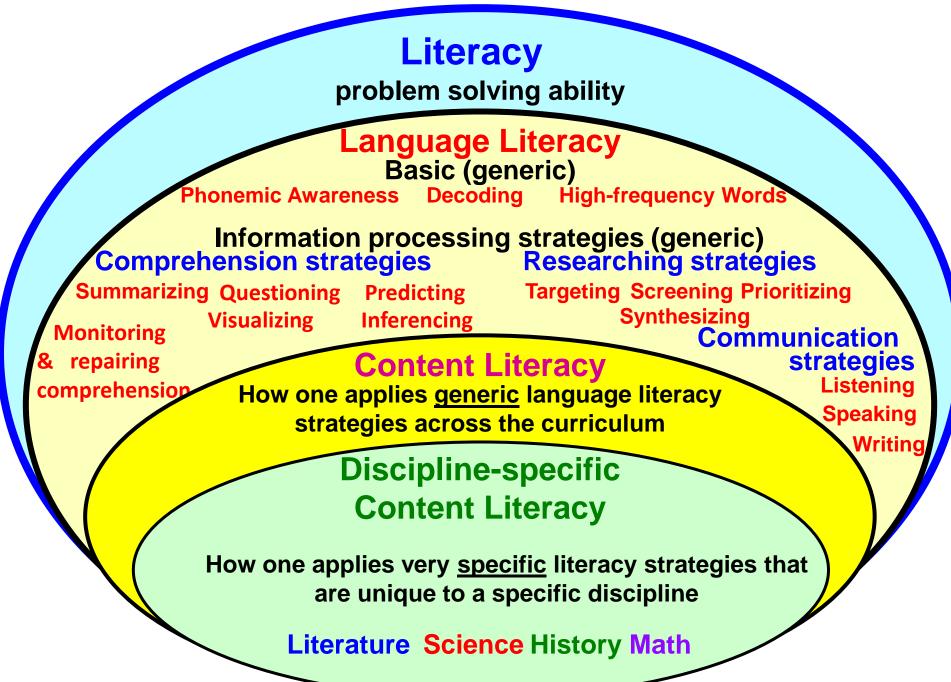
HOW / WHEN / WHY to do things to solve problems

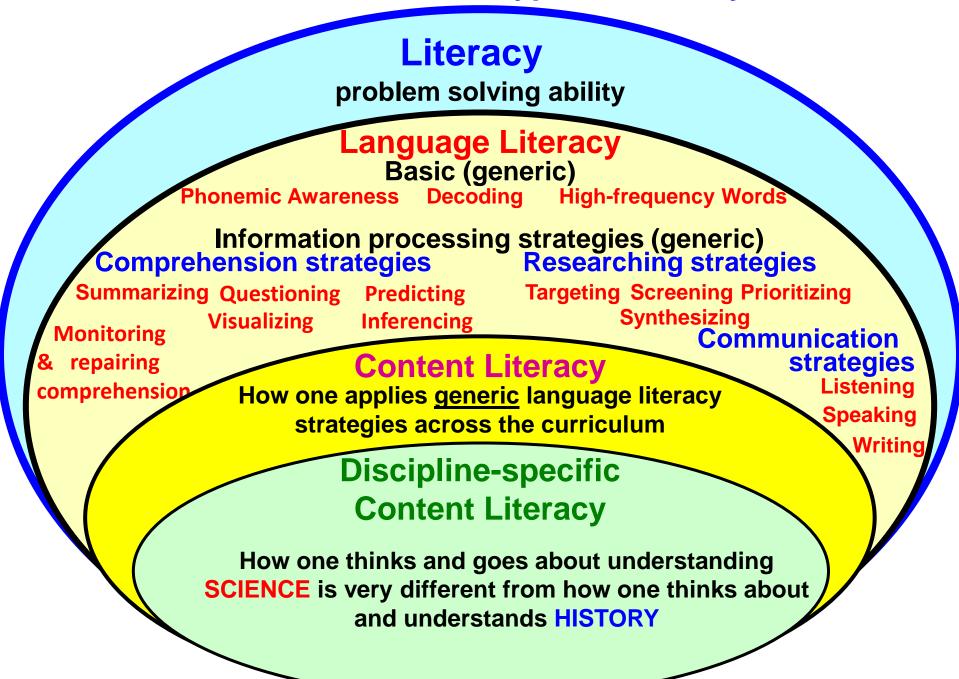


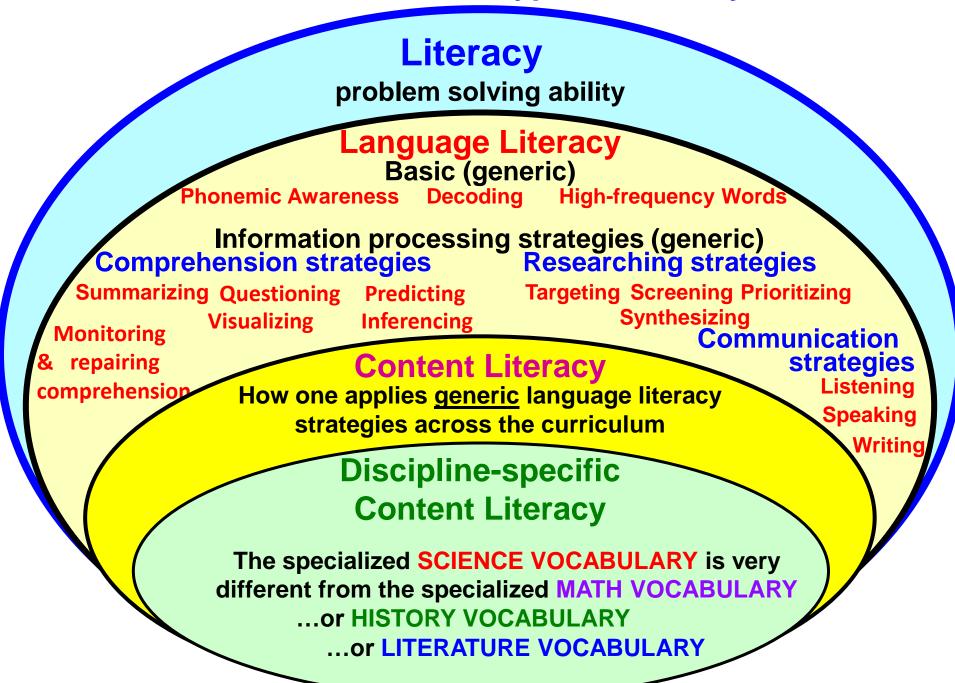












INFORMATION
RELATIONAL UNDERSTANDING
of content subjects

#### **LITERACY**

HOW / WHEN / WHY to do things to solve problems

Acquisition
Learning to perform it correctly
(high cognitive load)

Fluency

Learning to perform it <u>smoothly & quickly</u> (low cognitive load)



**Transfer & Generalization** 

Using skill/strategy to solve a range of problems in different situations & settings

#### **INFORMATION**

RELATIONAL UNDERSTANDING of content subjects

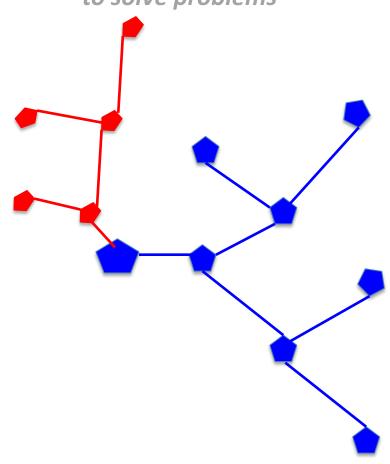
SUPERFICIAL / ERRONEOUS / SURFACE



Relational understanding of knowledge ranges from...

#### LITERACY

HOW / WHEN / WHY to do things to solve problems



#### **INFORMATION**

of content subjects

**LITERACY** 

HOW / WHEN / WHY to do things to solve problems

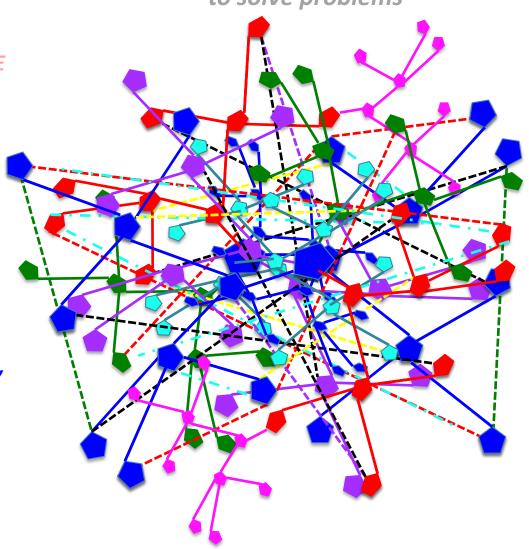
SUPERFICIAL / ERRONEOUS / SURFACE



Relational understanding of knowledge ranges from...



SOPHISTICATED / BREADTH / DEPTH / ACCURATE / MANY CONNECTIONS



#### **INFORMATION**

RELATIONAL UNDERSTANDING of content subjects

SUPERFICIAL / ERRONEOUS / SURFACE

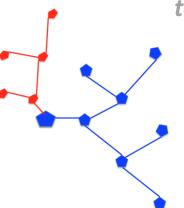


Relational understanding of knowledge ranges from...

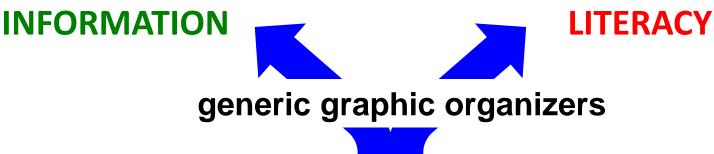
SOPHISTICATED / BREADTH / DEPTH /
ACCURATE / MANY CONNECTIONS

#### **LITERACY**

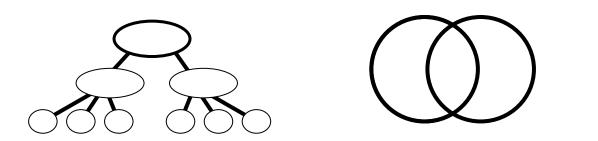
HOW / WHEN / WHY to do things to solve problems

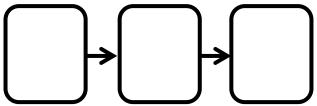


How do you make this happen?



**VERY EFFECTIVE tools for teaching both areas** 





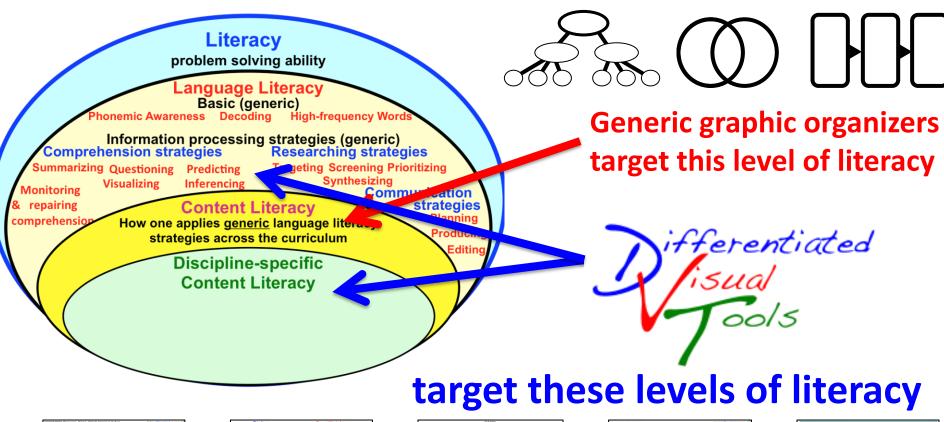
**Enable students to SEE how the information is structured** 

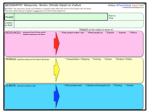
It's NOT a VISUAL LEARNER thing

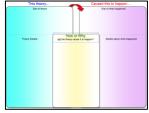
It's a HOW TO REDUCE COGNITIVE LOAD thing

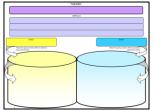
It's a HOW TO STRUCTURE FOR SUCCESS thing

# The same instructional strategies & tools do NOT work equally well for each different type of literacy





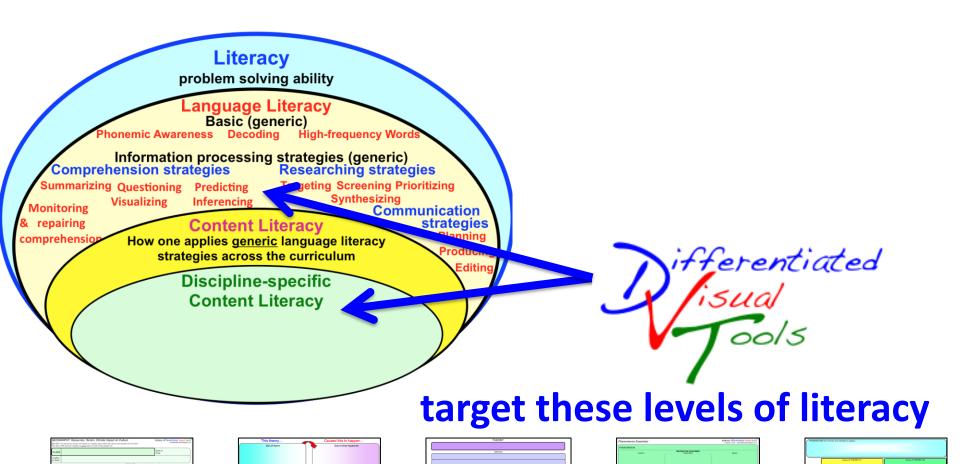






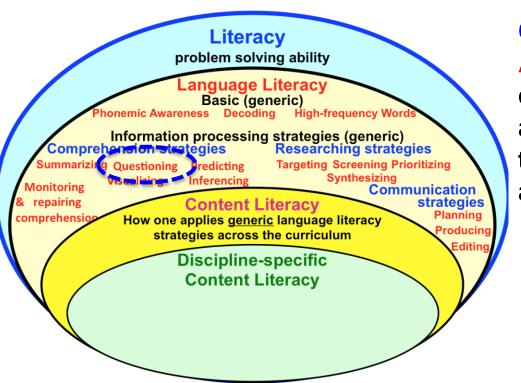


# s are individually designed to address specific literacy standards



# 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.



## Meet the Mayor by Arnim Franke



WHO was the main PERSON in the story?

### The Mayor

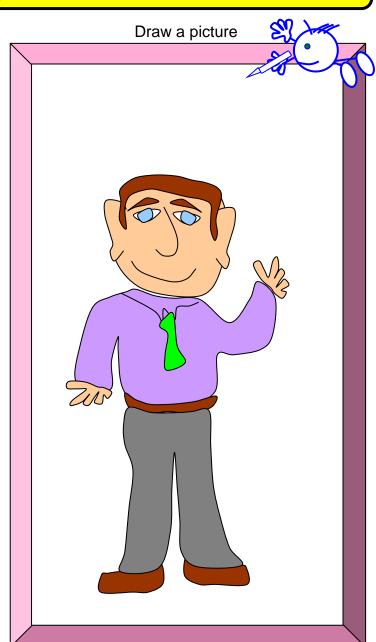
WHAT happened to the PERSON?

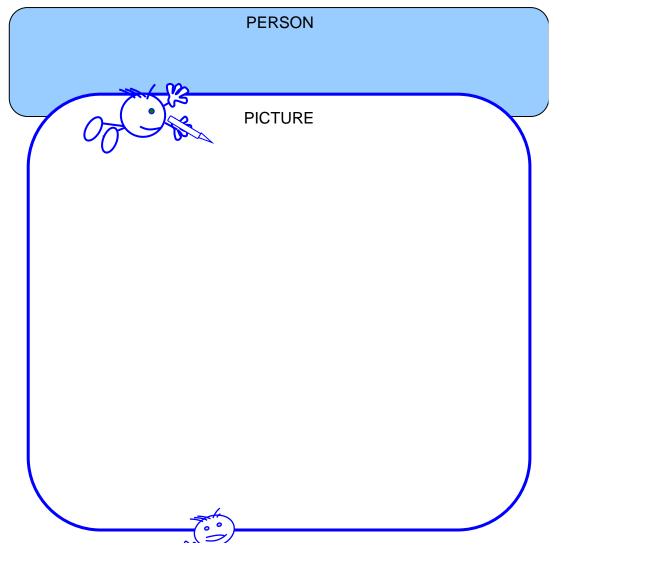
People vote for who they want to be mayor. The mayor promises to work hard. They work in city hall, and make laws and rules.

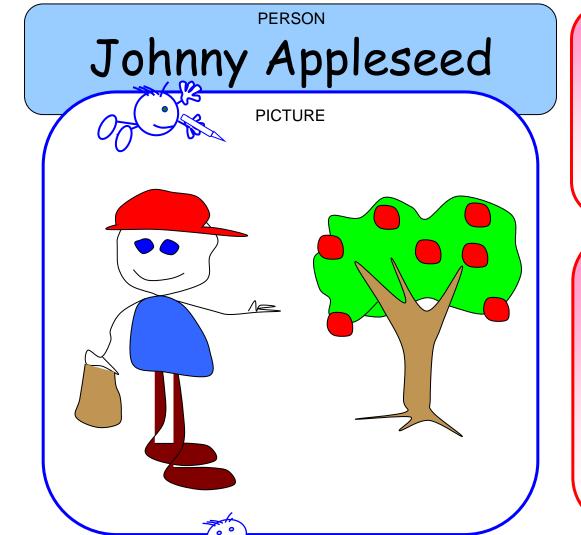
WHERE did it happen?

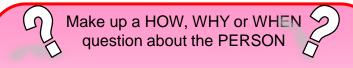
In every city and town in the United States

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Why did Johnny Appleseed plant so many apple trees?



Answer to your question

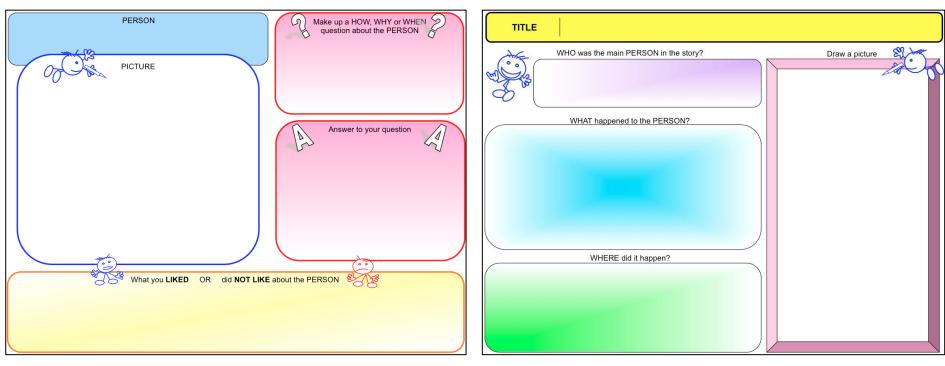


He was a nurseryman. He wanted everyone to have an apple tree. He taught people how to take care if plants and land.



I like him because he cared about animals and the earth.

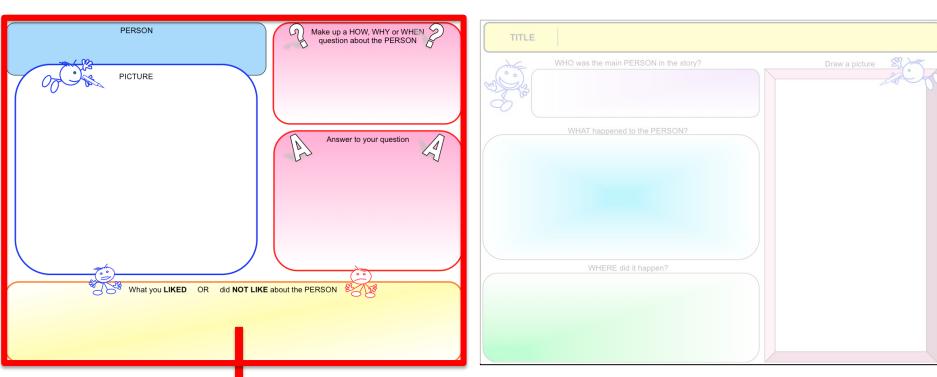
#### So what is the difference between these two visual tools?



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.

## Is are individually designed to address specific literacy standards

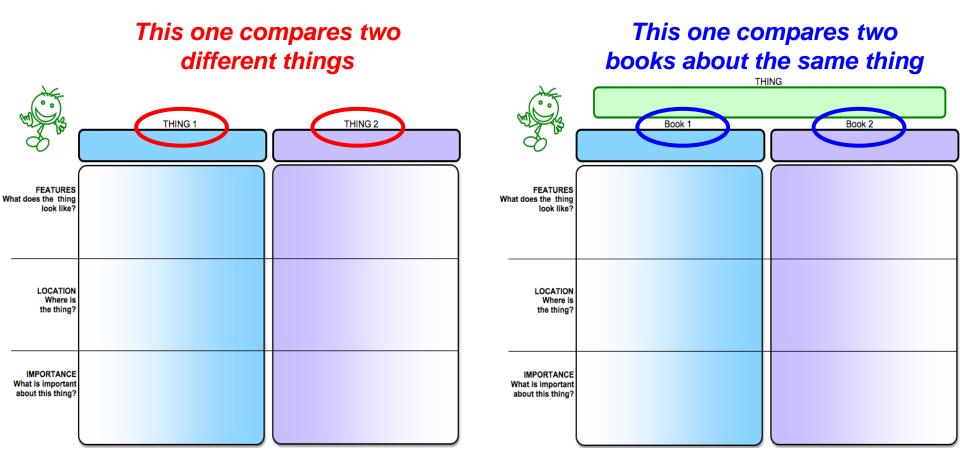


This visual tool is specifically designed to address THIS specific standard

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

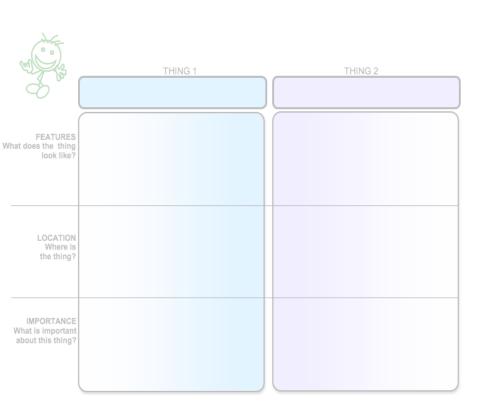
Which of these address the standard?

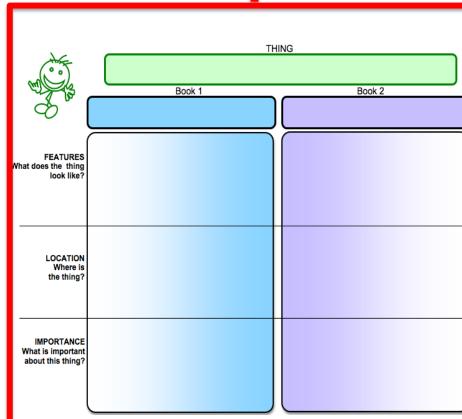


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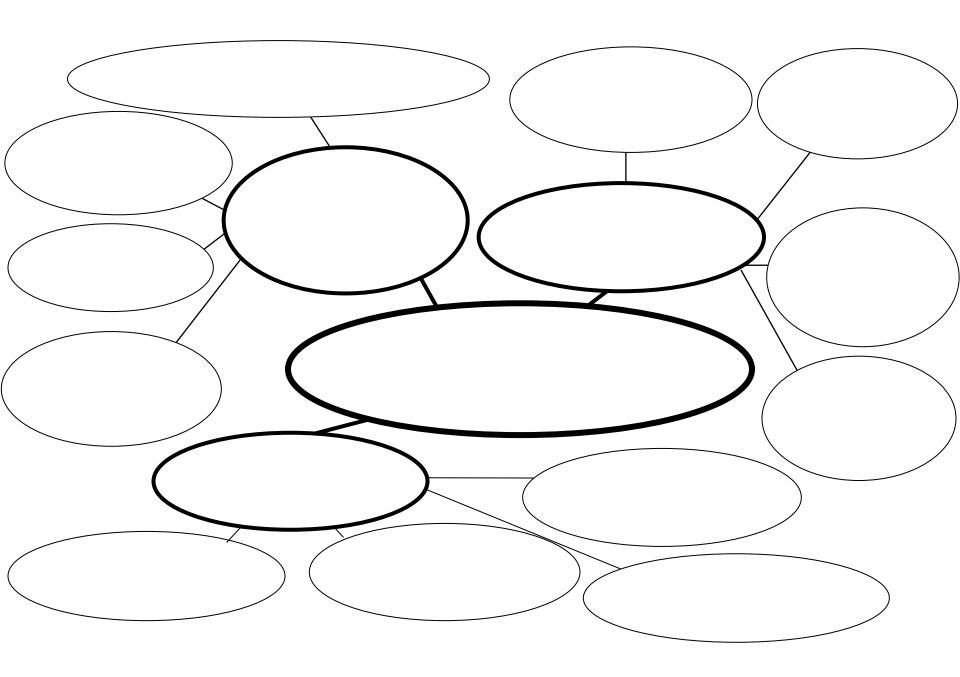
Compare and contrast the most important points and key details presented in two texts on the same topic.

This visual tool is specifically designed to address THIS specific standard





Web generated from a 5<sup>th</sup> grade guided reading / note taking lesson...



## Web generated from a 5<sup>th</sup> grade guided reading / note taking lesson...

### Next slide = identical info (word-for-word) but different visual tool



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

Is about ...

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

When a myth is treated as truth, people fool themselves

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

Main Idea

Are wealthy people more valuable?

Main Idea

Newspaper:

"Titanic is largest & fastest – probably even unsinkable"

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

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

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

Main Idea

Fewer lifeboats so ship seems more attractive = selling more tickets

Rich were given priority over poor for spaces on lifeboats

Builders began to believe the myth; took short-cuts

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

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

BIG IDEA

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

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

BIG IDEA

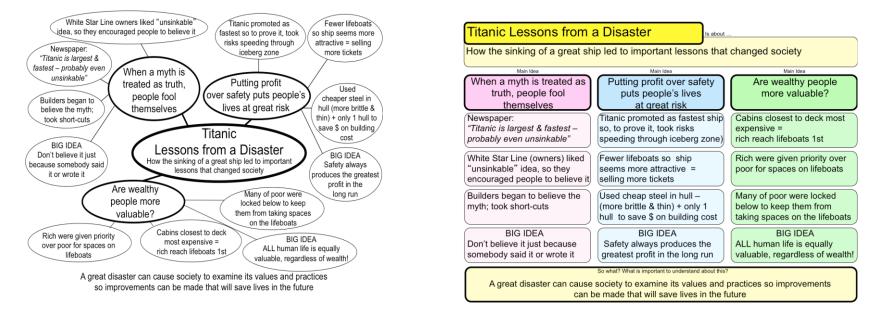
ALL human life is equally valuable, regardless of wealth!

So what? What is important to understand about this?

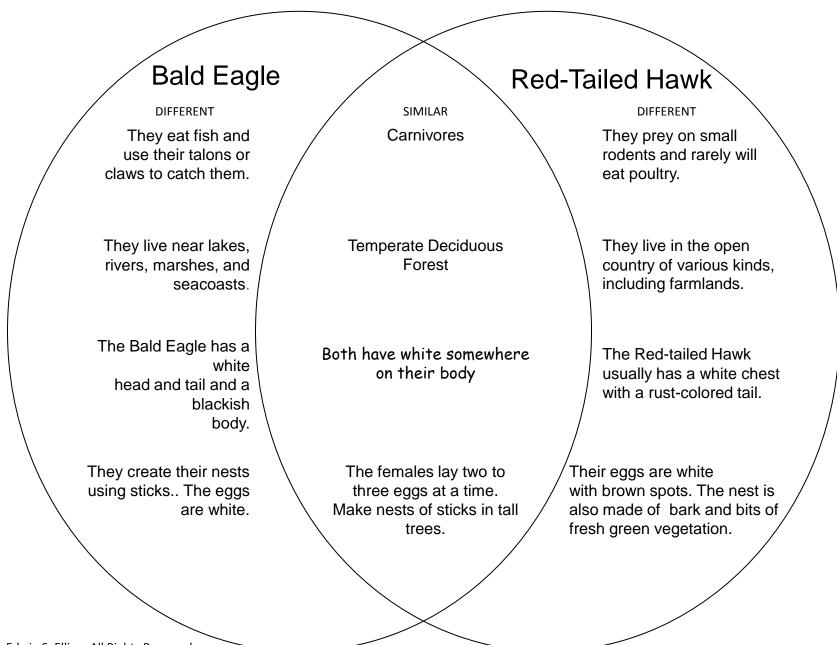
A great disaster can cause society to examine its values and practices so improvements can be made that will save lives in the future

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

#### Which would you rather have?



Idea is to make it easier (not harder) to process information



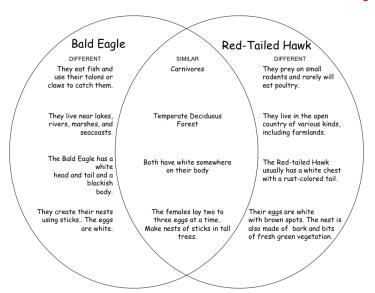
#### Same information (word-for-word) plus semantic prompts

	Bald Eagle		Red-Tailed Hawk
Food	They eat fish and use their talons or claws to catch them.	SIMILAR Carnivores	DIFFERENT They prey on small rodents and rarely will eat poultry.
Habitat	They live near lakes, rivers, marshes, and seacoasts.	Temperate Deciduous Forest	They live in the open country of various kinds, including farmlands.
Color	The Bald Eagle has a white head and tail and a blackish body.	Both have white somewhere on their body	The Red-tailed Hawk usually has a white chest with a rust-colored tail.
Nests	They create their nests using sticks The eggs are white.	The females lay two to three eggs at a time. Make nests of sticks in tall trees.	Their eggs are white with brown spots. The nest is also made of bark and bits of fresh green vegetation.

Notessential understanding prompits adds to the visual

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

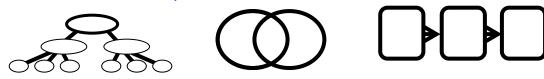
#### Which would you rather have?



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#### **KEY IDEA #2 Some visual tools are a lot better than others!** Essential understandings are People - literature **Huck Finn** discipline specific Jim **DIFFERENT SIMILAR DIFFERENT** View of Self View of others Motivation Interactions with others People - history Washington Lincoln DIFFERENT DIFFERENT **SIMILAR** Goals **Key Decisions** Factors weighed when making those decisions Impact of decisions





...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)

#### **KEY IDEA #3** *Discipline-specific* visuals are a LOT better than generic GOs when teaching complex standards

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

SCIENCE	HISTORY	LITERATURE	MATH
Specialized science vocabulary	Specialized history vocabulary	Specialized literature vocabulary	Specialized math vocabulary
Unique set of science generative ideas	Unique set of history generative ideas	Unique set of literary analysis generative ideas	Unique set of math generative ideas
How one thinks about & understands science	How one thinks about & understands history	How one thinks about & understands literature	How one thinks about & understands math

#### generic, one-size-fits-all GOs fail to address these important differences in disciplines

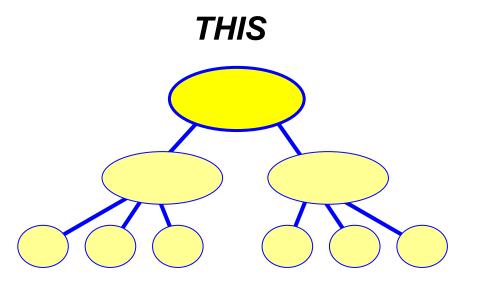
# KEY IDEA #3 Discipline-specific visuals area LOT better than generic GOs when teaching complex standards

#### 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?



STORY	
TOPIC of the story	THEME of the story is (author's unstated opinion or message about the story's topic)
Description of an EVEN	CHARACTER, or SETTING CONNECTIONS TO THE THEME
Literary device used in the Explanation	connection → Irony Salire Parody Motivation Personification Symbolism Other
Literary device used in the Explanation	connection → Irony Satire Parody Motivation Personification Symbolism Other
<b>*</b>	
	J
Literary device used in the Explanation	connection → Irony Satire Parody Motivation Personification Symbolism Other

The Pardoner's Tale by Geoffrey Chaucer				
TOPIC of the story	TOPIC of the story  THEME of the story is (author's unstated opinion or message about the story's topic)			
Loyalty Betraying your friends will lead to your own do		ls will lead to your own downfall.		
Description of an EVENT,	CHARACTER, or SETTING CONNECTIONS TO			
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 c	connection → Irony Satire Parody	Motivation Personification Symbolism Other		
Explanation  Ironic because it se	eems like they are really good frier	nds, so you would expect them to help		
each other out and	share stuff, but the reality is, the	y 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 → Irony Satire Parody Motivation Personification Symbolism Other				
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 →				
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.

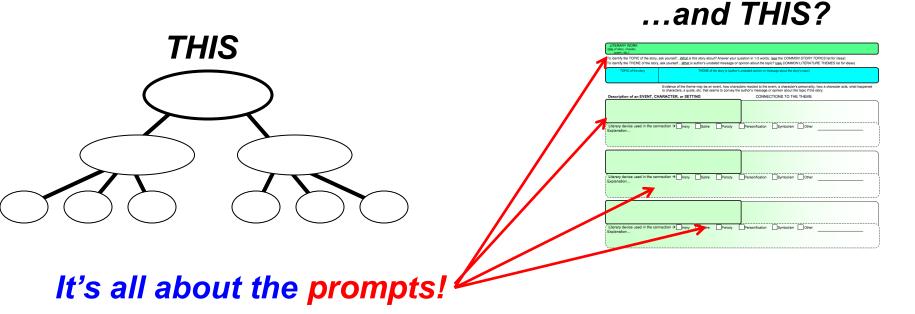
The three robbers end up killing each other. Here, Chaucer uses an event in the story and motivation as a literary device to illustrate the betrayal theme. Because they all turned their backs on each other to try and keep more of the gold, they all ended up dead.

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.

STORY The Pardoner's Tale by Geoffrey Chaucer				
TOPIC of the story	THEME of the story is (author's unstated opinion or message about the story's topic)			
Loyalty	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 c	Literary device used in the connection → X Irony Satire Parody Motivation Personification Symbolism Other			
Explanation  Tronic 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 →IronySatireParodyMotivationPersonification X SymbolismOther				
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 →IronySatire Parody X MotivationPersonification Symbolism Other 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				

## **KEY IDEA #3** Discipline-specific visuals area LOT better than generic GOs when teaching complex standards

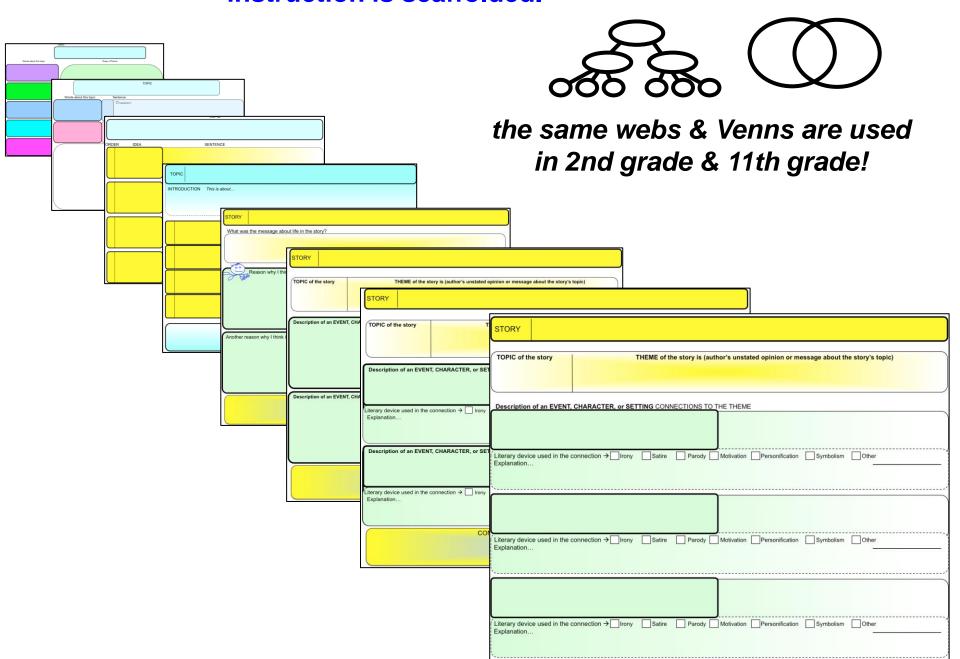
## What's the difference between...



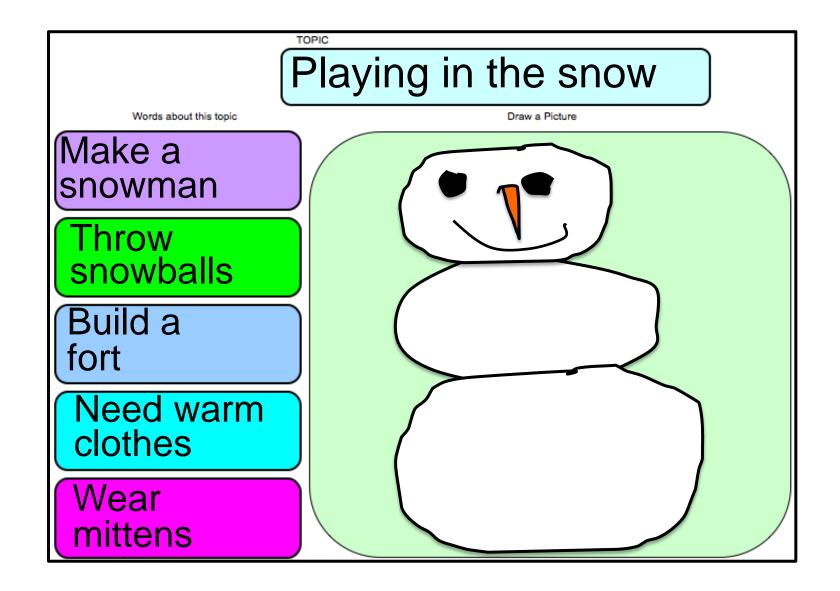
\* Clear & explicit \* Guide thinking \* Simple

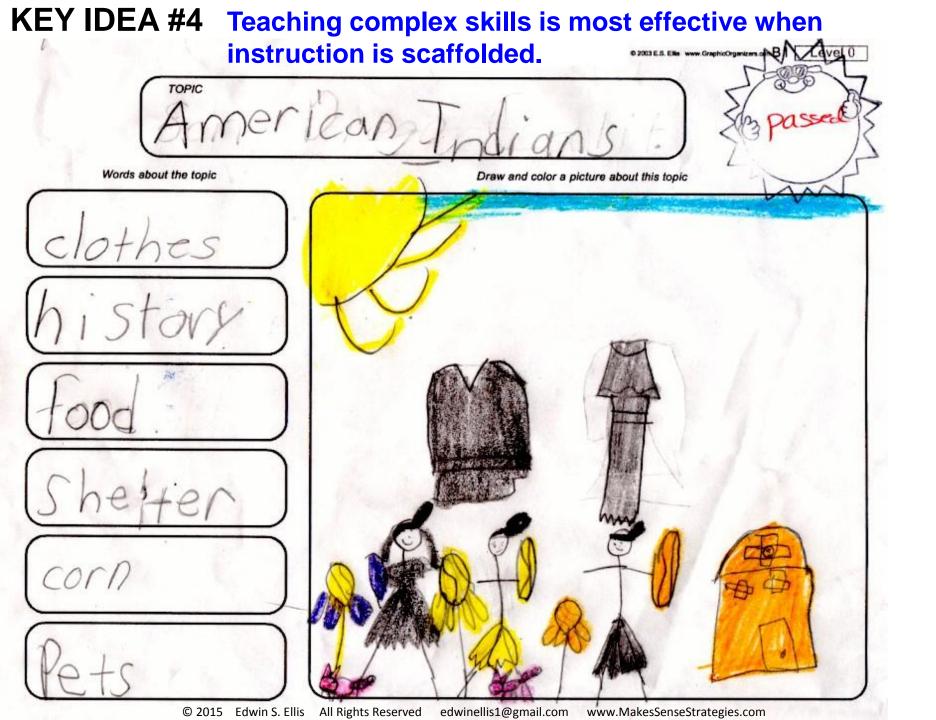
\* Standard-specific

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

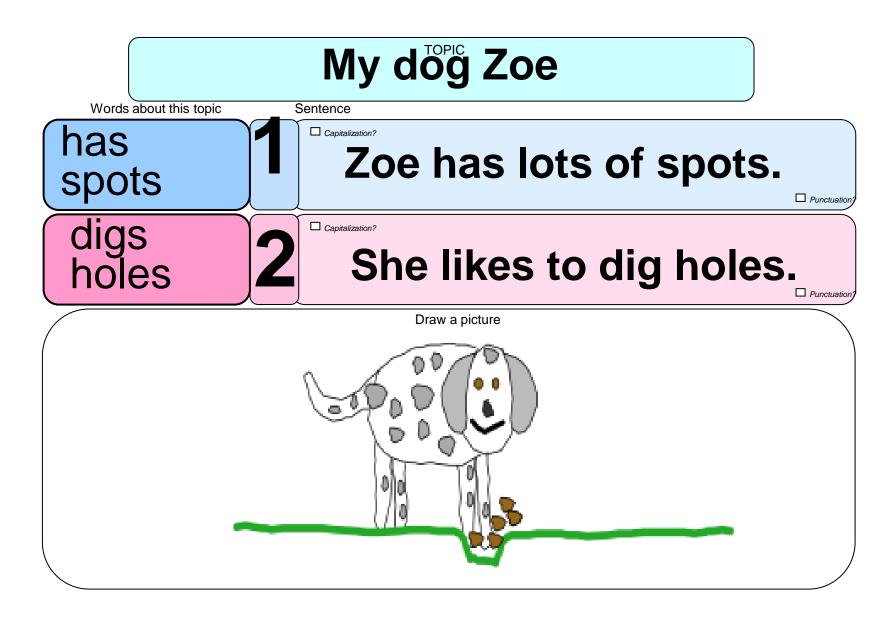


## KEY IDEA #4 Teaching complex skills is most effective when instruction is scaffolded.





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



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

**TOPIC** 

# Thanksgiving is my favorite holiday!

ORDER IDEA SENTENCE

Wearing costumes

At school we dress up like Pilgrims or Native Americans. That is really fun.

Native
Americans

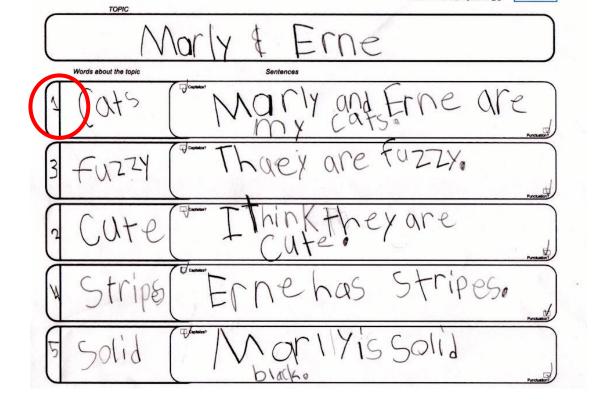
We visit Moundville and climb the mounds where the Native Americans lived. We see ceremonies and get our faces painted.

3 The feast!

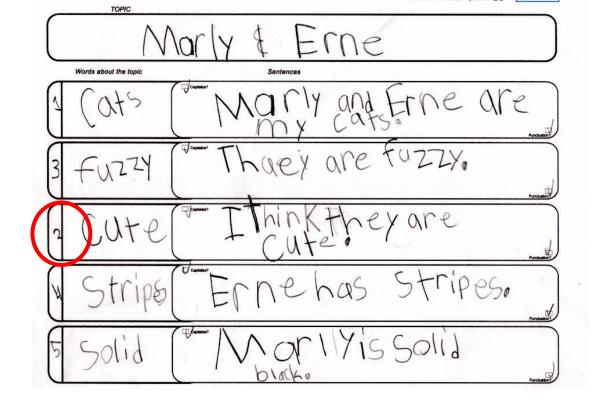
We have a Thanksgiving feast at school just like the Pilgrims and Native Americans had.

4 Out of school

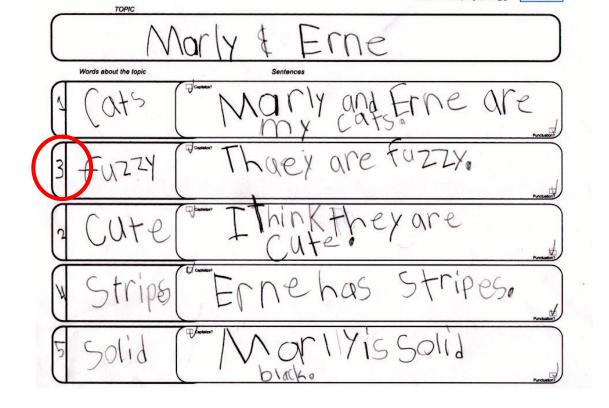
I also like to be out of school for a week, and I get to do things with my family.



Marly & Erne

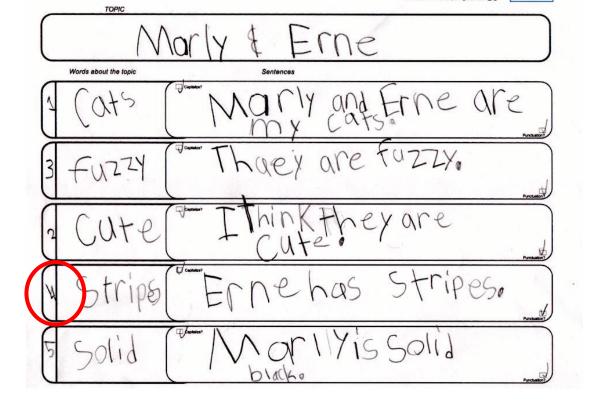


Marly & Erne Marly and Erne are my cats.



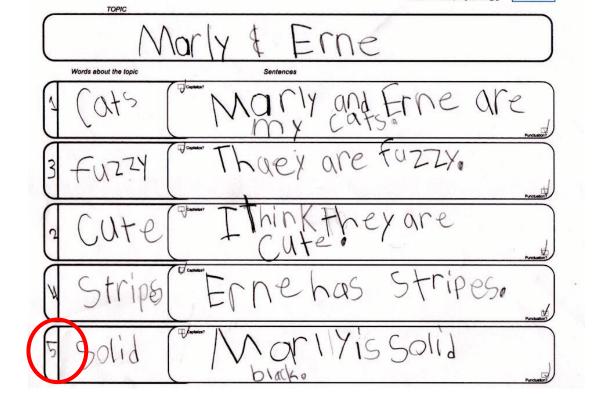
Marly & Erne

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.

TOPIC

# Recycling

INTRODUCTION This is about...

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

3 Reduces landfills...

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

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

4 Helps our climate...

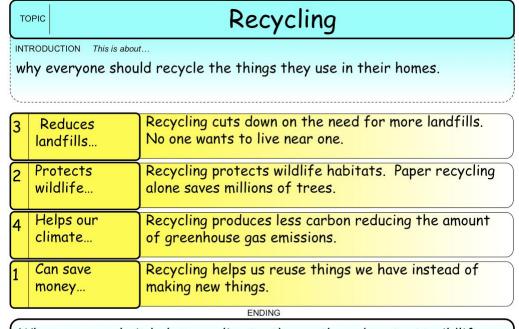
Recycling produces less carbon reducing the amount of greenhouse gas emissions.

Can save money...

Recycling helps us reuse things we have instead of making new things.

**ENDING** 

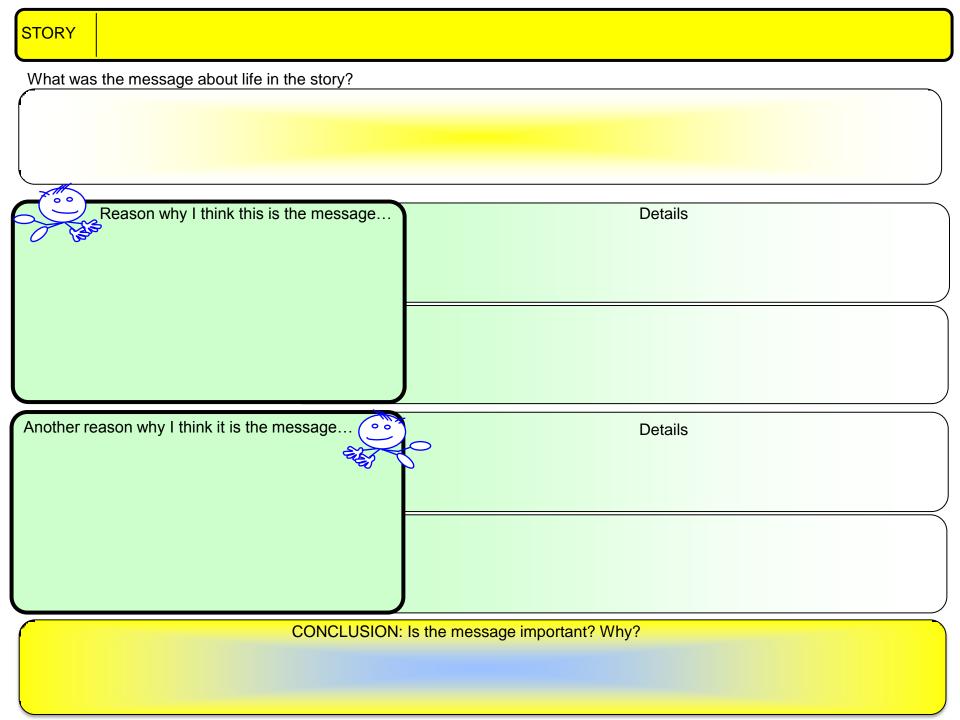
When we recycle it helps our climate, the earth, and protects wildlife. Also it is the right thing to do!



## Recycling

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

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!



# Mufaro's Beautiful Daughters

by John Steptoe

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.

Details

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.

# Mufaro's Beautiful Daughters

by John Steptoe

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.

Details

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...

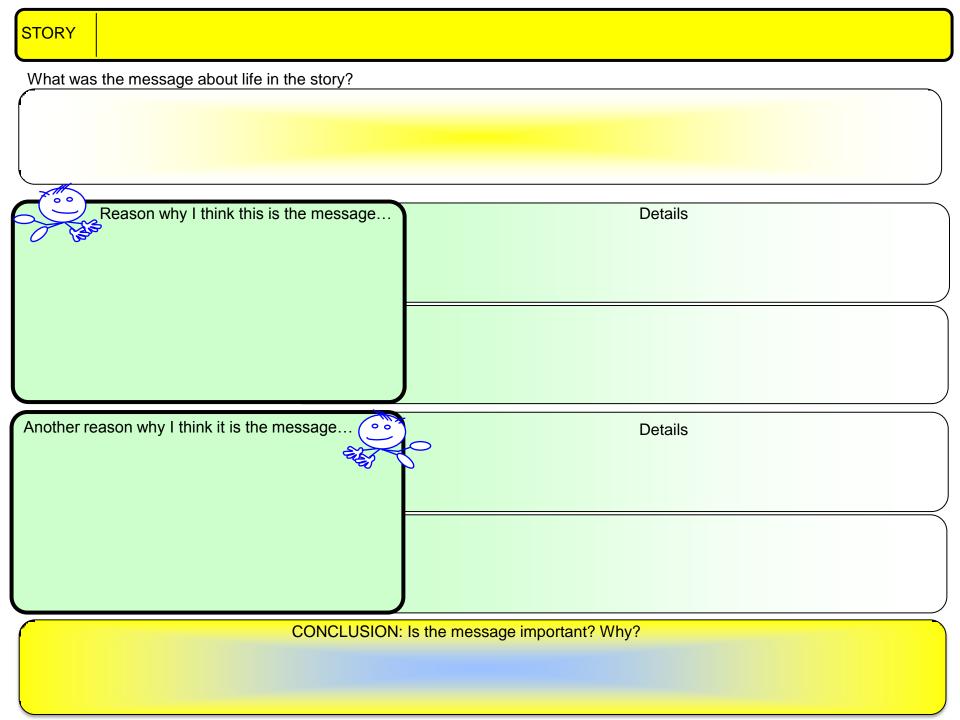
Manyara was mean to her sister and everyone.

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		
TOPIC of the story	THEME of the story is (author's unstated opinion or message about the story's topic)	
Description of an EVENT,	CHARACTER, or SETTING	CONNECTIONS TO THE THEME
Description of an EVENT,	CHARACTER, or SETTING	CONNECTIONS TO THE THEME
	CONCLUSION: Is	the message important? Why?

**STORY** 

## A Gathering of Days by Joan W. Blos

TOPIC of the story

challenges.

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

Circle of life

There are many circles of life that overlap.

#### Description of an EVELT, 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

#### 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-marries, 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

**STORY** 

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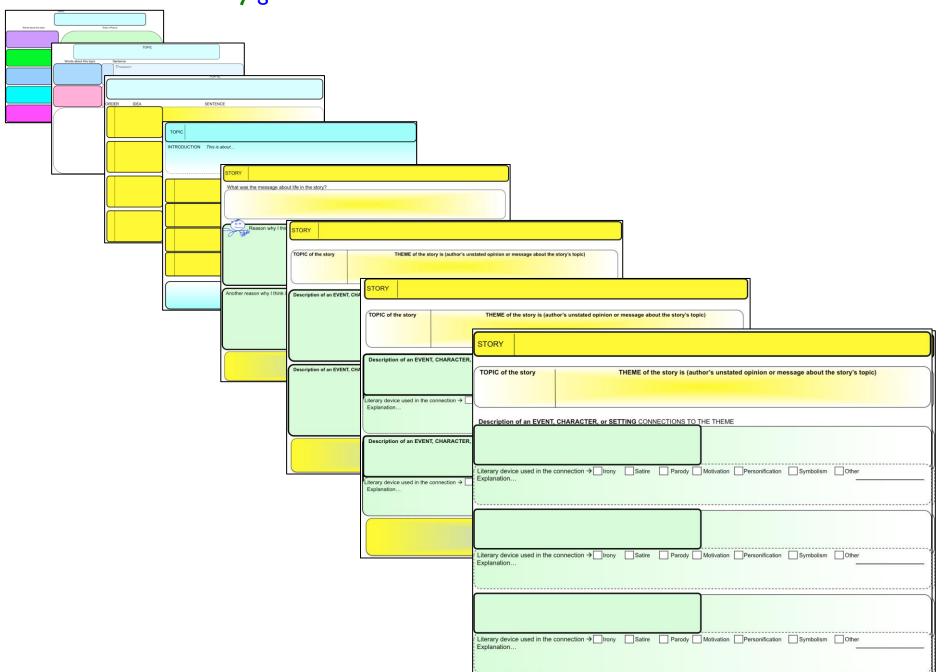
STORY		
TOPIC of the story	THEME of the	story is (author's unstated opinion or message about the story's topic)
Description of an EVENT	T, CHARACTER, or SETTING	CONNECTIONS TO THE THEME
Literary device used in the c Explanation	connection → Irony Satire	Parody Motivation Personification Symbolism Other
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Literary device used in the control Explanation	connection →  Irony  Satire	Parody Motivation Personification Symbolism Other
	CONCLUSION	: Is the message important? Why?

The Brave by Robert Lipsyte		
TOPIC of the story  THEME of the story is (author's unstated opinion or message about the story's topic)		
Growth & initiation	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 → ☐ Irony ☐ Satire ☐ Parody Motivation ☐ Personification ☐ Symbolism ☐ Other Explanation  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 → ☐ Irony ☐ Satire ☐ Parody ☐ Motivation ☐ Personification ☒ Symbolism ☐ Other Explanation  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		

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.

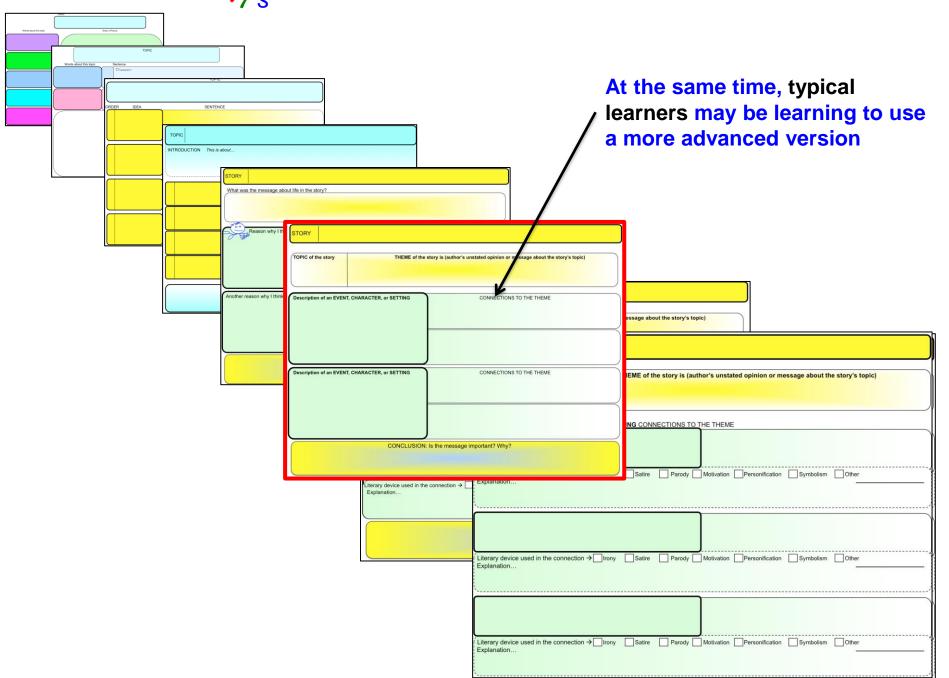
## ...rather, we build up to it Thus, we don't start with something this complex... INTRODUCTION This is about. What was the message about life in the story? TOPIC of the story THEME of the story is (author's unstated opinion or message about the story's topic) STORY Description of an EVENT, CH TOPIC of the story THEME of the story is (author's unstated opinion or message about the story's topic) STORY Description of an EVENT, CHARACTER, Description of an EVENT, CH TOPIC of the story THEME of the story is (author's unstated opinion or message about the story's topic) Literary device used in the connection → Description of an EVENT, CHARACTER, or SETTING CONNECTIONS TO THE THEME Satire Parody Motivation Personification Symbolism Other Literary device used in the connection → Irony iterary device used in the connection → Satire Parody Motivation Personification Symbolism Other Literary device used in the connection → Irony Literary device used in the connection → Irony Satire Parody Motivation Personification Symbolism Other

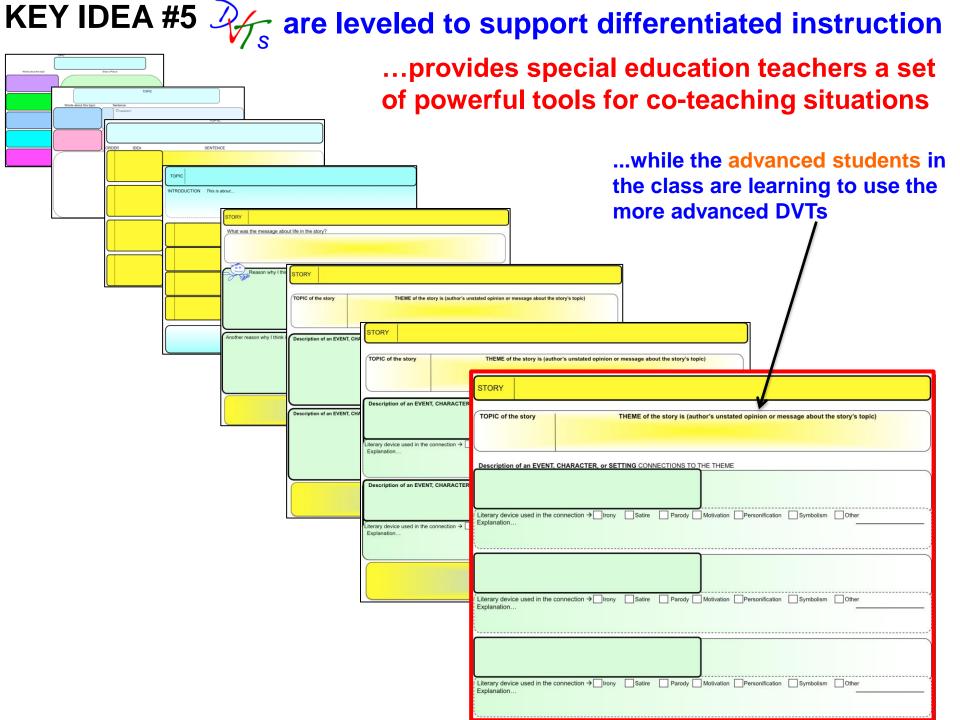
KEY IDEA #5 are leveled to support differentiated instruction



KEY IDEA #5 are leveled to support differentiated instruction Some struggling learners in a classroom may be learning to use this DVT because it matches their developmental levels INTRODUCTION This is about THEME of the story is (author's unstated opinion or message about the story's topic STORY Description of an EVENT, CHARACTER TOPIC of the story THEME of the story is (author's unstated opinion or message about the story's topic) Literary device used in the connection → Description of an EVENT, CHARACTER, or SETTING CONNECTIONS TO THE THEME Literary device used in the connection → Irony Satire Parody Motivation Personification Symbolism Other Explanation. iterary device used in the connection > Literary device used in the connection → Irony Satire Parody Motivation Personification Symbolism Other Literary device used in the connection → Irony Satire Parody Motivation Personification Symbolism Other

KEY IDEA #5 are leveled to support differentiated instruction







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

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





## 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

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





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

## For example, in middle school...

**SCIENCE** 

high-frequency topics by science content standards

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

**Phenomena** 

**Procedures** 

**Discovery** 

**Life Forms** 

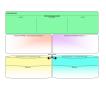
**Structures & Systems** 

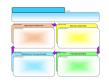
Theory

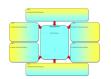
**Experiments** 

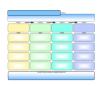
Research

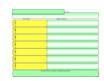
**IMPORTANT!** 



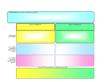


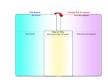


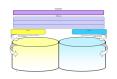














The Phenomena DVTs are different than the Theory DVTs because their generative essential understandings are different and the thinking patterns for understanding each are different

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





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

## For example, in middle school...

**SCIENCE** 

high-frequency topics by

science content standards

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



**Procedures** 

**Discovery** 

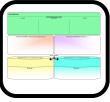
**Life Forms** 

**Structures & Systems** 

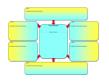
**Theory** 

**Experiments** 

Research











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

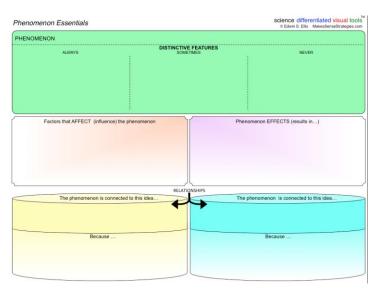
## Phenomenon Essentials ASN

## **CCSS Standards targeted by this DVT...**

## **Reading Science**

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

<u>CCSS.ELA-Literacy.RST.6-8.2</u> 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**

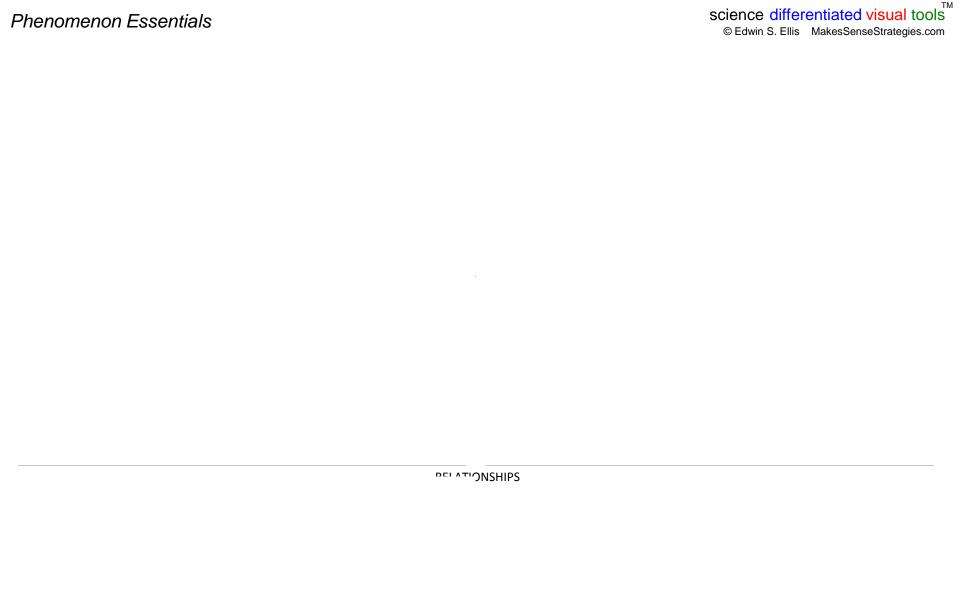
<u>CCSS.ELA-Literacy.RI.6.2</u> Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

<u>CCSS.ELA-Literacy.RI.7.3</u> 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.



#### **PHENOMENON**

### Laws of Thermodynamics

#### **ALWAYS**

Energy and matter are always entering and leaving organism systems and chemical reactions.

Heat energy is lost in every reaction

#### **DISTINCTIVE FEATURES**

SOMETIMES

Molecules and compounds are rearranged to drive reactions.

Energy is either stored or released in most reactions

#### NEVER

Energy and matter are never created or destroyed in any reaction.

#### Factors that AFFECT (influence) the phenomenon

The level of organization in an organism or system drives energy or heat transfer.

Highly organized systems will spontaneously fall apart without the constant input of more energy.

Phenomenon EFFECTS (results in...)

The Laws of Thermodynamics result in the gradual but consistent breakdown of matter into its simplest form.

Without these laws, organisms would have no need to create or consume energy compounds.

#### **RELATIONSHIPS**

The phenomenon is connected to this idea...

### Photosynthesis

Because...

Sunlight is captured and converted into chemical compounds.

Energy is stored at each step of Photosynthesis to BUILD organic compounds.

The phenomenon is connected to this idea...

#### Cell Respiration

Because...

Organic compounds are BROKEN down, releasing energy at every step.

This process eventually recycles the components assembled in photosynthesis.





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

### For example, in middle school...

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high-frequency topics by science content standards

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

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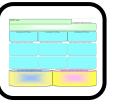
**Life Forms** 

**Structures & Systems** 

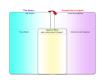
Theory

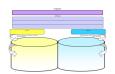
**Experiments** 

Research











### 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

**THEORY** name

science differentiated visual tools

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### Evolution by Natural Selection

Is supposed to explain how or why...

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

Differential Survival

# New Feature of the Theory Differential Reproduction

Inter-specific
Competition

Details, Examples and/or Evidence of Feature

An organism must be 'fit

Details, Examples and/or Evidence of Feature

Opposable thumb in primates that benefits tool use; allows species to manipulate their environment

An organism must be 'fit' enough to survive in its environment long enough to reach sexual maturity.

Two species cannot exist in the same place at the same time without competing for resources.

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

Those organisms who can survive to reproductive age have a greater chance of passing on their own genes.

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.

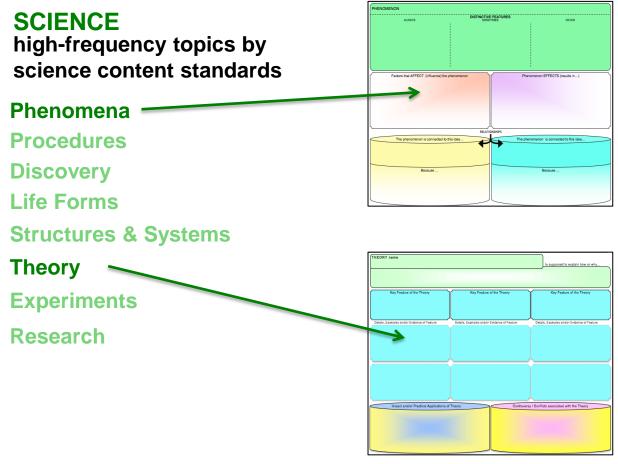
Controversy / Conflicts associated with the Theory

Evolution clashes with religious principles:
Creation vs. The Big Bang Theory



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

### For example, in middle school...



Both the visual design and the prompts differ in these DVTs because the generative essential understandings and thinking patterns associated with each topic differ

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





### 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

HISTORY

high-frequency topics by history content standards

**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

#### PERSON COMPARISONS

Summarize central ideas distinct from prior knowledge or opinions / Describe how a text presents (comparison) information

differentiated visual tools history © MakesSenseStrategies.com

**PERSON** Thomas Jefferson (Anti-Federalist)

**PERSON** James Madison (Federalist)

- **PFRSONAL** QUALITIES
- Displayed perseverance
- •Believed in education founded College of Virginia •Innovative - Created a way to copy his letters and
- notes
- \* Owned slaves yet wrote "All men are created equal" in Declaration of Independence
- Intelligent Courageous
- Determined

• To pass the Constitution • To unify the colonies

**GOALS** 

**ACTIONS** 

**IMPACT** 

- To secure personal rights and freedoms from the government for the citizens • Limit the power of the government
- Gathered support to block the ratification of the Constitution
- Negotiated the first 10 amendments, known as the Bill of Rights
- Impact was being the primary author of Declaration of Independence - set the stage for establishing a democratic government "of the people, by the people"
- Looked for ways to appease the colonists in order to get the Constitution passed

\* Wanted a strong (powerful) central government

 Allowing the Bill of Rights, the Constitution was ratified

By working to create the U.S. Constitution, Madison transformed ideas into a set of specific structures, laws, and processes for a "balance of powers"

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.





### 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

HISTORY

high-frequency topics by history content standards

People

**Event** 

Idea / Ideology

Issue / Conflict

**Era or Movement** 

**Structures & Systems** 

Policy / Law

**Process** 

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

#### Motivation Inferences

Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text



CHARACTER:

#### Sanger Rainsford

Brief description of the character's main **GOALS**...

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.

**EXPLICT INFORMATION PROVIDED BY TEXT** 

Based on the text clues, my INFERENCES about what motivated the character

CLUES about the character's PERSONALITY

Connections character's goals or actions

Who cares how the jaguar feels.

Where there are pistol shots, there are men

He has no compassion for the animals he hunts. (He does not put himself in another's position well.

Rainsford uses deductive reasoning to direct himself to a safer place than the sea

CLUES about the character's VALUES/BELIEFS about life or self

The world is made up of two classes—the hunters and the hunted. (p.1)

Connections character's goals or actions

Rainsford believes that he is strong and in the "hunter" class. (metaphorically, the hunters are the ones in control)

I have played the fox. Now I must play the cat of the fable.

Rainsford is a realist. He accepts that he must deal with being hunted.

CLUES about the character's **PRIOR EXPERIENCES** 

I've read your book about hunting snow leopards in Tibet. (p.13)

Not many men know how to make a Malay man-catcher. (p. 20)

Connections character's goals or actions

Rainsford wrote a book about hunting and is considered an expert.

Rainsford made this to try to fatally injure Zaroff. He uses his hunting and travel experiences to save himself from General Zaroff.

CLUES about the character's style of INTERACTING with OTHERS

The weather is making you soft. Be a realist. (p. 1)

I will agree to nothing of the kind. (p.18)

Connections character's goals or actions

Rainsford is condescending to his friend.

Rainsford will not agree to stay quiet about General Zaroff if he wins the game. He refuses to compromise his integrity.

#### My CONCLUSION about the character's motivation

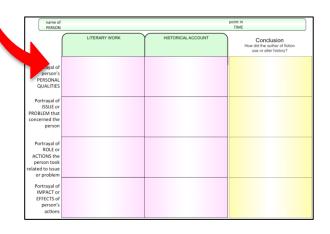
General Zaroff began hunting at an early age, and he had no remorse about it. His father fed his desensitization toward pain and death of animals with praise for his marksmanship. Then, he killed people in warfare. His experiences created a belief that the world was made for only strong and victorious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

S enable teachers to SEE the structure for addressing unfamiliar complex standards in relatively simple, straight-forward ways.

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.

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



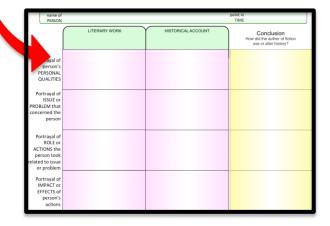
OURCE	
Define the issue or topic	
ummarize the issue / topic addressed by the author AND why is it important	4
xpose author's position (thesis) on the issue and/or purpose for addressing it	
e author's position on this issue/ topic seems to be AND/OR Qq, surhor's purpose for writing about this issue seems to be	
ack-up the position with reasoning and/or supporting evidence	
easoning and/or supporting evidence the author provided	
cknowledge conflicting evidence or alternative viewpoint	
hat author indicated was an alternative view of the issue or topic OR conflicting evidence	
arget a response to the conflicting evidence or alternative viewpoint	
sy point supporting the alternative viewpoint or evidence that conflicts with the author's view AND How the author responded to the key point or conflicting evidence	
sey point supporting the alternative viewpoint or evidence that conflicts with the author's view AND how the author responded to the key point or conflicting evidence	
s post supporting the attenuative viewpost or evidence that conflicts with the author's view AND now the author responded to the key point or conflicting evidence	
ay post appearing the alternative viewpoint or evidence that conflicts with the author's view AND from the author responded to the key point or conflicting evidence	
y perd augusting the diametric viewgold or evidence that conficin with the author's view AND then the author responded to the key point or conficting evidence.	
against appending the alternative presidence that conflicts with the author's view AND tree the author responded to the lawy point or conflicting endeads.  Explain your conclusion.	

KEY IDEA #7

Senable teachers to SEE the structure for addressing unfamiliar complex standards in relatively simple, straight-forward ways.

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.



For example...

SOURCE
Define the issue or topic
Summaries the leave I topic addressed by the author ANO why is it insportant
Expose author's position (thesis) on the issue and/or purpose for addressing it
The author's position on this issue / topic seems to be ANO/OR 200 softer's propose for writing about this issue seems to be
Back-up the position with reasoning and/or supporting evidence
Reasoning effort regarding evidence the sufter provided
Acknowledge conflicting evidence or alternative viewpoint
What author indicate was an atternative view of the issue or topic OR conflicting evidence
Target a response to the conflicting evidence or alternative viewpoint
Keep point supporting the aftermixen everagent or evidences that conflicts with the author's view AND rise the author's responded to the key point or conflicting evidence
Kee good supporting the afternative enterposit of excitation that contains with the author's over AND rise the author's responded to the key post of containing enterines
Explain your conclusion

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name of PERSON			point in TIME
	LITERARY WORK	HISTORICAL ACCOUNT	Conclusion  How did the author of fiction use or alter history?
Portrayal of person's PERSONAL QUALITIES			
Portrayal of ISSUE or PROBLEM that concerned the person			
Portrayal of ROLE or ACTIONS the person took related to issue or problem			
Portrayal of IMPACT or EFFECTS of person's actions			

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	ame of ERSON	Henry M	point in 1st quarter of Queen Victoria's TIME reign	
		LITERARY WORK <u>Dodger</u> by Terry Pratchett	HISTORICAL ACCOUNT <u>London Labour and the</u> <u>London Poor</u> by Henry Mayhew	Conclusion  How did the author of fiction  use or alter history?
Portray per PERSC QUAL	rson's ONAL	Opened home to mysterious girl He and his wife took care of her Interested in London's poorest Kind, compassionate Not rich, but not poor Generous	Friend of Charles Dickens Journalist, playwright, social researcher, and advocate of reform Co-founder of magazine <i>Punch</i> . Skilled storyteller	The author described him mainly as a caring and generous gentleman. He did not describe his other occupations such as playwright or journalist.
PROBLEM concerned	UE or that	Wanted to improve conditions for London's poorest Concerned about lack of clean water, health care, rats, overflowing sewers	Many people flooded into London Very poor, harsh conditions Overflowing sewers and septic tanks Cholera and other diseases	The author described the conditions in London accurately according to historical accounts particularly the work by the real Henry Mayhew.
Portray RO ACTIONS person related to or pro	S the took issue	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	Used facts and statistics Walked around the streets chatting with orphans, street venders, prostitutes, etc to learn about conditions Wrote describing their lives	This was very similar to history. Henry Mayhew did write his books/articles based on his interviews with the real people of London.
•	CT or	His kindness to Simplicity helped save her life	His books/articles influenced many writers Gave a voice to London's poor The impact was immediate Raised money for the people he wrote about	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.

name of PERSON			point in TIME
$\mathcal{V}$	LITERARY WORK	HISTORICAL ACCOUNT	Conclusion How did the author of fiction use or after history?
ayal of person's			
PERSONAL QUALITIES			
Portrayal of ISSUE or			
PROBLEM that concerned the person			
Portrayal of ROLE or			
ACTIONS the person took related to issue			
or problem			
Portrayal of IMPACT or			
EFFECTS of person's actions			

SOURCE
Define the issue or topic
documented the lease I large addressed by the author AND why is it insportant
Expose author's position (thesis) on the issue and/or purpose for addressing it
The author's position on this laser / lagic seems to be ANDOR Equivaries propose for writing about this base seems to be
Back-up the position with reasoning and/or supporting evidence
Research and the responding evidence the author provided  Acknowledge conflicting evidence or alternative viewpoint
Oblit Author Included was an alternative view of the lasse or tagic OR coefficing excesses
Target a response to the conflicting evidence or alternative viewpoint
ting pendi supporting the adherentine viseopoid or evidence that conflicts with the author's view AND raw the author's responded to the key point or conflicting evidence
See point augusting the alternative revergence or evidence that conflicts with the auditor's view AND rave the auditor's required to the large point or conflicting evidence.
Explain your conclusion

For example...

## Author's Response to Conflicting Evidence

### **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.



#### SOURCE Danielle Dellorto http://www.cnn.com/2011/HEALTH/05/31/who.cell.phones/

#### **D**efine the issue or topic

Summarize the issue / topic addressed by the author AND why is it important

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.

#### Expose author's position (thesis) on the issue and/or purpose for addressing it

The author's position on this issue / topic seems to be... AND/OR The author's purpose for writing about this issue seems to be...

Danielle Dellorto wrote this article that claims cell phones cause brain cancer in order to warn the audience about these risks.

### **B**ack-up the position with reasoning and/or supporting evidence

Reasoning and/or supporting evidence the author provided

Dellorto  $\rightarrow$  W.H.O. included mobile phones on "carcinogenic hazards" list (same category as lead, engine exhaust & chloroform). Dellorto quoted Dr. K. Black: "What microwave cell phone radiation does is similar to what happens to food in microwaves, essentially cooking the brain," 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.

### Acknowledge conflicting evidence or alternative viewpoint

What author indicated was an alternative view of the issue or topic OR conflicting evidence

Cell phone manufacturers claim cell phones to be safe when used away from the human body. BlackBerry Bold advises users to "keep the BlackBerry device at least 0.98 inch (25 millimeters) from your body when the BlackBerry device is transmitting."

#### Target a response to the conflicting evidence or alternative viewpoint

Key point supporting the alternative viewpoint or evidence that conflicts with the author's view AND How the author responded to the key point or conflicting evidence

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.

Key point supporting the alternative viewpoint or evidence that conflicts with the author's view AND How the author responded to the key point or conflicting evidence

The Wireless Association added that W.H.O. researchers "did not conduct any new research, but rather reviewed published studies." Dellorto

→ "The European Environmental Agency has pushed for more studies, saying cell phones could be as big a public health risk as smoking, asbestos and leaded gasoline."

#### Explain your conclusion

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?

 $\mathcal{H}_s$  are powerful tools for watering up the curriculum, but how educators teach with them is equally important.

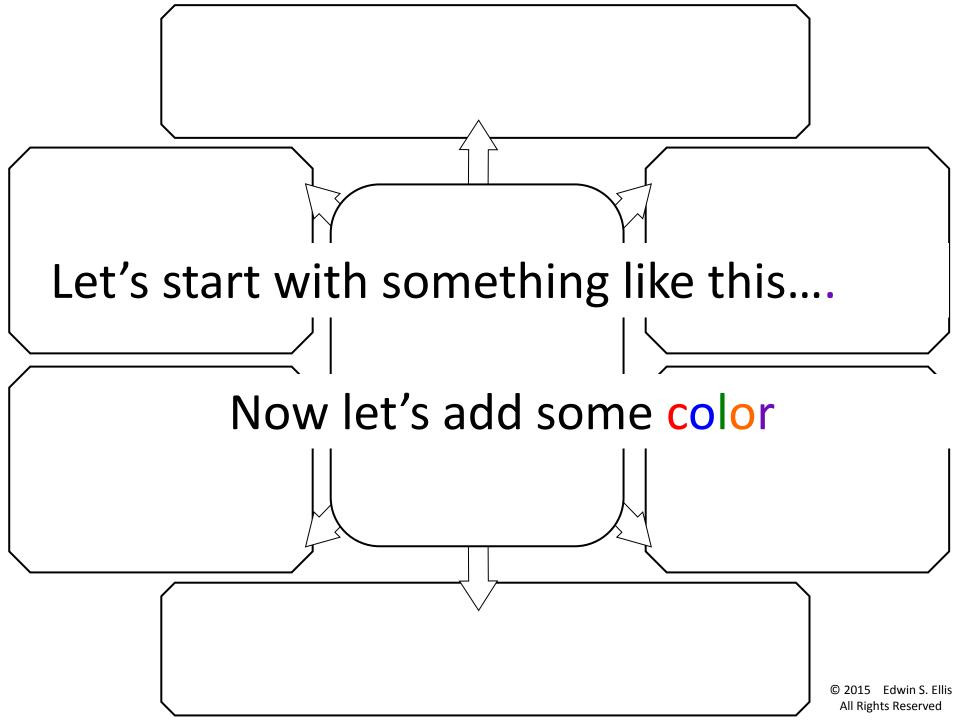
"Stratagems" for using DVTs effectively...

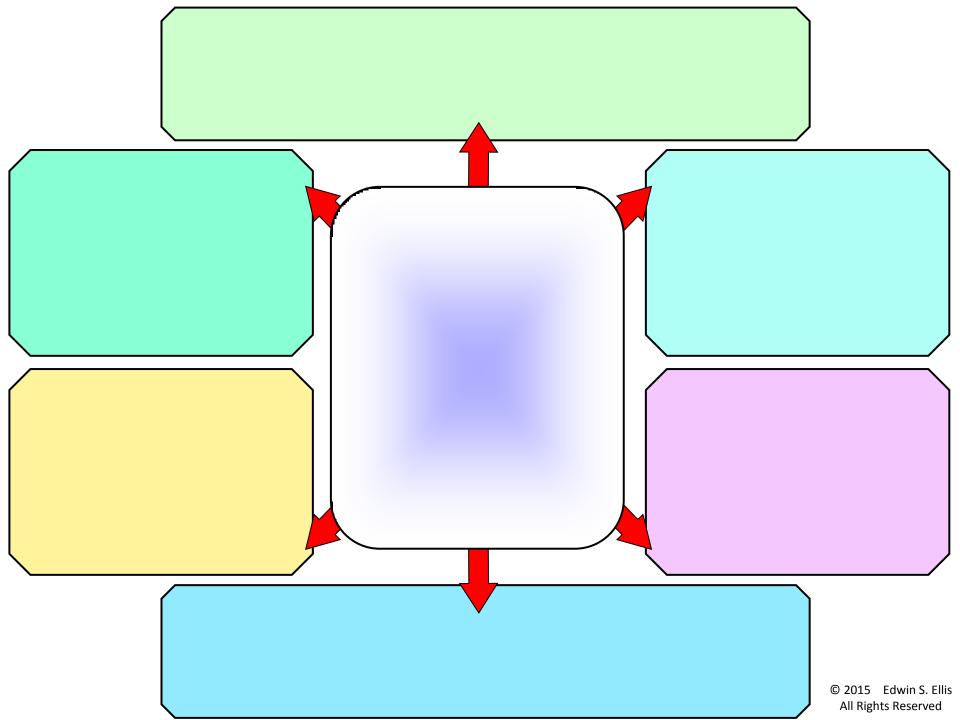
....BEFORE the lesson to review prior learning and/or preview or introduce essential questions that the lesson will address;

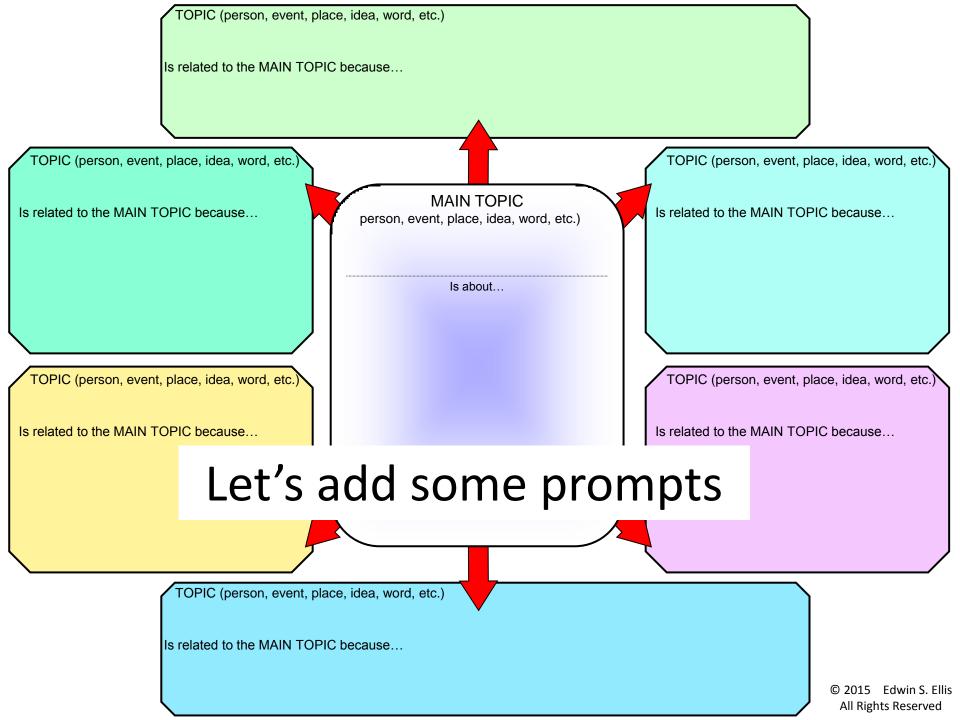
....DURING the heart of the lesson to provide clear, explicit instruction that is scaffolded (gradual release);

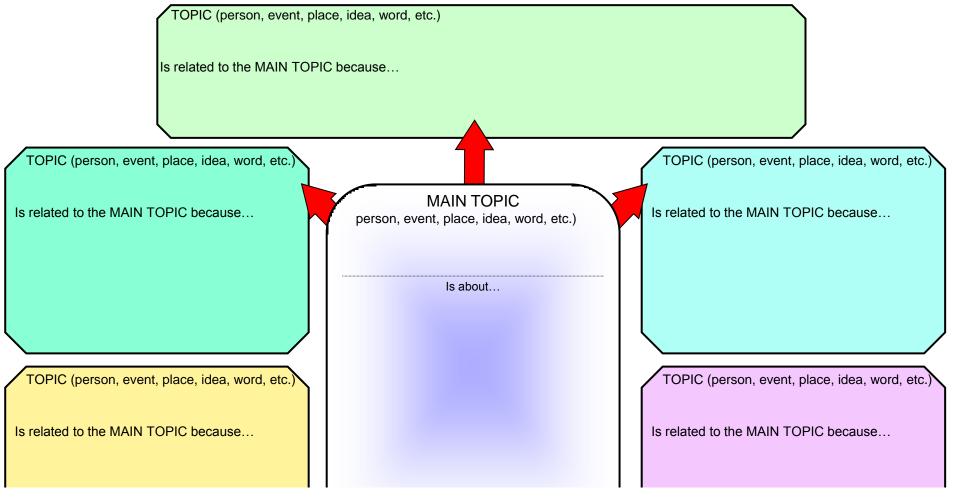
....AFTER the lesson to facilitate reflective reviews of essential understandings as well as essential questions.

The following slides illustrates the "Rotated Visuals" Stratagem









# WHAT IF...

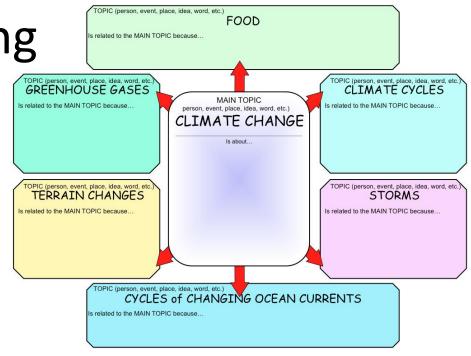
# The teacher identified the key terms for each topic?

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TOPIC (person, event, place, idea, word, etc.) FOOD Is related to the MAIN TOPIC because... TOPIC (person, event, place, idea, word, etc.) TOPIC (person, event, place, idea, word, etc.) GREENHOUSE GASES CLIMATE CYCLES **MAIN TOPIC** Is related to the MAIN TOPIC because... Is related to the MAIN TOPIC because... person, event, place, idea, word, etc.) CLIMATE CHANGE Is about... TOPIC (person, event, place, idea, word, etc.) TOPIC (person, event, place, idea, word, etc.) TERRAIN CHANGES STORMS Is related to the MAIN TOPIC because... Is related to the MAIN TOPIC because... TOPIC (person, event, place, idea, word, etc.) CYCLES of CHANGING OCEAN CURRENTS Is related to the MAIN TOPIC because... © 2015 Edwin S. Ellis All Rights Reserved

When could something like this be used?

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



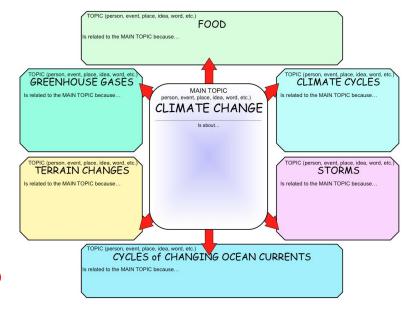
Could students use it to plan an in-class debate?

# When could something like this be used?

Could it be used at the BEGINNING of a lesson?

Review previously taught terms?

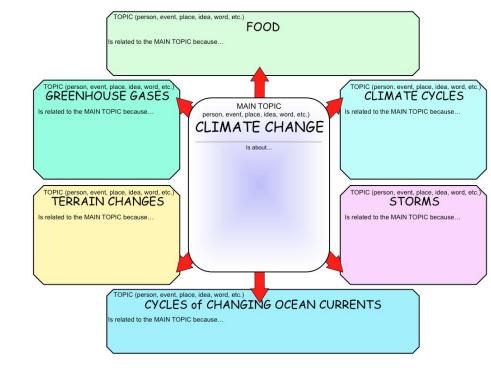
Pre-teach new terms?



### Could it be used DURING the lesson?

Guided Reading / Note-taking?

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



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

### Team adds one idea to the visual

TOPIC (person, event, place, idea, word, etc.)
GREENHOUSE GASES

Is related to the MAIN TOPIC because...

TOPIC (person, event, place, idea, word, etc.)
TFRRAIN CHANGES

Is related to the MAIN TOPIC because...

MAIN TOPIC

person, event, place, idea, word, etc.)

CLIMATE CHANGE

Is about...

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

TOPIC (person, event, place, idea, word, etc.)

Is related to the MAIN TOPIC because...

TOPIC (person, event, place, idea, word, etc.)

Is related to the MAIN TOPIC because...

TOPIC (person, event, place, idea, word, etc.)

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...

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Team adds one idea to the visual

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

TOPIC (person, event, place, idea, word, etc.)
TERRAIN CHANGES

Is related to the MAIN TOPIC because...

### 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.

TOPIC (person, event, place, idea, word, etc.) **STORMS** 

Is related to the MAIN TOPIC because...

TOPIC (person, event, place, idea, word, etc.)

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...

Team adds one idea to the visual

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

Passes it to another team who then has to add <u>something</u> <u>different...</u>

### 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.

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

TOPIC (person, event, place, idea, word, etc.)

Is related to the MAIN TOPIC because...

TOPIC (person, event, place, idea, word, etc.)

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...

Team adds *one* idea to the visual

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

Passes it to another team who then has to add <u>something</u> <u>different</u>...

### 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.

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

TOPIC (person, event, place, idea, word, etc.)

Is related to the MAIN TOPIC because...

**ETC** 

TOPIC (person, event, place, idea, word, etc.)

CYCLES of CHANGING OCEAN CURRENTS

Is related to the MAIN TOPIC because...

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.

TOPIC (person, event, place, idea, word, etc.)

FOOD

Is related to the MAIN TOPIC because...

At same time population is exploding, food may become more

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.

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

temperatures predicted to increase 4-11 degrees.

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

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

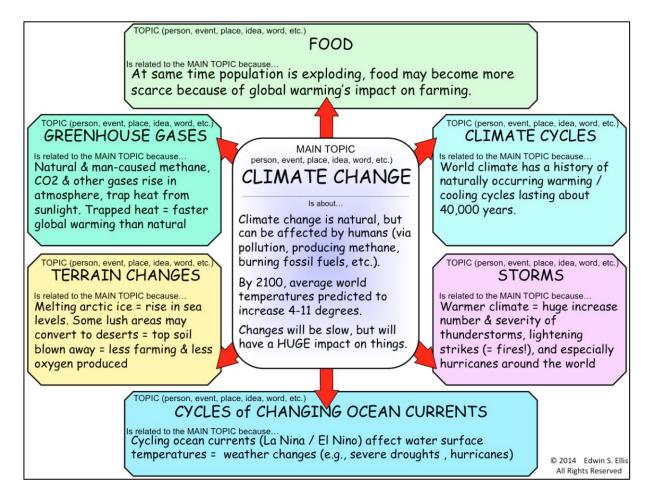
TOPIC (person, event, place, idea, word, etc.)

### 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)



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

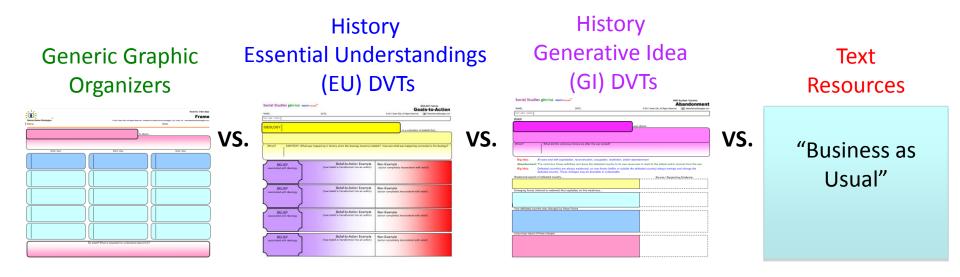
Teachers and students like and value DVTs - both groups view DVTs as teaching/learning tools that significantly REDUCE COGNITIVE LOAD

The following slides provide a brief overview of specific studies. To read more about DVT theoretical basis and research, see...

Ellis, E.S., Wills, S, & Deshler, D. (2011). Toward validation of the Genius Discipline-specific Literacy Model. <u>Journal of Education</u>, 191 (1), 13-32.



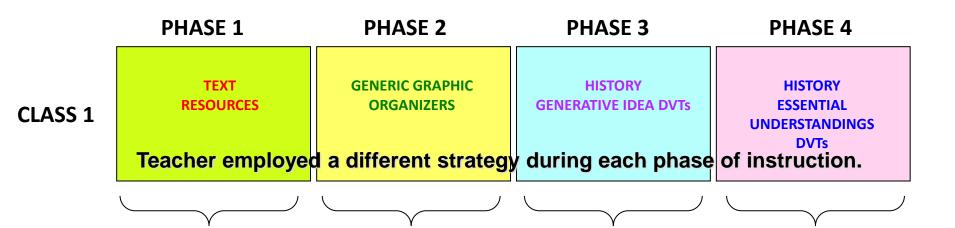
### This study compared the relative impact of....



...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





Pre & Post measures of students'

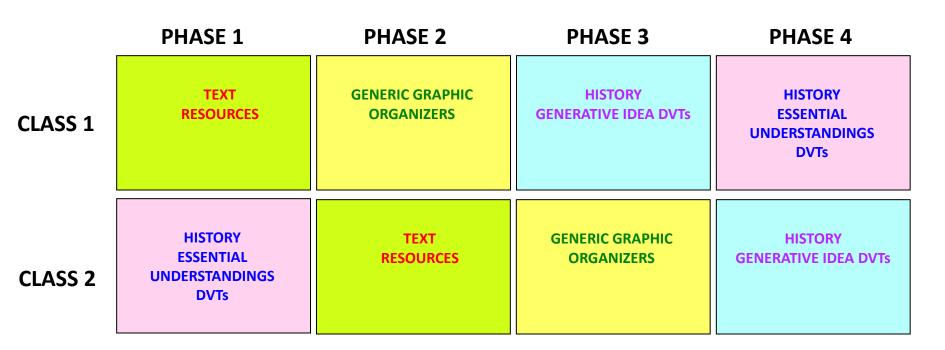
Breadth of knowledge

Depth of knowledge

**Accuracy of knowledge** 

Learning measured for each phase





2nd teacher used same strategies, but in a different order

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
CLASS 1	TEXT RESOURCES	GENERIC GRAPHIC ORGANIZERS	HISTORY GENERATIVE IDEA DVTs	HISTORY ESSENTIAL UNDERSTANDINGS DVTs
CLASS 2	HISTORY ESSENTIAL UNDERSTANDINGS DVTs	TEXT RESOURCES	GENERIC GRAPHIC ORGANIZERS	HISTORY GENERATIVE IDEA DVTs
CLASS 3	HISTORY GENERATIVE IDEA DVTs	GENERIC GRAPHIC ORGANIZERS	TEXT RESOURCES	HISTORY ESSENTIAL UNDERSTANDINGS DVTs
CLASS 4	GENERIC GRAPHIC ORGANIZERS	HISTORY ESSENTIAL UNDERSTANDINGS DVTs	HISTORY GENERATIVE IDEA DVTs	TEXT RESOURCES



### depth / breadth / accuracy of knowledge

**AVOVA statistical analysis** 

**Tukeys Post Hoc Analysis** 

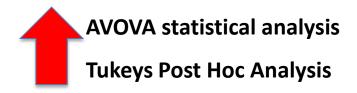
		High Achieving	Typical Achieving	Low Achieving	Learning Disabilities
Generic Graphic Organizers	3rd				
ifferentiated Essential	1st	El	J DVTs — supe	erior to> GI DV	Ts
Jools Understanding D		EU	J DVTs — supe	erior to <del>&gt;</del> Tradit	tional
Differentiated Generative Ideas  Soul DVTs	2nd		eneric Os — supe	rior to -> Tradi	tional
Traditional Discussion / Guided Note Taking	4th	Same	results, rega	rdless of stud	lent- type



EU DVTs had the greatest impact on all students depth of relational understanding.



### depth / breadth / accuracy of knowledge



	High Achieving	Typical Achieving	Low Achieving	Learning Disabilities
Generic Graphic Organizers  2nd	EU	DVTs — supe	rior to GI DV	Ts
Differentiated Essential 1st Tools Understanding DVTs		neric supe	rior to → Tradit rior to → GI DV	
Jifferentiated Generative Ideas Tools DVTs 3rd		neric sune	rior to -> Tradit	tional
Traditional Discussion / Guided Note Taking 4th	Same	esults, regar	dless of stud	lent- type



Again... EU DVTs had the greatest impact on <u>all</u> students breadth of relational understanding.



### depth / breadth / accuracy of knowledge



	High Achieving	Typical Achieving	Low Achieving	Learning Disabilities
Generic Graphic Organizers				
Differentiated Essential Fools Understanding DVTs	no	significant o	differences	
Jifferentiated Generative Ideas  Jools DVTs				
Traditional Discussion / Guided Note Taking				

In other words, on measures of accuracy of new knowledge, each treatment worked equally

**32 High Achieving** 



### Amount of new knowledge

	WEEK 1	WEEK 2
Teacher A	Teaches 1 <sup>st</sup> mini-unit using traditional guided note-taking / discussion instruction	Teaches 2nd mini-unit using History EU DVts  Differentiated Fiscal Fools
Teacher B	Teaches same 1 <sup>st</sup> mini-unit using History EU DVts  Jifferentiated Fiscally Tools	

Changes in students' knowledge about the mini-unit topic are measured at end of each mini-unit

32 Low Achieving

16 Students w/LD

32 Typical Achieving

**32** High Achieving



WFFK 2

16 Students w/LD

### Amount of new knowledge

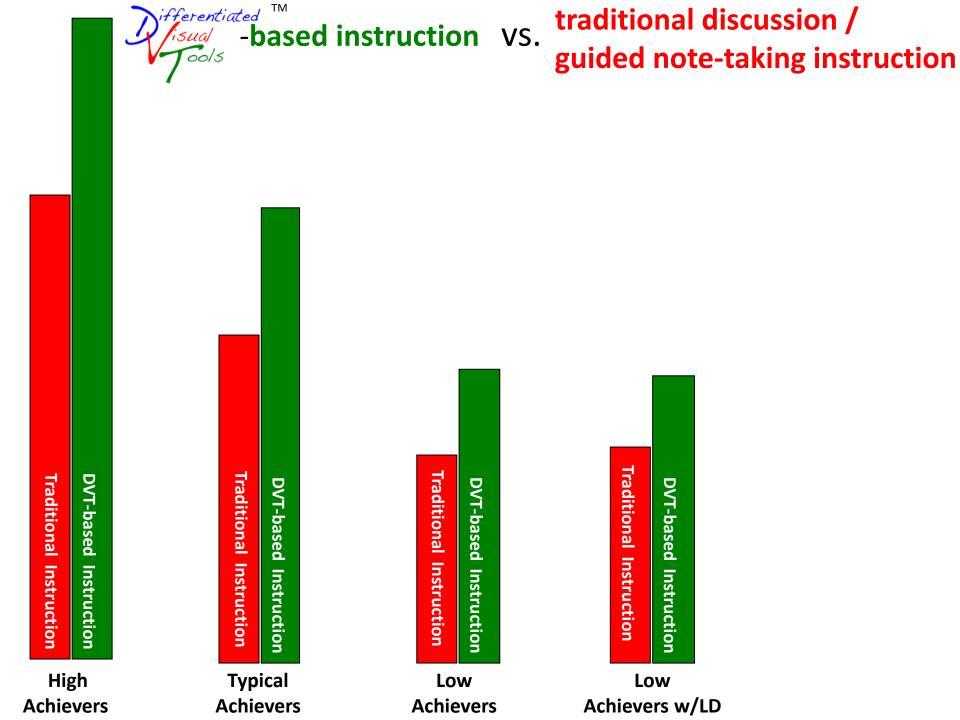
WFFK 1

**32 Typical Achieving** 

	VVLLKI	WLLK Z
Teacher A	Teaches 1 <sup>st</sup> mini-unit using traditional guided note-taking / discussion instruction	Teaches 2nd mini-unit using History EU DVts  Differentiated Fisher  Fi
Teacher B	Teaches same 1 <sup>st</sup> mini-unit using History EU DVts  Wifferentiated History Fools	Teaches same 2nd mini-unit using traditional guided note-taking / discussion instruction

Changes in students' knowledge about the mini-unit topic are measured at end of each mini-unit

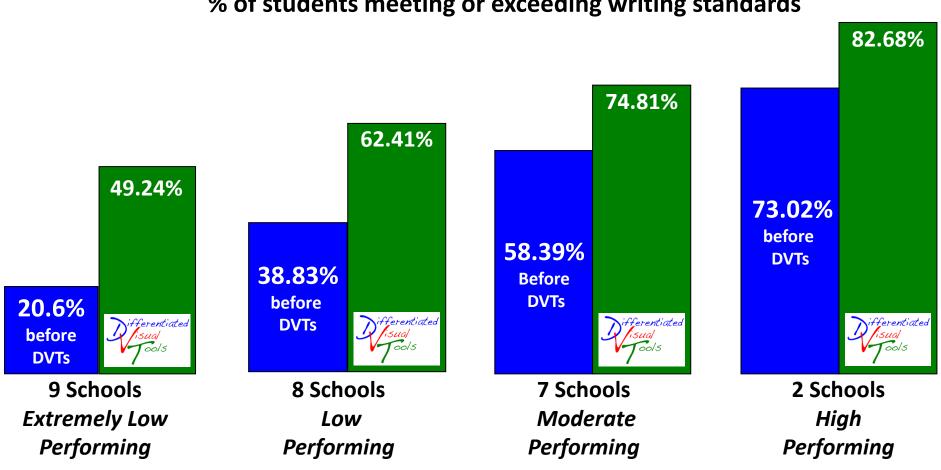
**32 Low Achieving** 





## Impact on writing assessment across schools with different performance histories

% of students meeting or exceeding writing standards



### Semi-rural 5th grade Alabama Writing Assessment

### % students meeting or exceeding standards

			ifferentiated		
	Year 1	Year 2	Year 3	Year 4	
	Business-as-usual		DVTs impl	DVTs implementation	
School #1	36.1	28.08	51.43	81.0	
			+ 23 pts.	+30 pts.	
School #2	22.0	10.0	62.24	71.0	
3011001 112			+ 52 pts.	+ 9 pts.	

### **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

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

### **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)

# Visualizing Disciplinary Thinking

# 10 KEY IDEAS about



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University of Kansas Center for Research on Learning



