Teaching Science
to English Learners (ELs)
through the Colorado English Language Proficiency (CELP) Standards

Rebekah Ottenbreit
Office of Culturally and Linguistically Diverse Education

Raise your hand if you are:

- A science teacher

- Another content area teacher

- An elementary school classroom teacher

- A bilingual education classroom teacher

- An ESL teacher

- A coach

- An administrator

- Here as a co-teaching team

- Here as a school team

➢Build awareness of WIDA's Can Do Philosophy and the Guiding Principals of Language Development

➢Learn strategies to teach the language of science in order to provide access to science content for English Learners and support academic language learning for all students
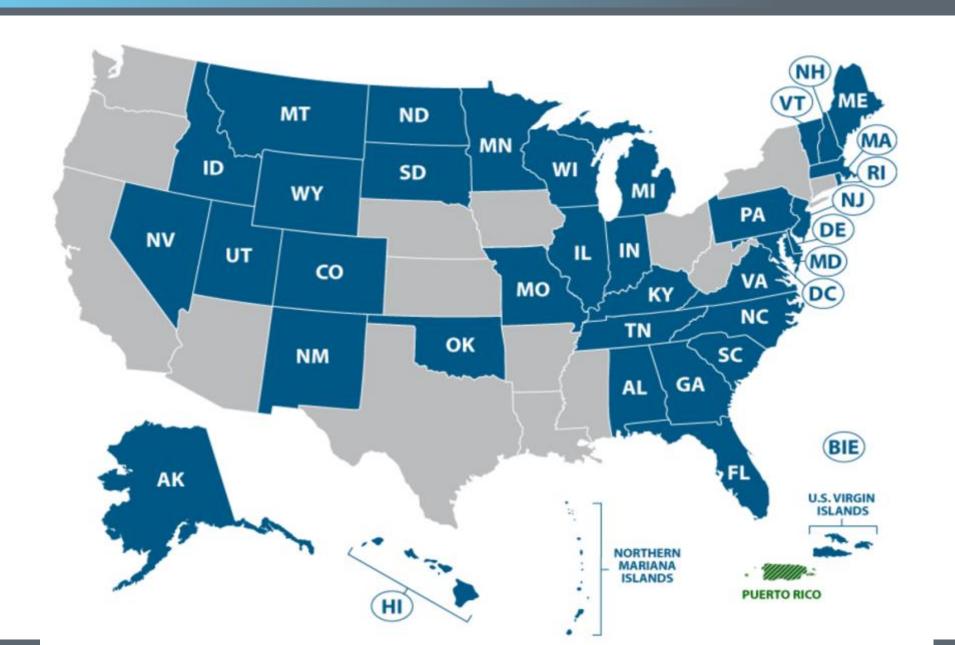
➢*Pick at least one strategy to start using tomorrow*

WIDA's Mission Statement

To promote educational equity and academic achievement for linguistically and culturally diverse students through the development and dissemination of curricular, instructional, and assessment products and resources.

WIDA Consortium States

Can Do Philosophy

WIDA Believes in Language Learners' Assets, Contributions, and Potential		
Assets	**Contributions**	**Potential**
Linguistic	Knowledge of multiple languages, varying representation of ideas, metalinguistic and metacognitive awareness, diverse strategies for language learning	Bi- or multilingual practices, abilities which learners utilize to communicate effectively across multiple contexts, multiple ways of expressing their thinking
Cultural	Different perspectives, practices, beliefs, social norms, ways of thinking	Bi- or multicultural practices as well as unique and varied perspectives, ability to develop relationships in a global society, ability to navigate a variety of sociocultural contexts
Experiential	Varied life and educational experiences, exposure to unique topics, diverse approaches to learning and expressing content knowledge	Enrichment of the school curriculum, extracurricular, and community opportunities, success in school and beyond
Social and Emotional	Personal interests and needs, awareness of/empathy for diverse experiences, knowledge and enrichment of community resources	Ability to form and sustain positive relationships, and broker meaningful interactions among peers and others within and beyond school

**The Cornerstone of WIDA's Standards:
Guiding Principles of Language Development**

1. Students' languages and cultures are valuable resources to be tapped and incorporated into schooling.

   Escamilla & Hopewell (2010); Goldenberg & Coleman (2010); Garcia (2005); Freeman, Freeman, & Mercuri (2002); González, Moll, & Amanti (2005); Scarcella (1990)

2. Students' home, school, and community experiences influence their language development.

   Nieto (2008); Payne (2003); Collier (1995); California State Department of Education (1986)

3. Students draw on their metacognitive, metalinguistic, and metacultural awareness to develop proficiency in additional languages.

   Cloud, Genesee, & Hamayan (2009); Bialystok (2007); Chamot & O'Malley (1994); Bialystok (1991); Cummins (1978)

Student Portrait

Language

Culture/ Community

Academic Strengths

Family History

Educational History

Meet Raul

Raul is able to read more complex texts when he works with a partner to engage in pre-reading activities.

Raul is a 6th Grade Student who immigrated from Mexico to the United States with his family when he was in 4th grade.

Raul takes time to prepare his answers to questions in class and prefers time to practice with models of writing and graphic organizers.

Raul is literate in his L1, which is Spanish.

He enjoys playing soccer and using tools. He is learning to repair bicycles.

ACCESS Scores
Listening: 3.2
Speaking: 4.0
Reading: 2.6
Writing: 2.1

Raul writes stories with simple sentences and general vocabulary. He prefers to write informational texts and is beginning to write more complex sentences.
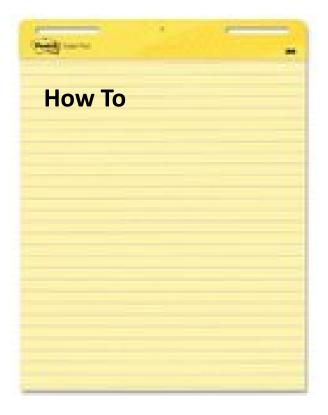
Raul prefers to read graphic novels.

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How to Gather a Student Portrait

- Brainstorm how to gather a student portrait
- Put your ideas on chart paper

How To

The Features of Academic Language in WIDA's Standards

The Features of Academic Language operate within sociocultural contexts for language use.

	Performance Criteria	Features
Discourse Level	**Linguistic Complexity** *(Quantity and variety of oral and written text)*	Amount of speech/written text Structure of speech/written text Density of speech/written text Organization and cohesion of ideas Variety of sentence types
Sentence Level	**Language Forms and Conventions** *(Types, array, and use of language structures)*	Types and variety of grammatical structures Conventions, mechanics, and fluency Match of language forms to purpose/perspective
Word/Phrase Level	**Vocabulary Usage** *(Specificity of word or phrase choice)*	General, specific, and technical language Multiple meanings of words and phrases Formulaic and idiomatic expressions Nuances and shades of meaning Collocations

The sociocultural contexts for language use involve the interaction between the student and the language environment, encompassing the...

- Register
- Genre/Text type
- Topic
- Task/Situation
- Participants' identities and social roles

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Sociocultural context

Language...

- does not exist in a vacuum

- is closely linked to culture

- involves the interaction between the student and the learning environment

Standard		Abbreviation
English Language Development Standard 1	English language learners **communicate** for **Social** and **Instructional** purposes within the school setting	Social and Instructional language
English Language Development Standard 2	English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Language Arts**	The language of Language Arts
English Language Development Standard 3	English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Mathematics**	The language of Mathematics
English Language Development Standard 4	English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Science**	The language of Science
English Language Development Standard 5	English language learners **communicate** information, ideas and concepts necessary for academic success in the content area of **Social Studies**	The language of Social Studies

Activity

Compare and contrast your two favorite candies.

"Observation"

What	How
Academic Concept	**Academic Language**
• Scientific observation is the central to the scientific method or process. • What can we observe? • I observed that my seedling grew in the direction of the light source. • We can make observations using our senses and recording information using scientific tools and instruments. • Based on observations we can form a hypothesis.	• Who are the subjects? What do they look like? What are they doing? • How is the environment affecting behavior? • I predict that … • After a week, I learned that… • I observed … by using a (e.g., scale, ruler, telescope, etc.). • Brand A papertowel is twice as thick as Brand B papertowel. • It (smelled, looked, felt, etc.) …

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Cognitive Functions

Thinking, not language dependent

Language Functions (WIDA Can Do Key Uses)

- Compare and contrast
- Persuade, argue, justify, defend, blame
- Question, ask for, request
- Express like or dislike, compliment or complain
- Recount
- Summarize, paraphrase
- Predict
- Agree or disagree
- Describe
- Explain
- Discuss
- Advise, suggest, warn
- Offer
- Inform
- Speculate
- Clarify
- Apologize

Linking Content to Language

Critical Language…	
EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend the critical language in the following statement: *"Mark Twain exposes the hypocrisy of slavery through the use of satire."*	The Academic and Technical (Tier 2 and Tier 3) ***vocabulary, semantics, and discourse*** p accessing and demonstrating understanding of the content, concepts and skills of the u - Cross-discipline *and* discipline-specific language and discourse patterns (the la - Extended, reasoned, logical, precise, connected discourse - Language of instruction - Language of academic texts (receptive & productive) - Language of assessment
Academic Vocabulary: **Cross-content**	Cross-discipline language and discourse patterns (e.g. migration, direction, mapping, examine, analyze)
Technical Vocabulary: **Content**	Discipline-specific language and discourse patterns (e.g., longitude, latitude)

http://www.cde.state.co.us/standardsandinstruction/samplecurriculumproject

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Department of Education

CDE CO

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SchoolView | Data & Accountability   Programs & Supports   Teaching & Learning   Policy & Funding

Standards and Instructional Support

2009/2010 Colorado Academic Standards

Colorado Academic Standards Review and Revision

Communication Resources

Standards Implementation Support

District Sample Curriculum Project

PLC-Bytes and Webinars

Extended Evidence Outcomes

Career and Technical Education

The Arts

Colorado English Language Proficiency

Comprehensive Health

Mathematics

Physical Education

Reading, Writing, and Communicating

Science

Social Studies

World Languages

Computer Science

Home / Standards and Instructional Support

2018 Colorado Academic Standards

Colorado Academic Standards

ALL STUDENTS
ALL STANDARDS

State Board completes review and approval process

The State Board of Education approved revisions to the Colorado Academic Standards in the ten content areas of comprehensive health and physical education; dance; drama and theatre arts; mathematics; music; reading, writing, and communicating; science; social studies; visual arts; and world languages by July 1, 2018, in alignment with state law. In addition, the State Board of Education adopted new voluntary secondary computer science standards.

Final versions of the 2018 Colorado Academic Standards will be available in August, following copy editing and website updates. These final versions will include amendments introduced by the State Board during the approval process for three content areas: comprehensive health and physical education; reading, writing, and communicating; and social studies. The links to proposed revisions by content area listed below are not the final versions. To read more about the 2018 review and revision process, along with previous drafts, committee meeting summaries, and public feedback, see a complete listing of resources for all the content areas.

Districts will have two years to review and revise their local standards as needed with implementation scheduled for the 2020-21 school year, which is the first year the Colorado Measures of Academic Success (CMAS) assessments will reflect the content of the 2018 standards.

http://www.cde.state.co.us/standardsandinstruction/casreview

Colorado Academic Standards

Science

Proposed for SBE Adoption

http://www.cde.state.co.us/standardsandinstruction/casreview-spring2018committeerecommendations-sc

Find and highlight language in the CAS:

- 1 color for content vocabulary

AND

- A 2nd color for cross-content vocabulary

AND

- A 3rd color for language functions

OR

- 1 color for all vocabulary

AND

- A 2nd color for language functions

Content Area: Science
Standard: 2. Life Science

Prepared Graduates:
➤ Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment

Grade Level Expectation: Third Grade

Concepts and skills students master:
1. The duration and timing of life cycle events such as reproduction and longevity vary across organisms and species

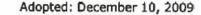| Evidence Outcomes	21st Century Skills and Readiness Competencies

Students can:
a. Use evidence to develop a scientific explanation regarding the stages of how organisms develop and change over time (DOK 1-3)
b. Analyze and interpret data to generate evidence that different organisms develop differently over time (DOK 1-2)
c. Use a variety of media to collect and analyze data regarding how organisms develop (DOK 1-2)
	Inquiry Questions:
	1. How are life cycles from a variety of organisms similar and different?
	2. How does an organism change throughout its life cycle?
	
	Relevance and Application:
	1. Living things may have different needs at different points in their life cycles.
	
	Nature of Science:
	1. Ask a testable question about the life cycles of a variety of organisms. (DOK 2)
	2. Compare what is done in class to the work of scientists:
	  a. Scientists evaluate and use data generated by other scientists to further their own ideas, just like students compare data in class.
	  b. A community of scientists weaves together different evidence and ideas to deepen understanding, similar to how students do investigations and read books to deepen understanding about a concept. (DOK 1-2)

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The Word/Phrase Level

- **General** vocabulary
  - **Cross content** vocabulary
    - before, describe, combine
- **Specific** vocabulary
  - **Content** vocabulary
    - theory, hypothesis, experiment
- **Technical** vocabulary
  - **Content** vocabulary associated with a specific content area topic
    - photosynthesis, acid-base, kinematic equation

General	Specific	Technical
knee	kneecap	patella
eat	consume	masticate
food	nutrients	sustenance
garbage	litter	refuse

6/28/2018

The Word/Phrase Level

- **Multiple Meaning words**
  - kitchen table vs water table
  - matter vs content matter vs "What's the matter?"
- **Word Forms**
  - noun vs verb: force
  - slang: "May the force be with you."
- **Formulaic and idiomatic expressions**
  - hand vs hand in
  - something hard vs something based on hard science
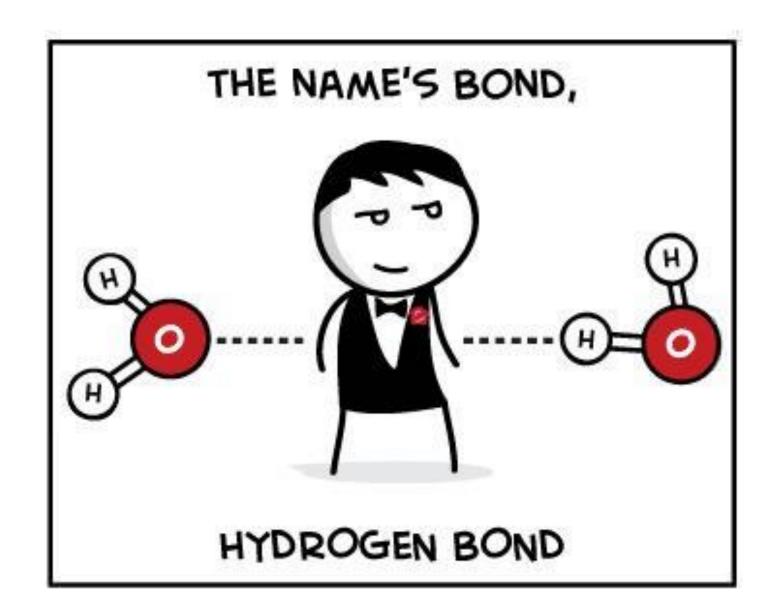- **Nuances and shades of meaning**
  - hold onto vs cling to
  - show your work vs list every single step
- **Collocations**
  - "strong tea" not "powerful tea"
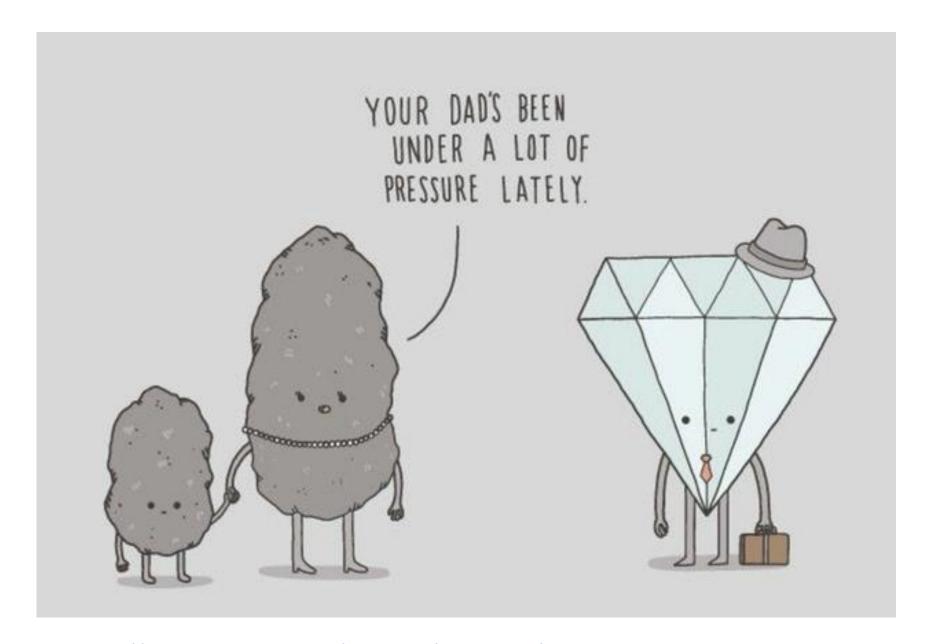 - "carbon atoms" not "atoms of carbon"
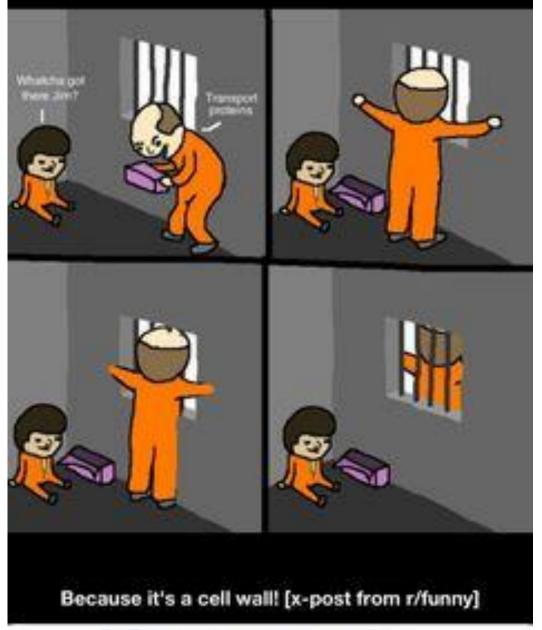
Because it's a cell wall! [x-post from r/funny]

Multiple Meaning Words

Everyday Meaning vs Science Meaning

| Word	Everyday Meaning	Science Meaning	Other Content Area Meanings
cell	cell phone	the basic structure or functional unit of all living things	small room or compartment
organic	food that is free from chemicals	carbon-based chemicals	evolve naturally
radical	unusual	molecule with unpaired electron	social studies—a reformist, advocate or revolutionary
bond	spy, 007, glue, attach	shackles between atoms	social studies--Physical restraints used to hold someone in prison, a pledge or oath
stem	part of a plant	embryonic tissue	sentence stem, to originate in or be caused by
paper	what we write on, a newspaper, wallpaper	a scientific report	
activation	done to a new credit card	energy barrier	
current	up to date	flow of electrons	
carrier	someone that carries a disease and gives it to others	movement of charge	
migration	when fish or birds move to another location	ions in a field	
band	musicians	continuum of electronic states	
positive	something good		
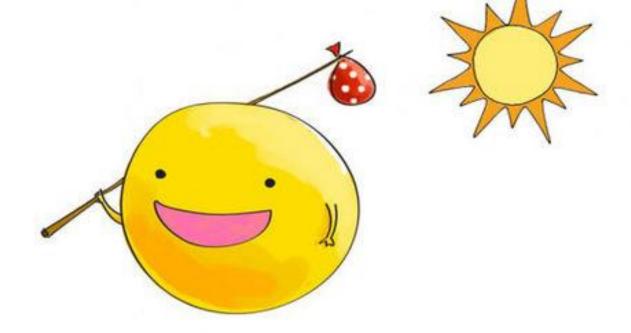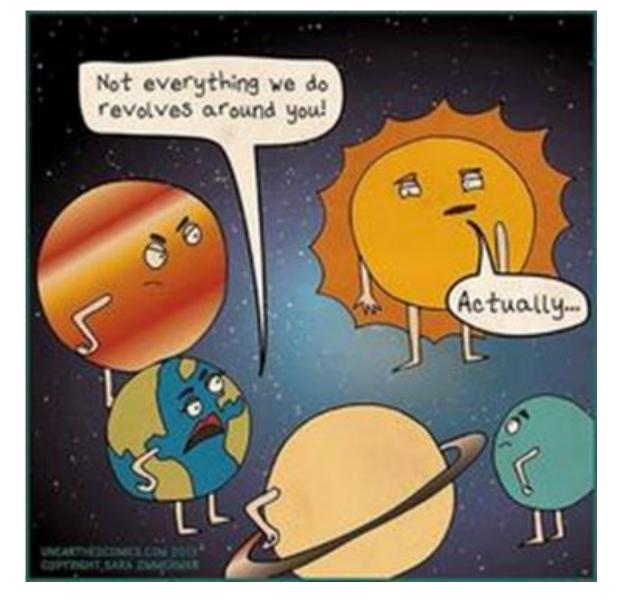
A PHOTON CHECKS INTO A HOTEL AND IS ASKED IF HE NEEDS ANY HELP WITH HIS LUGGAGE.

"NO, I'M TRAVELLING LIGHT."

http://unearthedcomics.com/wp-content/uploads/2013/07/Unearthed-RevolvesAroundYou-1307-1-web-300x300.jpg
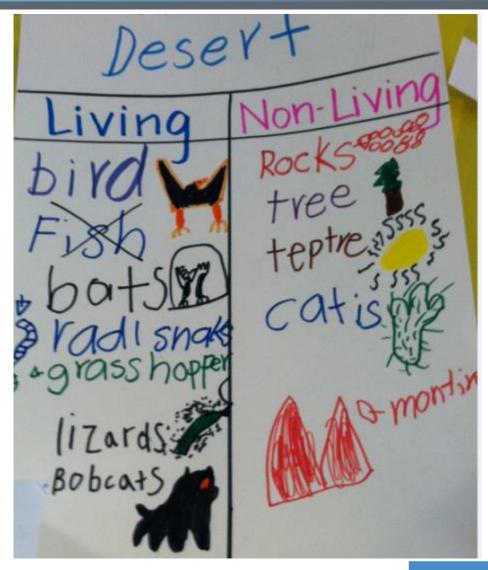
Synonyms for small

tiny, miniature, microscopic, little, petite

1. My _____ brother is 3 years old.

2. The germs were _____.

3. The dollhouse had _____ furniture inside it.

4. The new baby had _____ toes.

5. My sister is so small that she wears _____ sized dresses.

Anchor Charts

Vertebrate	Characteristics
Birds	feathers, beaks, lay eggs
Reptiles	scales, cold-blooded, leathery eggs
Amphibians	cold-blooded, life cycles on water/land
Mammals	fur, warm-blooded, mothers provide milk for offspring
Fish	gills, cold-blooded

http://www.learnnc.org/lp/pages/7079

Word Walls

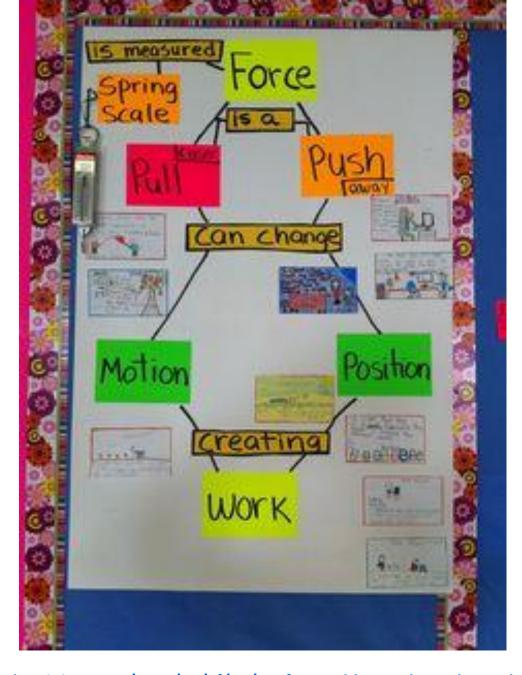**http://www.thesciencetoolkit.com/blog/**

"I felt silly at first when I did this approach because I thought word walls were only for primary grades but was very surprised by the student response. "

Word Walls in the Secondary Classroom

- Word Walls: A Support for Literacy in Secondary School Classrooms

http://www.readingrockets.org/content/pdfs/World_Walls_-_A_Support_for_Literacy_in_Secondary_School_Classrooms.pdf

- A Research-Based Guide to Word Walls in the Secondary Classroom

http://www.fulton-ind.k12.ky.us/userfiles/56/Classes/4649/Secondary%20Word%20Walls.pdf

- Vocabulary Strategies for Secondary Students

https://alex.state.al.us/ccrs/sites/alex.state.al.us.ccrs/files/9-Vocabulary%20Strategies%20%20For%20Secondary_0.docx

Cognates

- **Three types**
  - **True**—looks and sounds alike, similar meaning
    - insect and insecto
  - **Partial**—may have similar meaning but different contexts
    - la historia vs history
  - **False**—look and sound alike, different meaning
    - embarrassed vs embarazada

FIGURE 3

Connecting vocabulary levels with cognates.

English Tier 1	Academic (Latin-based) English Tier 2, 3	Spanish Tier 1
home	habitat	habito
pound	lb. (libra)	libra
body	corpus corpse	cuerpo
asleep	dormant	dormir
slow	torpid	torpe

http://www.washingtonesds.org/cms/lib4/WA07001775/Centricity/Domain/68/Unlocking%20Academic%20Vocab.pdf

FIGURE 4

Deriving nouns from verbs.

English verb	Spanish verb	English noun	Spanish noun
distill	destile	distillation	destilación
evaporate	evapore	evaporation	evaporación
precipitate	precipite	precipitation	precipitación

http://www.washingtonesds.org/cms/lib4/WA07001775/Centricity/Domain/68/Unlocking%20Academic%20Vocab.pdf

76% of the words identified for instruction in the fourth grade science units reviewed were English/Spanish cognates.

Bravo, M.; Author, B. & Pearson, P.D. (2007). *Tapping the Linguistic Resources of Spanish English Bilinguals: The Role of Cognates in Science*. In R.K. Wagner, A. Muse & K. Tannenbaum Vocabulary Development Implications for Reading Comprehension *(pp. 140-156).* New York City, N.Y.: Guilford

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CALFIORNIA STATE UNIVERSITY, NORTHRIDGE

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SED 555
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SED 619
SED 642
SED 646
SED 671
SED 695B
SED 695G
SED 699
ELPS 710
ELPS 789
CSET Physics & Geoscience

Dr. Herr's Books

Sourcebook for Teaching Science
Hands-On Chemistry
Hands-On Physics
Other publications

CSCS Investigations

CSCS Activities
CSCS - Biology
CSCS - Chemistry
CSCS - Env. & Earth/Space Sci
CSCS - General Science
CSCS - Physics
NGSS
Apps for teaching

Grants

CSCS California Science Project
CSMP
CSCS

CSCS Activities > CSCS - General Science >

Cognates & Scientific Terms

Academic language is the language needed by students to understand and communicate in the academic disciplines. Academic language includes such things as specialized vocabulary, conventional text structures within a field (e.g., essays, lab reports) and other language-related activities typical of classrooms, (e.g., expressing disagreement, discussing an issue, asking for clarification). Academic language includes both productive and receptive modalities.

Table 2.5 Comparison of Scientific Terms in Five European Languages

English	Italian	Spanish	French	German
chemistry	chimica	química	chimie	Chemie
biology	biologia	Biología	biologie	Biologie
physics	fisica	fisica	physique	Physik
geology	geologia	geología	géologie	Geologie
astronomy	astronomia	Astronomía	astronomie	Astronomie
meteorology	meteorologia	meteorología	météorologie	Meteologishe
photosynthesis	fotosintesi	fotosíntesis	photosynthèse	Photosynthese
metamorphosis	metamorfosi	metamorfosis	métamorphosse	Metamorphose
cell	cellula	célula	cellule	Zelle
organism	organismo	organismo	organisme	Organismus
ecology	ecologia	ecología	écologie	Ökologie

Add your own terms here

Cognates - Translate Copy

Name	English	Spanish	German	French	Italian
	Accelerate	Acelerar	Beschleunigen	Accélérer	Accelerare
	accountability	responsabilidad	Rechenschaftspfli	responsabilité	responsab
	accountable	explicable	verantwortlich	responsable	responsab
	acoustic	acústico	akustisch	acoustique	acustico
	almond	almendra	Mandel	amande	mandorla
	ambulance	ambulancia	Krankenwagen	ambulance	ambulanza
	amino acids	aminoácidos	Aminosäuren	acides aminés	aminoacidi

https://sites.google.com/site/drnormanherr//CSCS-Activities/general-science/cognates

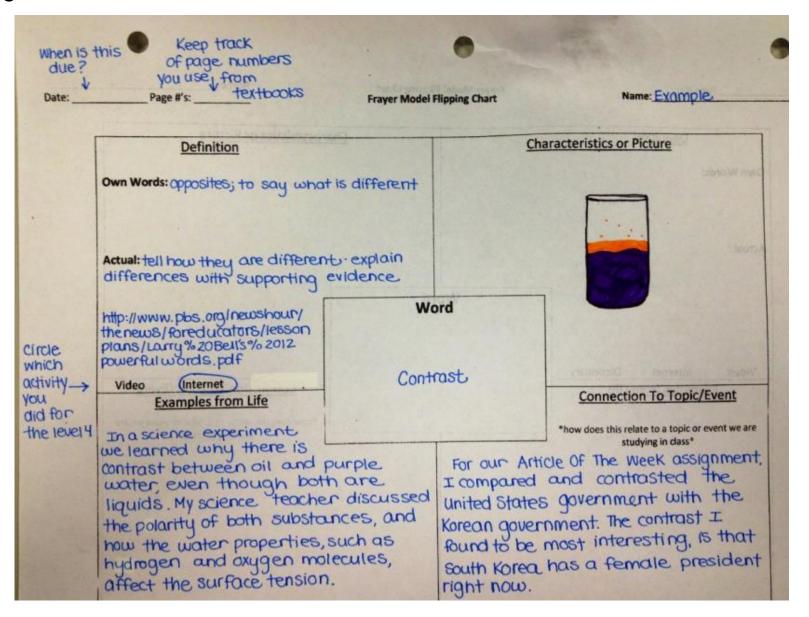| Latin Roots	Meaning	Examples
calc	stone	calcite, calcium, calcification
cerebro	brain	cerebral, cerebrospinal
cide, cise	cut, kill	homicide, insecticide
clar	clear	clarify, clarification
flor	flower	florist, floral, flora
herbi	grass, plant	herbicide, herbivorous, herbal
lact/o	milk	lactate, lactose, lactic acid
luc	light	lucid, translucent
lumin	light	Illuminate, lumen

https://www.learnthat.org/pages/view/roots.html#l

Frayer Model

Date: _____ Page #'s: _____

When is this due? ↓

Keep track of page numbers you use from textbooks ↓

textbooks

Frayer Model Flipping Chart

Name: Example

Definition

Own Words: opposites; to say what is different

Actual: tell how they are different; explain differences with supporting evidence.

http://www.pbs.org/newshour/thenews/foreducators/lessonplans/Larry%20Bell's%202012powerfulwords.pdf

Circle which activity → you did for the level 4

Video   (Internet)

Characteristics or Picture

Word

Contrast

Examples from Life

In a science experiment we learned why there is contrast between oil and purple water, even though both are liquids. My science teacher discussed the polarity of both substances, and how the water properties, such as hydrogen and oxygen molecules, affect the surface tension.

Connection To Topic/Event

how does this relate to a topic or event we are studying in class

For our Article Of The Week assignment, I compared and contrasted the United States government with the Korean government. The contrast I found to be most interesting, is that South Korea has a female president right now.

http://keeleygriffin5thgrade.weebly.com/uploads/1/3/2/2/13223365/frayer_model_four-square_example.jpg

Standard:

Teach a few well-selected words directly	Teach word learning strategies
Prior knowledge Science processes Science Tools	Are there any affixes that should be taught? Words with multiple meanings? Cognates?
Provide "rich and varied" language experiences Word wall, vocabulary strategies, vocabulary games and enrichment ideas	**Foster "word consciousness"** Student awareness of and interest in words and their meanings TARGET Vocabulary

Teach Vocabulary

Benefits
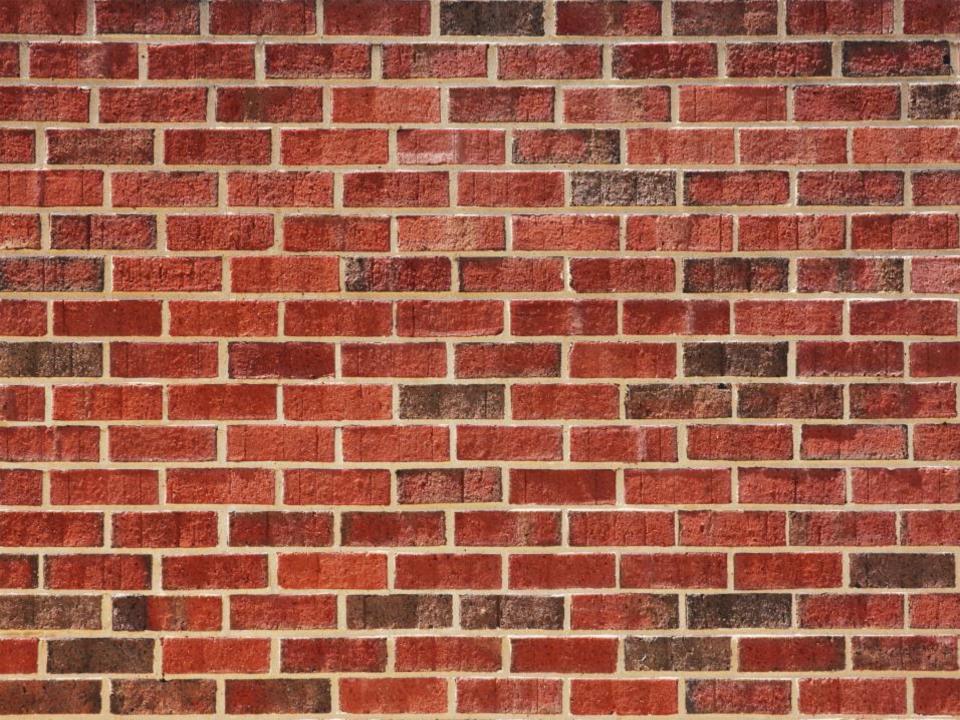
- Learn **content specific vocab**

- Learn **cross-content, academic vocab**

- Make **connections** (across content, in context)

- **Visual** learners

- Learn to use **reference tools**

- **Brain research**>color coding

- Use **higher level vocab** orally and in writing

- **Vocab>literacy**

How to

- Teach **in context**
- **Limit number** of new words introduced at one time
- **Review, recycle** words
- Teach meaning of words **across the content areas**
- **Picture, definition, synonym and/or the word used in a sentence**
- Word walls as **part of the lesson**
- **Add to** word wall
- **Refer to** word wall
- Students add words to **personal reference tool**

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The Discourse Level

- Language functions and tasks
- Quality and quantity of language
- Organization and structure of ideas (written or spoken)
- Cohesion and connection of ideas
- Explaining ideas with details and support
- Expression of ideas (style, voice)

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Reading

Listening

<u>Read or listen to someone else's:</u>

- Field notes
- Lab reports
- Arguments
- Research
- Instructions
- Steps in an experiment
- Data
- Observations

The earthquake and its aftershocks caused widespread damage. Roads were split apart and some large buildings showed signs of structural stress. In the coastal town of Kaikoura, a popular whale-watching destination, many residents and tourists found their water and power supplies cut off. They also had no easy way out of the area, with the town's main road blocked by landslides...Cars could be seen lying on their sides, and other parts of the road lay in ruins. "It's just utter devastation," Key said. People aren't the only ones in the area who were left stranded. Video footage shot from a helicopter showed three cows trapped on a small island of grass, surrounded by deep valleys of collapsed earth—the remains of a small field near Kaikoura that had been ripped apart during the quake.

http://www.timeforkids.com/news/earthquake-hits-new-zealand/499356
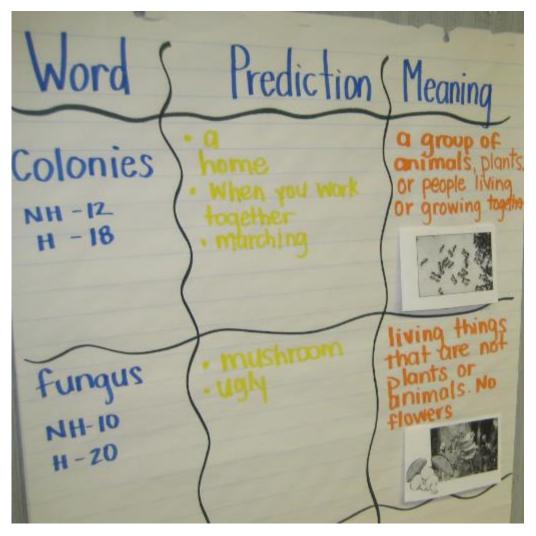
- Pre-teach
  - Vocabulary
  - Discourse patterns
  - Sentence structures

- Students predict what the reading will be about
  - Probable Passage (Beers 2003)
  - Anticipatory set

Pre-Teach Vocabulary

http://www.scholastic.com/teachers/sites/default/files/posts/u105/images/img_0887.jpg

Probable Passage

FIGURE 1 — Probable passage vocabulary for a reading from *Volcanoes and Earthquakes*

Title of selection: *Volcanoes and Earthquakes*

Words from text: ash, fault, mantle, seismic wave, lava, plate, vent, epicenter, magma

- Teacher lists key words and concepts
- Students categorize key words
- Based on the list, students write a prediction

NSTA: Improving Science Reading Comprehension
http://www.nsta.org/publications/news/story.aspx?id=50301

Anticipatory Set

FIGURE 2	Sample anticipation guide

Book: *Storms*

Agree	Disagree	
		Tornadoes generally last 15 minutes or less.
		If you are in your car during a tornado, you should stay in it.
		The funnel cloud is dark because of the debris it picks up.
		You should lie on the ground during a thunderstorm.
		The heat from lightning causes thunder.
		All major storms result from cold and warm air mixing.
		Hurricanes are the least dangerous storm.
		The eye of a hurricane is calm.
		A watch and a warning are the same thing.

NSTA: Improving Science Reading Comprehension

http://www.nsta.org/publications/news/story.aspx?id=50301

Text Comprehension Through Differentiation

- **Differentiated Texts**
  - Jigsaw
  - Texts written in sheltered English
    - National Geographic
    - Newsela
    - https://newsela.com/articles/vampire-bats-cooperation/id/31238/
    - Reading A-Z Science
    - https://www.readinga-z.com/content-area-reading/science/
    - Readworks.org
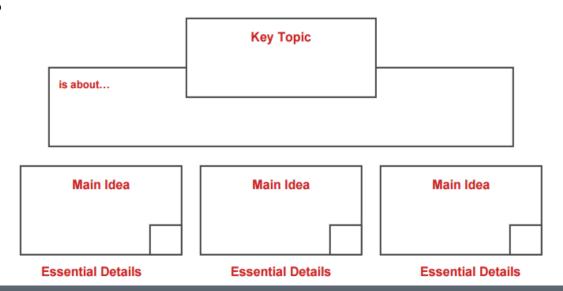
- **Support**
  - Audio-books
  - Reading Buddy

Reflect on reading while reading

- Revisit predications to verify accuracy

- Graphic Organizers
  - Response log
  - Articulate thinking--"Say Something" starters (Beers 2003)
  - Analyze text structures
  - Put in your own words

Response Log

NSTA: Improving Science Reading Comprehension

http://www.nsta.org/publications/news/story.aspx?id=50301

"Say Something" Starters

FIGURE 4 **Say Something starters** (adapted from Beers 2003)

Question	Clarify	Connect
I don't get this part…	Oh, I get it…	This reminds me of…
Why…	Let me explain…	This is similar to…
What do you think…	Now I understand…	The differences are…
What is…	This makes sense now…	I have heard of this…
What does this mean…	No, I think it means…	An example is…
What if…	This is really saying…	

Predict	Comment	Explain
I predict that…	This is hard because…	My understanding is…
I wonder if…	This is confusing because…	The basic idea is…
I think that…	I think that…	
The next idea will…		

NSTA: Improving Science Reading Comprehension
http://www.nsta.org/publications/news/story.aspx?id=50301

Analyze Text Structures

FIGURE 5	Text structures found in *Life in the Ocean*	
Text structure	**Page**	**Purpose of text structure/Message to the reader**
Photograph	10	The author inserted a picture of this fish because it lives in the twilight zone of the ocean. This fish was picked because it has large eyes that help it find food in this zone.
Bold words	14	The term *midnight zone* is bold to show that it is an important concept. It is one of the four zones of the ocean.

NSTA: Improving Science Reading Comprehension
http://www.nsta.org/publications/news/story.aspx?id=50301

Put in Your Own Words

Original Text	In My Own Words
Roads were split apart and some large buildings showed signs of structural stress.	Roads broke and large buildings cracked.
In the coastal town of Kaikoura, a popular whale-watching destination, many residents and tourists found their water and power supplies cut off.	In parts of the town, Kaikoura, people lost water and power.
They also had no easy way out of the area, with the town's main road blocked by landslides.	People could not get out of town because rocks and dirt blocked roads.
Cars could be seen lying on their sides, and other parts of the road lay in ruins.	Cars were on their sides, and parts of the road were destroyed,
Video footage shot from a helicopter showed three cows trapped on a small island of grass, surrounded by deep valleys of collapsed earth—the remains of a small field near Kaikoura that had been ripped apart during the quake.	A helicopter video-taped three cows trapped on a small patch of grass that was separated from the rest of the field.
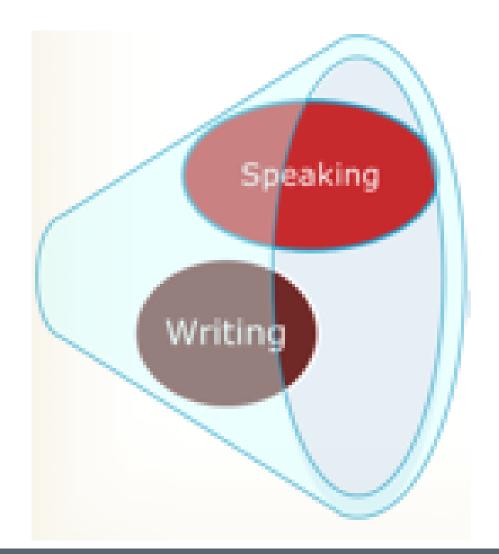
- Discuss the reading

- Present the reading

- Recreate the reading
  - Literature circles
  - Socratic Seminar
  - Jigsaw
  - Reader's Theater
  - RAFT

6/28/2018

Science at the Discourse Level (productive)

- Take field notes
- Record observations
- Ask questions
- Answer questions
- Define problems
- Construct explanations of data
- Argue using evidence
- Explain investigations
- Write reports

Mix N Match activity

By Nancy Commins

UC Denver

http://www.ucdenver.edu/academics/colleges/SchoolOfEducation/FacultyandResearch/Pages/NancyCommins.aspx

- Order the steps in a science experiment
- Order words by shade of meaning
- Match vocabulary words with definitions, synonyms or pictures
- Groups aspects of important concepts

The Language of Science

Content

What?

Investigate and communicate findings about what happens when the Sun's light is blocked.

Use evidence to develop a scientific explanation about how organisms depend on their habitat.

Language Use/Function
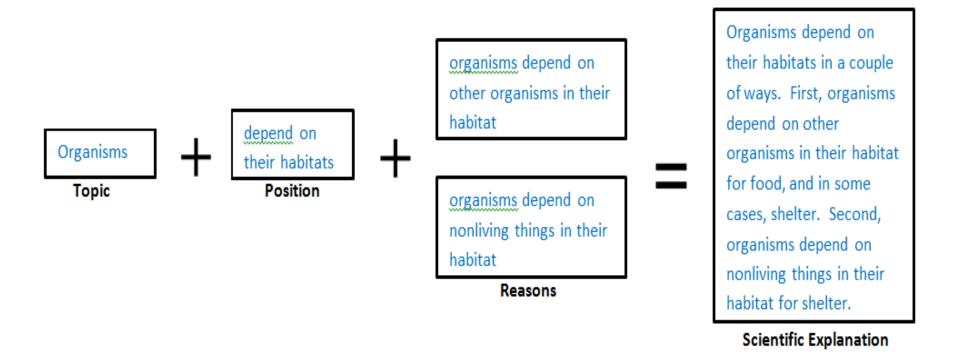
How?

- Retell
- List
- Summarize

Language function?

Use evidence to develop a scientific explanation about how organisms depend on their habitat.

Modified from ASCD Express Thesis Writing Workshop:
http://www.ascd.org/ascd-express/vol12/1224-thornblad.aspx

Language Functions

- Explain

- Argue

- Retell

- Describe

- Compare

- Contrast

- Justify

WiDA®
CONSORTIUM

Science Examples

- Explain the process of the experiment your partner and you conducted.

- Argue why renewable resources should be used for electricity.

- Retell the natural patterns you observed.

- Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and/or magnetic effects are produced.

- Compare the results.

- Contrast law and theory as they are defined in science vs in other disciplines or common use.

- Justify an evidence-based analysis of the forces acting on an object and the resultant acceleration produced by a net force.

Write Your Own--Activity part 1

- You will need <u>at least 3</u> post it notes
  - 1 post it—explain
  - 1 post it—argue
  - 1 post it—retell
- Who does a 4th post it?
  - Those experienced writing sentence frames
  - ELD specialists
- Ok, I have a 4th post it, what do I do with it?
  - Choose your own—describe, compare, contrast, justify, predict, inform, etc

Then, put your post its on their respective charts

Activity

Activity borrowed from Beth Skelton, Consultant
http://www.bethskelton.com/
Destination Imagination Instant Challenges
https://thewaterlilyway.wordpress.com/2014/02/25/team-building-activity-tower-of-cups/
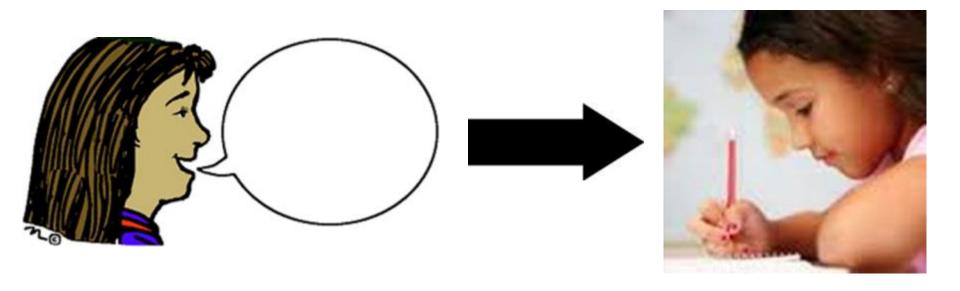
Oral Rehearsal

Opportunities for Discourse

Mix N Match activity

By Nancy Commins

UC Denver

http://www.ucdenver.edu/academics/colleges/SchoolOfEducation/FacultyandResearch/Pages/NancyCommins.aspx

- Order the steps in a science experiment
- Order words by shade of meaning
- Match vocabulary words with definitions, synonyms or pictures
- Groups aspects of important concepts

Teach at the Discourse Level

How to

- **Think about:**
  - the language functions in the science CAS
  - the discourse structures in scientific text
  - the type of scientific discourse students are expected to understand and produce

- **Provide opportunities** for students to actively read about and discuss scientific concepts

Benefits

- **Understand**
  - teacher
  - text book
  - assessments
- **Explain**
  - thinking
- **Answer**
  - questions
- **Speak like a scientist**
- **Write like a scientist**
- **Transfer to other content areas**
  - Understanding
  - Oral skills
  - Written skills

The Features of Academic Language in WIDA's Standards

The Features of Academic Language operate within sociocultural contexts for language use.

	Performance Criteria	Features
Discourse Level	**Linguistic Complexity** *(Quantity and variety of oral and written text)*	Amount of speech/written text Structure of speech/written text Density of speech/written text Organization and cohesion of ideas Variety of sentence types
Sentence Level	**Language Forms and Conventions** *(Types, array, and use of language structures)*	Types and variety of grammatical structures Conventions, mechanics, and fluency Match of language forms to purpose/perspective
Word/Phrase Level	**Vocabulary Usage** *(Specificity of word or phrase choice)*	General, specific, and technical language Multiple meanings of words and phrases Formulaic and idiomatic expressions Nuances and shades of meaning Collocations

The sociocultural contexts for language use involve the interaction between the student and the language environment, encompassing the…

- Register
- Genre/Text type
- Topic
- Task/Situation
- Participants' identities and social roles

The Sentence Level

- **Grammatical structures**
  - Match of correct language form to purpose/language function
  - Commonly used forms—passive voice (e.g.: The polio vaccine was discovered by Salk.)
- **Conventions**
  - Subject verb agreement
  - Correct verb tense
- **Sentence variety**
  - Compound sentences
  - Complex sentences
- **Variety of grammatical structures**
  - Not starting each sentence the same way
  - Using different transitions
  - Changing word order

- **Gallery walk**
  - pick a post it that is not yours….unless….
- **Think** about the language you want to hear your students using
- **Script** the ideal conversation
- **Keep** your post its

Example

Explain how the speed of an object may change due to an outside force.

An outside force can impact the speed of an object in one of two ways. It can either slow the object down or speed the object up. For example, if a deer jumps onto the road, right in front of a car and hits the car, the car will slow down. However, if a moose is behind a car, pushing the car, the car will speed up.

Transition Words Activity

I think that the word _____ should go in

the (beginning, middle, or high) category

because_____.

also

similarly

moreover

Common Transition and Signal Words

Language Function(s)	Transition and Signal Words
• Sequence • Arrange • Order (into steps) • Describe the process	after, afterward, after that, anticipation, at first, at this time, before, beginning with, beyond, during, earlier, ending with, eventually, initially, finally, following, from then on, last, later, meanwhile, in the meantime, next, now, at that point, preceding, previously, prior, reflecting, simultaneously, since, soon, subsequently, then, ultimately, until, when, while, at which point
• Compare & Contrast • Distinguish between • Associate	Contrast: alternatively, although, but, contradictory, conversely, despite, even though, however, in contrast, nevertheless, on the contrary, on the other hand, opposed/opposition, rather, unlike, whereas Compare: both, in common, by comparison, compared to, correlate to, equal(ly) likewise, same, share, similarly
• Identify Cause & Effect	affect, as a result, because, because of, caused by, change, consequently, contributed, factors, for that reason, if...then, impact, in the aftermath of, leads to, in order to, in reaction/response to, since, that is why, shift, since, therefore
• Classify • Sort • Categorize	according to, attributes, behaviors, belongs, characteristics, dimensions, fits, features, group, organized by, qualities, traits, value
• Infer/ Draw Conclusions • Predict	Conclude, draw a conclusion, estimate, implies, inference, guess, speculate, suspect, suspicion

• Elaborate (add detail) • Give examples	also, another, besides, for example, further, for instance, furthermore, in addition, likewise, moreover, similarly, such as, to illustrate, that is
• Justify • Persuade	after analysis, appeal to, argue, based on, belief, certainly, claim, convince, consider, criteria, defend, evidence, in fact, in light of, point of view, propose, prove/proof, sway, urge
• Critique/Evaluate • Assess	advantage/advantageous, benefit, bias, certainly, judge, misleading, objective/subjective, obviously, of course, outweigh, positive/support, scrutiny, undoubtedly, without a doubt, worth, value
• Summarize • Conclude	Summarize: above all, all in all in fact, in other words, most important, in summary Conclude: accordingly, all in all, finally, in conclusion, in other words, in short, to conclude, to sum up, to summarize

Sentence Frames

- Who has experience with sentence frames?

- How do you write them?

- Who has experience with differentiated sentence frames?

- How do you write them?

Though I concede that_____,
I still insist that_____.

Explain how the speed of an object may change due to an outside force.

Ideal Conversation

An outside force can impact the speed of an object in one of two ways. It can either slow the object down or speed the object up. For example, if a deer jumps onto the road, right in front of a car and hits the car, the car will slow down. However, if a moose is behind a car, pushing the car, the car will speed up.
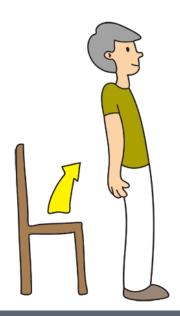
Sentence Frames

Newcomer

An outside force can impact the speed of an object in __(number)_ ways. It can _____ or it can _____.

Beginning

An outside force can impact the speed of an object in__(number)__ ways. It can _____ or it can _____. An example of the first way is _____. An example of the second way is _____.

Middle

An outside force can impact the speed of an object by ___(verb)___ing _____ or by (verb)__ing _____. For example, _____. However,_____.

High

An outside force can impact the speed of an object by _____ or by _____. While the effect of _____ would be_____. The effect of _____ would be _____.

Writing Your Own Sentence Frames—Activity part 3

1. Think about the ideal language for each level of student
2. Pick where you want to start and write your first frame
3. Scaffold up or down, as needed, to write your other frames
   - Lower level frames may have more language provided
   - Higher level frames may expect students to generate more language on their own
   - Lower level frames may have more hints
   - Higher level frames may use more sophisticated transition words
   - Higher level frames may elicit more complex grammatical structures
4. Use your resources
   - List of common transition words
   - Experienced colleagues
   - Ask me
5. As you finish,
   - Put your post its on their respective charts

Gallery Walk
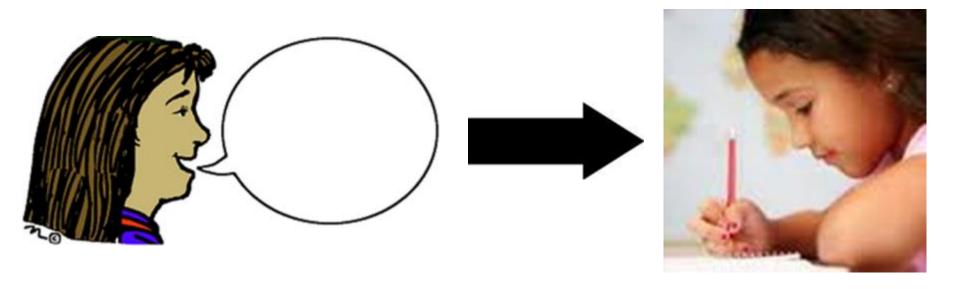
- Purpose
- Differentiated frames
- Scaffolding away
- Reference Tool
- Writing your own

CUSTOMIZE

Oral Rehearsal

Teach at the Sentence Level

Benefits

- **Understand**
  - teacher
  - text book
  - assessments
- **Explain**
  - thinking
- **Answer**
  - questions
- **Speak like a scientist**
- **Write like a scientist**
- **Transfer to other content areas**
  - Understanding
  - Oral skills
  - Written skills

How to

- **Think about:**
  - the sentence patterns you use
  - the sentence patterns used in science texts and assessments
  - the sentences you want your students to produce
- Use **example signal words, grammatical structures and sentence frames**
- **Color code** by language proficiency level
- Students can **use their level frame or challenge themselves with a higher level frame**
- Students **add frames to personal reference tool**

WIDA Performance Definitions - Speaking and Writing Grades K–12

Within sociocultural contexts for language use...

Discourse Dimension	Sentence Dimension	Word/Phrase Dimension
Linguistic Complexity	**Language Forms and Conventions**	**Vocabulary Usage**

Level 6 - Reaching

English language learners will use a range of grade-appropriate language for a variety of academic purposes and audiences. Agility in academic language use is reflected in oral fluency and automaticity in response, flexibility in adjusting to different registers and skillfulness in interpersonal interaction. English language learners' strategic competence in academic language use facilitates their ability to relate information and ideas with precision and sophistication for each content area.

At each grade, toward the end of a given level of English language proficiency, and with instructional support, English language learners will produce...

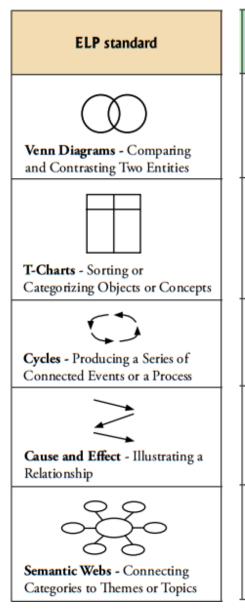|	Linguistic Complexity	Language Forms and Conventions	Vocabulary Usage
Level 5 Bridging	• Multiple, complex sentences • Organized, cohesive, and coherent expression of ideas characteristic of particular content areas	• A variety of complex grammatical structures matched to purpose • A broad range of sentence patterns characteristic of particular content areas	• Technical and abstract content-area language, including content-specific collocations • Words and expressions with precise meaning across content areas
Level 4 Expanding	• Short, expanded, and some complex sentences • Organized expression of ideas with emerging cohesion characteristic of particular content areas	• Compound and complex grammatical structures • Sentence patterns characteristic of particular content areas	• Specific and some technical content-area language • Words and expressions with expressive meaning through use of collocations and idioms across content areas
Level 3 Developing	• Short and some expanded sentences with emerging complexity • Expanded expression of one idea or emerging expression of multiple related ideas across content areas	• Simple and compound grammatical structures with occasional variation • Sentence patterns across content areas	• Specific content language, including cognates and expressions • Words or expressions with multiple meanings used across content areas
Level 2 Emerging	• Phrases or short sentences • Emerging expression of ideas	• Formulaic grammatical structures • Repetitive phrasal and sentence patterns across content areas	• General content words and expressions • Social and instructional words and expressions across content areas
Level 1 Entering	• Words, phrases, or chunks of language • Single words used to represent ideas	• Phrase-level grammatical structures • Phrasal patterns associated with familiar social and instructional situations	• General content-related words • Everyday social and instructional words and expressions

WiDA™

WIDA Examples of Use of Graphic Organizers to Teach the Language of Science

ELP standard	4- The language of Science
Venn Diagrams - Comparing and Contrasting Two Entities	• Two body systems or organs • Two animals or plants
T-Charts - Sorting or Categorizing Objects or Concepts	• Forms of matter • Forms of energy • Senses • Vertebrates/Invertebrates
Cycles - Producing a Series of Connected Events or a Process	• Scientific inquiry • Life cycles • Water cycle
Cause and Effect - Illustrating a Relationship	• Chemical reactions • Adaptation • Weather events
Semantic Webs - Connecting Categories to Themes or Topics	• Foods and their nutritional ingredients • Types and characteristics of rocks

Taken from WIDA English Language Proficiency Standards and Resource Guide 2007 Edition Page RG-23

Education Trust West Report

http://blogs.edweek.org/edweek/learning-the-language/2017/01/integrating_science_and_englis.html?r=1403995687&qs=with+more+exposure+to+science

Supported by a 3-year grant from the National Science Foundation, developers Rita MacDonald, Emily Miller, and Sarah Lord worked with 4th and 7th grade math and science teachers to try out and revise the resources shown here.

Professional Learning Opportunities

COLORADO
Department of Education

Search

SchoolView | Data & Accountability   Programs & Supports   Teaching & Learning   Policy & Funding

Culturally and Linguistically Diverse Education Home

Statewide Support

CLDE Meetings

Events

Professional Learning Opportunities

Targeted Support

Webinars

ELD Program Requirements

English Language Proficiency Act (ELPA)

Title III (ESEA)

Title VI

Title IX (Education Amendments of 1972)

Resources

Secondary Educational Resources

Contact Us

Home / Statewide Support

Professional Learning Opportunities

Attendees must register for Professional Learning Opportunities through the registration link associated with each date below. Space is limited to 35 people. In the event that there are fewer than ten people registered, the professional learning opportunity will be rescheduled and those registered will be notified. To obtain presentation materials associated with each training, please click on *Request Training Materials*.

2017-2018 Professional Learning Opportunities for Administrators

English Language Development (ELD) Program Requirements Trainings

Intended Audience - District Directors, Coordinators, and Administrators

These trainings will provide an understanding of state and federal requirements for ELD programs/services for English Learners. *Request Training Materials*

- September 7, 2017 - Pueblo City Schools - 315 West 11th Street, Pueblo, CO 81002
- September 22, 2017 - Northwest BOCES - 325 7th Street, Steamboat Springs, CO 80487
- September 29, 2017 - Centennial BOCES - 2020 Clubhouse Drive, Greeley, CO 80634

Cultural Responsiveness

Intended Audience - District Directors, Coordinators, and Administrators

In this session, we will explore culture and diversity as it applies to educators and education. Participants will explore the influence of culture in the education system and on individual identity development as it relates to students, schools, and districts. *Request More Information from Trainer*

- October 6, 2017 - Douglas County School District, 620 Wilcox Street, Castle Rock 80104
- December 1, 2017 - Fountain School District, 10665 Jimmy Camp Road, Fountain 80817

http://www.cde.state.co.us/cde_english/professionaldevelopment

WIDA Tools

- **WIDA English Language Development Standards (CELP Standards)**

https://www.wida.us/standards/eld.aspx

- **WIDA Download Library**

http://www.wida.us/downloadlibrary.aspx

- **WIDA Educator Resources**

https://www.wida.us/professionaldev/educatorresources/

Other Resources

- **Science Vocabulary Word Wall Cards**

http://simplyscience.com/vocabulary-cards/

- **Science Vocabulary Cards and Games**

http://www.mes-english.com/flashcards/science.php

- **Science Toolkit, K-8 books, Passages, and News**

https://morethanenglish.edublogs.org/resources/#Science

- **Graphic Organizer Maker**

http://graphicorganizer.net/?utm_campaign=p4l_home&utm_source=p4l&utm_medium=web

- **Vocabulary Strategies, Sentence Frames, Cognates**

http://www.houstonisd.org/cms/lib2/TX01001591/Centricity/Domain/26922/VocabularyStrategiesDocument.pdf

- **CU Science Discovery Teacher Resources**

http://sciencediscovery.colorado.edu/resources/teacher-resources/engineering-the-future/

- **Latin American Center for Arts, Science, and Education**

http://www.clace.us/

- **STEM Teaching Tools**

http://stemteachingtools.org/news

- **Doing and Talking Math and Science**

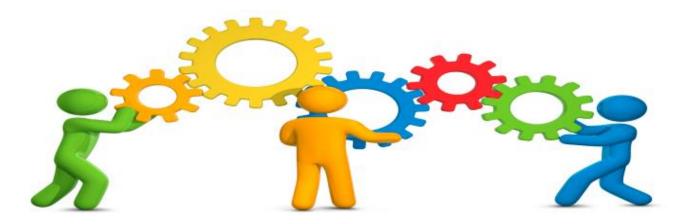http://stem4els.wceruw.org/index.html

Please

- How do you teach the language of science?
  - Email photos, videos, lesson plans, handouts, etc. **Ottenbreit_r@cde.state.co.us**
  - Post a lesson on the WIDA lesson plan share space

  https://www.wida.us/professionaldev/educatorresources/lessonPlan-shareSpace.aspx

  - Submit a video to the WIDA video contest

  https://www.wida.us/professionaldev/educatorresources/videos.aspx

Outcomes

- Build awareness of WIDA's Can Do Philosophy and the Guiding Principals of Language Development

- Learn strategies to teach the language of science in order to provide access to science content for English Learners and support academic language learning for all students

- *Pick at least one strategy to start using tomorrow*

Ticket Out the Door

- Describe one strategy that you will start using tomorrow and explain why you chose that strategy.

- Describe one strategy that you will share with a colleague and explain why you chose that strategy.

- What is something that you would like to know more about?

Rebekah Ottenbreit

Ottenbreit_r@cde.state.co.us