

# comments

from CRISS

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## STEM Themed Issue

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#### Call for Articles

Are you or someone you know doing great things with CRISS? Want to share your ideas with others? Perhaps you have a personal goal to be a published author? We are always looking for new authors for the newsletter. Articles should be 300-750 words in length. Include a brief biography and a headshot of the author (in jpeg). Articles should focus on how CRISS and a particular topic work together for student growth. Lesson plans may be in any format but all aspects of a CRISS learning plan should be evident. Data, student samples, and teacher and student reflections are encouraged.

#### Newsletter Topics & Deadlines

**Fall Theme - Reflection: July 16, 2012/August 1, 2012**

If you're interested in submitting an article, please send a one paragraph abstract by July 16 to Anna Deese at [adeese@projectcriss.com](mailto:adeese@projectcriss.com). If accepted, articles will be due by August 1, 2012.

Is there a theme or focus area you'd like to see in future issues of Comments? Please contact the editor of *Comments from CRISS*, Anna Deese ([adeese@projectcriss.com](mailto:adeese@projectcriss.com)), with your ideas.

#### Implementation: What's your vision for CRISS?

Don't let your Level I training be both the first and last time you think about Project CRISS! During each Level I, participants are given time to make Learning Log entries in their Materials Packets; review those entries the next time you sit down to plan. You can also request follow-up training support from your trainer and watch our website for notices about webinars that will be hosted by the staff at the CRISS National Office. Take action!

#### New Level I Training and Manual Available!

After months of hard work, the 4th edition of the CRISS Level I training is being conducted around the country. Some elements were retained, but we've updated the learning plans to cover more timely topics and multiple genres within lessons. The new training makes connections to Common Core Standards, and the manual includes updated research and new strategies. We've also created an online resource center for 4th edition Level I participants – access PDF and Word versions of your favorite CRISS graphic organizers and tools! **If you haven't taken a 4th edition Level I but still want access to the online resources, you can purchase access for a year for \$10. New materials are being added regularly!**

# Using CRISS Strategies in Math

By Lisa Courtney, FL

I have often heard that math teachers don't understand how to implement CRISS in their classes. They do not see how "The Two Sides" or "The Restless Decade" relate to what they teach. As a math teacher and a CRISS trainer, I offer these ideas to help you implement CRISS.

Algebra students need to be able to work through processes. Geometry students need to learn vocabulary as well as how to organize their knowledge and work through multi-step problems. I suggest teachers incorporate organization strategies such as Content Frames and Process Maps into your teaching. Use tools such as Anticipation Guides or K-W-L charts at the beginning of class as a way to activate students' background knowledge.

**Lesson 8.2**  
I will be able to determine if a figure is a triangle and if so whether it is a right triangle, acute Δ or an obtuse Δ

**Anticipation Guide:** In the space, write A if you agree with the statement and D if you disagree with the statement.

A.1. If  $c^2 = a^2 + b^2$ , then the triangle is a right triangle.

A.2.  $\sqrt{144} = 12$

D.3. It is impossible for a triangle to have sides measuring 5 cm, 9 cm & 12 cm.

A.4. If  $c^2 > a^2 + b^2$ , then the triangle is obtuse.

D.5. If  $c^2 < a^2 + b^2$ , then there is no triangle.

In the following theorems,  $c$  is always the longest side.

- Acute Triangle Theorem:** If  $c^2 < a^2 + b^2$ , then  $\triangle ABC$  is an acute triangle.
- Obtuse Triangle Theorem:** If  $c^2 > a^2 + b^2$ , then  $\triangle ABC$  is an obtuse triangle.
- Right Triangle Theorem:** If  $c^2 = a^2 + b^2$ , then  $\triangle ABC$  is a right triangle.

Sides	Is it a $\Delta$ ?	$a^2$	$b^2$	$c^2$	$a^2 + b^2$	Type of $\Delta$
7, 9, 10	yes	49	81	144	$144 > 130$	obtuse
4, 7, 11	yes	16	49	64	$64 < 65$	acute
9, 12, 15	yes	81	144	225	$225 = 225$	right
5, 8, 12	yes	25	64	144	$144 > 89$	obtuse
9, 10, 11	yes	81	100	121	$121 < 181$	acute
6, 5, 11	no					
13, 8, 17	yes	64	169	289	$289 < 333$	acute
9, 18, 27	yes	81	324	324	$324 = 324$	right

2. Complete these Pythagorean Triples:  
 a. 3 - 4 - 5  
 b. 5 - 12 - 13  
 c. 8 - 15 - 17  
 d. 6 - 8 - 10

3. Find the missing leg and then find the area.

$A = \frac{1}{2}bh$

$a^2 + b^2 = c^2$   
 $a^2 + 12^2 = 15^2$   
 $a^2 + 144 = 225$   
 $a^2 = 81$   
 $a = 9$

missing leg = 9

$A = 90$

In this example, a math teacher provided an Anticipation Guide on the left and students completed the chart on the right to guide them through a multi-step problem. Students could then use this chart as a model for their own Content Frames for future problems.

In all mathematics classes, students must learn content-specific vocabulary; CRISS offers a wide variety of learning strategies to engage students more than simply writing definitions. The Frayer Model provides teachers and students an opportunity to engage in small-group and whole-class discussion. Students gain a deeper understanding of math vocabulary when they examine the meanings of mathematical words by giving examples and non-examples. The Frayer Model provides great value to math because it can be modified to meet a variety of needs. In geometry, I have students write the term at the top of the frame and I choose titles for the four sections based on what I want the students to understand about the term.

Angle of Depression	
Definition:	Diagram:
Example	Non-example

Adapted Frayer Model

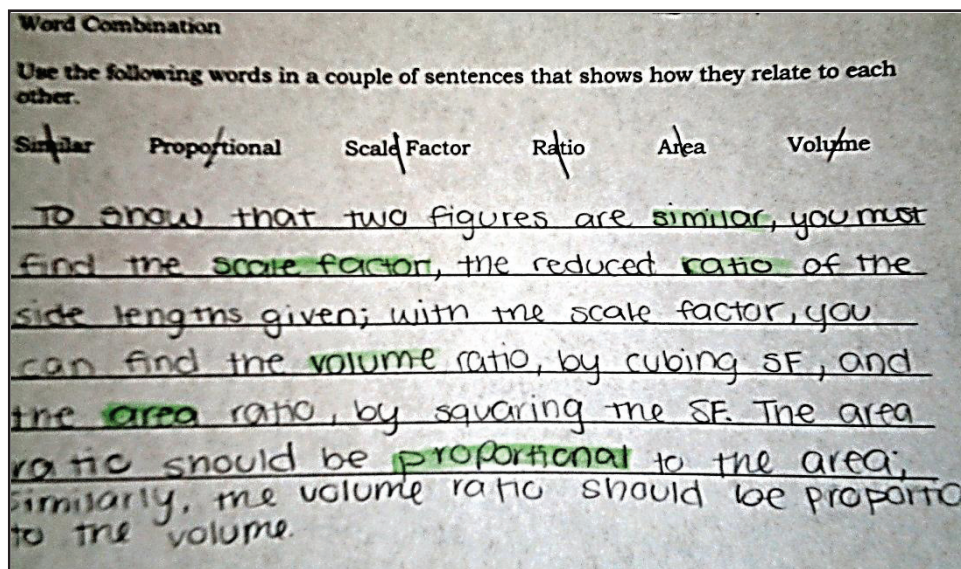




Two Word Walls used in math classes

Posting new vocabulary on a Word Wall enables students to revisit the terms as they encounter them in succeeding lessons. Entries on Word Walls in math classrooms can include the definition, a diagram, and an example. Consider using the Frayer Model format on your Word Wall.

As you become more adept at using organization and vocabulary strategies, I suggest you implement some of the CRISS writing strategies in your classes. Word Combining (see the example below), is an activity that is easy for math teachers to use. Try it as a lesson check at the end of class, as a question on homework assignments or quizzes, or as bell-ringer work at the very beginning or end of a class. When I use Word Combining in class, I am often amazed at students' misconceptions. This gives me a chance to clarify what I have taught and to individualize my instruction to specific students.



Implementing CRISS learning strategies in the mathematics classroom does not require teachers create worksheets or handouts. Teachers can have students incorporate these activities into their daily classwork or notes. It is important to know that this is not adding something more to the curriculum; rather, it is modifying how one teaches.

*Lisa Courtney has been teaching mathematics for Hillsborough Public Schools in Florida for 41 years. She is a District CRISS Trainer, provides follow-up trainings for mathematics teachers, and is National Board Certified. In her spare time she enjoys reading mystery novels.*

# An Easy Way to Write in Math Class

By Stephenie Jordan

Stephenie Jordan, a math teacher at Faith West Academy in Texas, describes how she uses Word Combining as a strategy to reinforce vocabulary terms and meanings in her pre-calculus class. Below she explains her process.

1. First, model how to write sentences that include contextual clues which explain the words and, if possible, show how the words relate to each other.

**Concept:** Circles

Vocabulary Words: circle, center, diameter, radius, circumference

**Example:** The **diameter** of a **circle**, which is twice the length of the **circle's radius**, is the distance across the circle through its **center**. The **circumference**, or distance around a **circle**, is about three times the length of the **diameter** and about six times the length of the **radius**.

2. **Terms to use:**

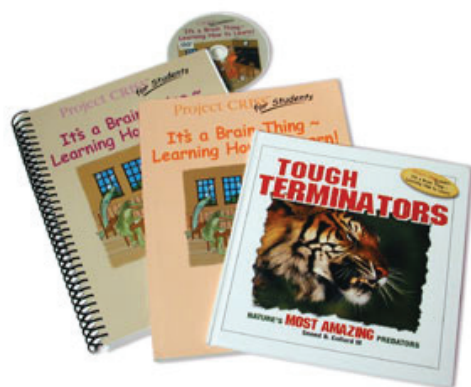
- point-slope form
- two-point form
- slope-intercept form
- domain
- range
- function
- greatest integer function
- odd function
- even function
- step function
- parallel
- perpendicular

3. Review critical words in a class discussion.

4. Allow students to work with partners to come up with sentences for the Word Combining activity and be prepared to share with the class.

After tests,  
I have students create  
Two-Column Notes. On the left,  
students record a problem they did  
incorrectly and then solve it step-by-step.  
In the right-hand column, they explain  
what they did wrong or what they should  
have done to achieve the correct  
response.

Stephenie Jordan, has taught math for 10 years, including 7th grade math, Algebra 1, Algebra 2, Geometry, and Pre-Calculus. Currently, she is getting a Master's in Curriculum and Instruction, Mathematics from the University of Texas at Arlington. She has a new position as the Math Academic Support and GT-Pre AP Geometry teacher at Seven Lakes Junior High in Katy ISD. Stephenie and her husband, JD, live in Katy with their two children, Scott and Rebekah.



## Project CRISS for Students I: It's a Brain Thing ~ Learning How to Learn!

*Project CRISS for Students I: It's a Brain Thing ~ Learning How to Learn!* is a semester-long learning strategies class for students in grades 5-9. The semester class introduces students to the CRISS principles and strategies. The curriculum includes the companion trade book *Tough Terminators* by Sneed B. Collard III and a DVD from the Critterman's World series (informational videos about animals) by Montana's own Doc Wild.

For more information about the CRISS for Students I program  
and a look at one of the chapters in the student workbook [click here](#).

# Content Frame or SFA?

By Anna Deese, Associate Director, MT

As a science teacher, I used Content Frames and Semantic Feature Analysis (SFA) frequently. Students always seemed drawn to the charts and diagrams in their books, so I wanted them to produce their own organizers for their notes. One day I was looking at a stack of Content Frames and realized that what I really gave students was a worksheet; I gave them the sub-categories and categories for the outer edges and asked them to fill in the chart. I wasn't getting the students to drive the organization of the assignment – I was asking them to fill in the blanks. I decided then and there to start asking students to do more of the work.

We started small; I stopped handing out sheets and instead I gave instructions such as, “Create a Content Frame that summarizes the differences between A, B, and C. Make sure it includes X, Y, and Z!” While I was still dictating what was going around the Frame or SFA, at least the students had to keep in mind the purpose for the activity in order to record the categories and sub-categories.

Slowly, we moved to where I was still explicit about one “side” of the Frame or SFA, but the students were selecting information for the other side. In the review activity below, students were asked to identify vocabulary terms related to each organism in a food web. The students needed to identify vocabulary relevant to a food web. They were given the critters. Students were told they only needed to complete the SFA for one producer, one organism at the 3rd trophic level (TL), one quaternary consumer, an omnivore, and a carnivore but most did the SFA for all organisms listed.

	1 <sup>st</sup> TL	2 <sup>nd</sup> TL	3 <sup>rd</sup> TL	4 <sup>th</sup> TL	5 <sup>th</sup> TL	Auto-troph	Heterotroph	primary con	secondary con	tertiary con	quad con	Producers.	Carnivore	Omnivore	Herbivore	Photosynthetic
Leaves	✓					✓										✓
Berries												✓				✓
Grasshopper		✓														
Frog			✓										✓	✓		
Mouse			✓											✓		
Squirrel		✓														
Rabbit		✓														
Fox																
Snake																
owl																

Finally, it was time to turn over the organization to the students fully. I also wanted to be better about ensuring the “I” in CRISS (CREating *Independence* through Student-owned Strategies) was represented in my classroom. As a model, I asked my students to brainstorm about the colleges in the area. My high school was located half way between University of Oregon and Oregon State University, so the students quickly shouted out those schools. They then added the local community college to the list. I asked the students to brainstorm the ways in which these schools are different. Often the students shouted details. I listed the details, but tried to guide them towards picking categories (e.g., Degrees/Programs offered instead of Associates or Medical School). Once we had categories, I asked students to create a SFA and a Content Frame that would cover three of the categories. When they finished, they compared results at their tables, and I asked them each to write a reflection about what they liked and disliked about each strategy. It was common to read that students thought it was easier to figure out what to put on the outside of a Content Frame, but they needed to put lots of details on the inside. Students also noted that they needed many more sub-categories on the outside of an SFA in order to cover relevant details for each topic.

The next day, students were told they needed to identify how the needs of an organism were met by each organ



system; this time, they chose whether to do an SFA or a Content Frame after they completed their reading. Students who selected Content Frames pretty easily determined the labels for the frame, but then spent much more time on the inner contents. The students who selected SFAs had to break down the “needs” into appropriate yes/no questions or categories, but then were able to knock out the center of the SFA much faster. Both groups finished around the same time. Again, I asked students to reflect on the experience, specifically how the modeling helped them. Their responses reinforced the CRISS process of introducing students to strategies using familiar, unthreatening content. Because they knew information about the schools, they could focus on the process of organizing. When confronted with more difficult content, they could think back to that accessible example. From this point on, students were always allowed to select either a Content Frame or an SFA to organize their work when I wanted something “chart-like” in their notes.

**Differences**

- Mascots
- Cost
- Football teams - goat teams
- Med school
- Law school Degrees you can get
- Online courses
- Location

**Content Frame**

	Cost	Mascot	Degrees
VO	OK?	Duck!	Bach, grad, law
OSU	OK?	Boo Beavers	Bach grad Med school
LCC	cheap	None	Ass degrees

**SFA**

	OK?	cheap	Degrees
VO	✓		
OSU	✓		
LCC		✓	

**SFA**

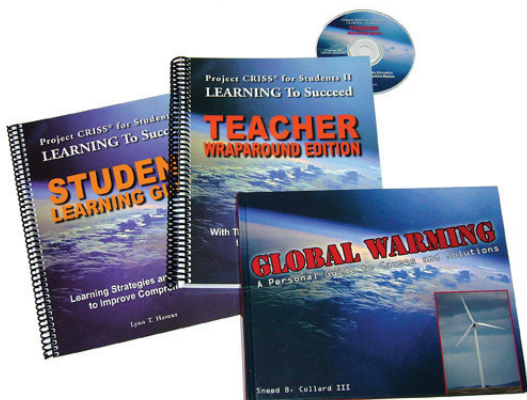
	OK?	cheap	Degrees	back	Law school
VO	N	Y	?	Y	Y
OSU	N	Y	?	Y	N
LCC	Y	N	Y	N	?

my mom got a law school degree  
what do I put here?

I like how I can get lots of info in the SFA but I really need to plan what goes at the top ahead of time. Can I put symbols in it other than Y+N (like "G" for grad school & make a key?)

Anna Deese is a National Trainer and the Associate Director of Project CRISS in Kalispell, Montana as well as a National Board Certified Teacher. She first started using Project CRISS with students at Harrisburg High School in Harrisburg, OR and found modeling and guided practice to be essential in getting student buy-in.

## Project CRISS for Students II: LEARNING To Succeed



*CRISS for Students II: LEARNING To Succeed* is a flexible curriculum designed to teach the CRISS learning principles and strategies directly to students in high school (or advanced middle school). Half of the lessons in the student workbook are based on the CRISS Keys to Learning - learning principles derived from cognitive psychology and brain research. Alternating with these lessons, students apply strategies to untangle the issue of global warming as presented by award-winning science author Sneed B. Collard III in his book, *Global Warming: A Personal Guide to Causes and Solutions*.

For more information about the CRISS for Students II program and a look at one of the chapters in the student workbook click [here](#).

# Organizing Vocabulary in a Science Classroom

By Maryanne Nicks, IN

In the following lesson, Maryanne incorporated a Vocabulary Rating Guide, Picture Notes, Student-Friendly Explanations, and Vocabulary Notebooks into a physics lesson.

In order to introduce Coulomb's Law and the relationships and similarities to Newton's Inverse Square Law of Gravitation, students need to learn new vocabulary. Inspired by the CRISS 4th edition updates to the Vocabulary Chapter, I decided to have students try something different.

First, I used the Rate Your Knowledge strategy. I instructed students to look at the words on our unit vocabulary list and circle K, H, S, or N for each word. They circle (H) if they have a hunch about the word, (K) if they know it, (S) if they are somewhat familiar with it, and (N) if do not know anything about the word at all. Next, they were asked to write Student-Friendly Definitions (using "you", "someone", or "something") for words with an H or K. If they circled S or N, they could consult with other students in the room who created their own Student-Friendly Definition to get advice on what to write. Students then used [www.physicsclassroom.com](http://www.physicsclassroom.com) (and other resources) to investigate and gather important information for each word. Throughout the process, students were encouraged to transform their new knowledge by discussing it with classmates. As a final step, students transformed what they learned by adding pictures to their charts.

Word or Term	Student Friendly Definition Use "you", "something", or "someone".	Important features/key concepts	Picture	H, K, S, N
Charge	something is charged if it has an electrical force.	<ul style="list-style-type: none"> <li>2 types +, -</li> <li>like charges repel, diff. " attract</li> <li>proton - electron charges equal but opposite</li> </ul>		H, K, S, N
Charge by Induction	if something can gain a charge from a charged object without touching it, that's by induction.	<u>no</u> contact!		H, K, S, N
Charge by Friction	Sometimes, when 2 things are rubbed together the electrons move from one to the other making them oppositely charged.	depends on types of materials, like rubber and fur		H, K, S, N
Charge by Conduction	when something that is charged touches something that's not charged and the uncharged thing becomes charged, that's by conduction.	Must be in <u>contact</u>		H, K, S, N
Static Electricity	something has static electricity when it is charged by one of the ways above and stays charged.	charged		H, K, S, N

## Reflection

I distributed this chart at the beginning of the unit on electrostatics. While the classes consist of mostly upper-level students, I have to consider the varied levels of background knowledge amongst the students. What really worked well was having the users rate each word first. This made them really think about each word and what they actually know. With the Student-Friendly Definition, I noticed at first that a lot of the kids were hesitant to use "you" or "something" because they have been told so often in language arts classes not to use those words in their writing. I commented on this, and many of them agreed. In cases where I knew the students were unfamiliar with the terms, I worked instruction into later parts of the unit and asked them to jot down traditional definitions. It also really helped me focus vocabulary instruction throughout the unit of study. Papers were returned to students, and they made additions and changes as we progressed through the unit.

Another bonus feature of this lesson came from the kids: they suggested other words for the chart. The next time I do

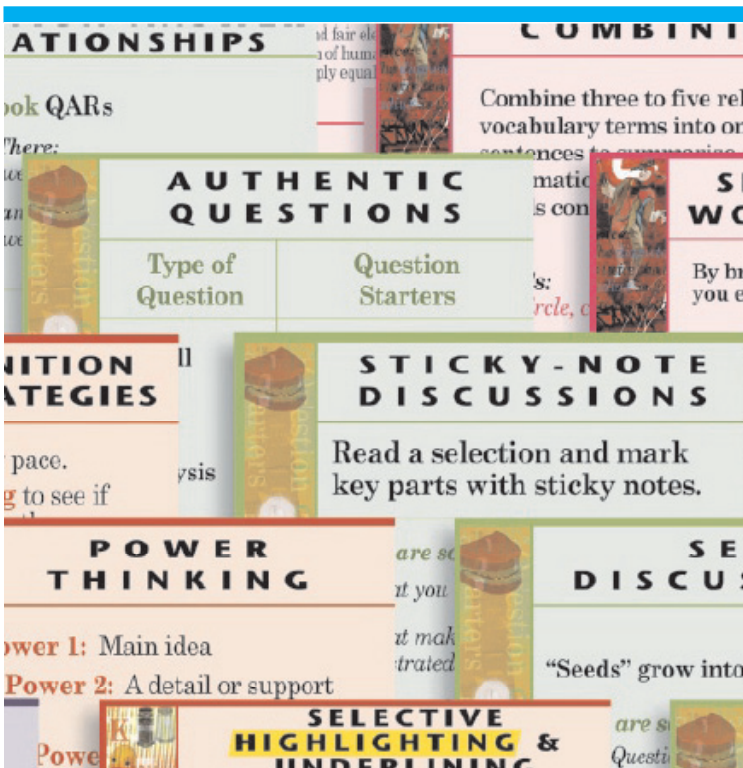
something similar, I will leave blank rows for students to make additions.

I created a similar lesson on ecology for my freshmen Biology class and gave students a similar chart, but changed the HKSN ratings to numbers 1 - 5 (where 1 is the least comfortable with the word and 5 being the most). This time, we used the chart at the end of the unit instead of the beginning. Two days before the unit test, the students used resources to complete the chart. I used these results to inform our review. One example of a troublesome term was, "energy pyramid"; most students rated this a 1. To review, I provided them with a variety of examples, and we discussed them in class. Altering the process effectively informed the review, and students did very well on the test.

Maryanne Nicks is a CRISS trainer from Crown Point High School in Indiana.

Data & Graphs Content Frame CRISS			
Types of Graphs	Used for	Example	Notes
Tally Table	Collect Data		Tally = 1 Tally = 5 Has to have a KEY!!!
Pictograph	Like a bar but with pictures		rectangular bars
Bar Graph	After the data is collected and it compares the data		
Line Plot	Used to plot data		Count!!!! Splits the ones and greater place.
Stem & Leaf Plot	Large sets of data median, range, mode		Must have x-axis and y-axis Think in the way of a clock or fractions!
Line Graph	To use change over time		
Circles/Pie Graph	Parts of a whole		

District Trainer and math teacher, **Annette Cowan**, submitted a similar lesson. She reported, "After doing Read-and-Say-Something, students created a Data & Graphs Content Frame to demonstrate their understanding of the purpose for each graph. Students finished their Content Frame with personal examples, illustrations, and notes, and then used the frame as a study guide."



## Improved and Expanded! CRISS Learning Poster Sets

Now available in six sets of six 19"x 25" full color glossy posters:

- Basics
- Discussion
- Strategies for Learning
- Organizing for Learning
- Writing
- Vocabulary
- OR the Full Package of 36 posters.

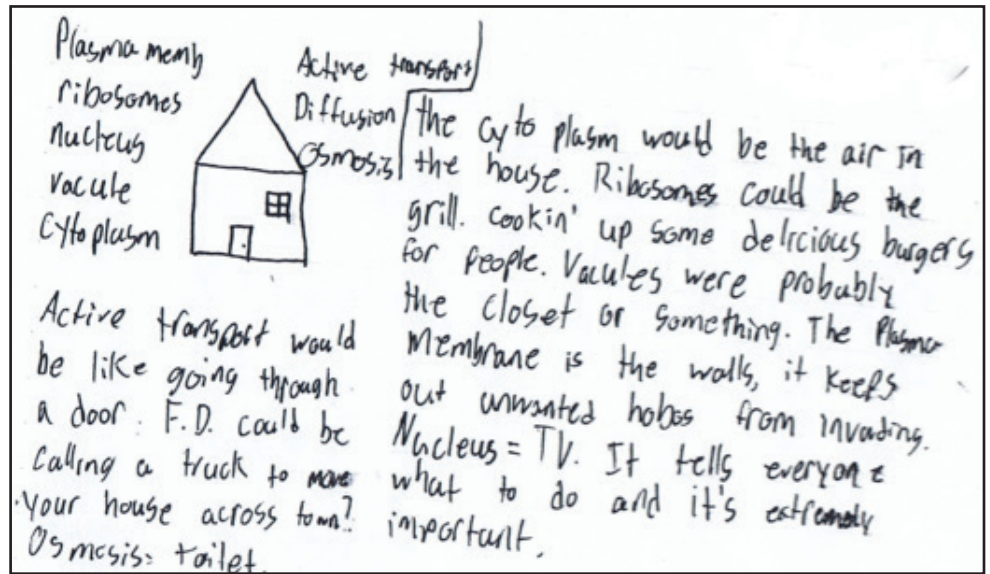
Guide students with visual reminders of the tools they can use to direct their own learning!

Click [here](#) for more information.

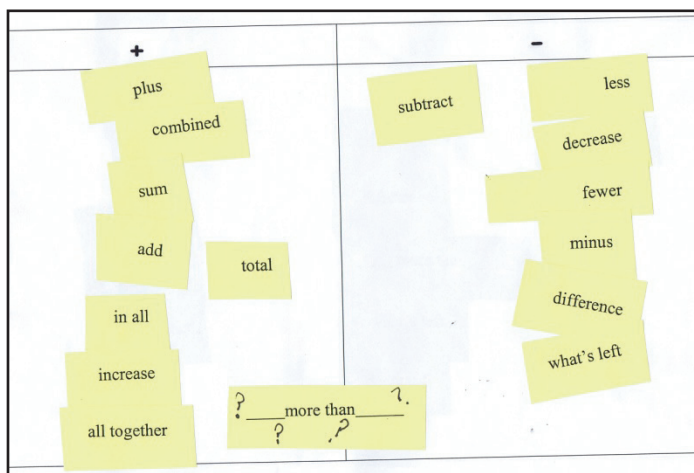


# Strategy Tips

Have students define concepts using analogies. In this example, a student describes how parts of the cell and the way things move across cell membranes relate to a house.

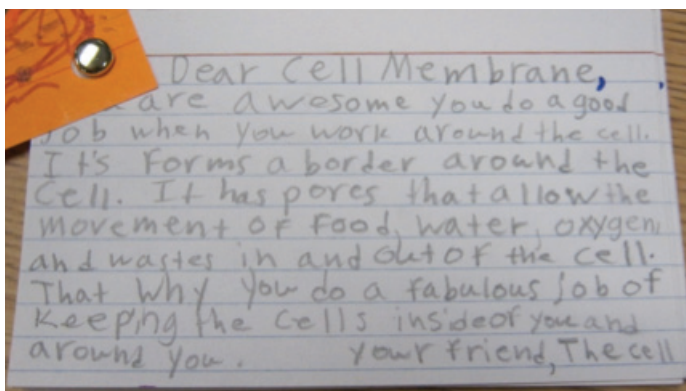


**Leslie Hooper** from Surry County Schools had her biology students sort Pattern Puzzle cards with details about different domains and kingdoms (i.e., Animalia, Fungi, Archaea) into proper categories before completing graphic organizers. This gave her the chance to provide feedback while they were working and before they recorded inaccuracies.



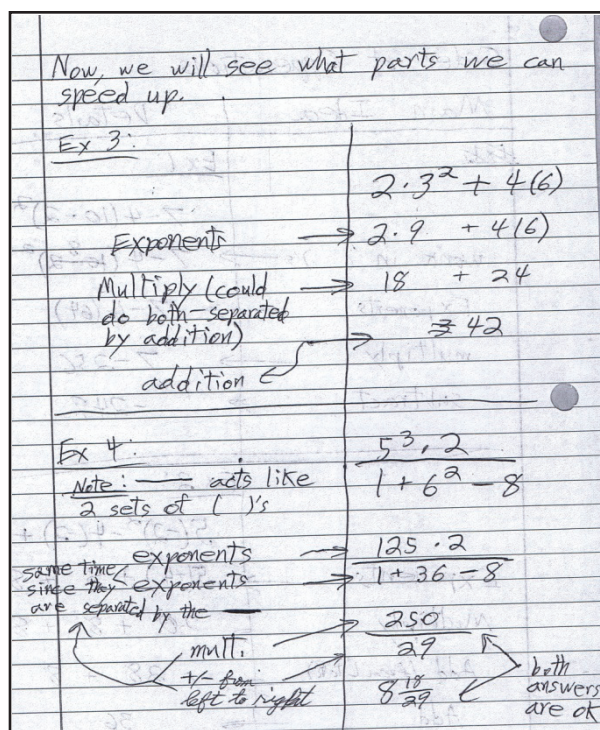
**Jessica Ballard**, a teacher from Mukwonago High School in Wisconsin, had her math students use Pattern Puzzles to identify cue words in word problems. She said, "My math class focuses on functional math skills and I primarily work with students with cognitive disabilities. Most, if not all of them, need a great deal of vocational skill training, and I find it necessary to overtly discuss and practice using the "real world" vocabulary they might encounter in a work environment. It is one thing for my students to be able to solve  $12+18=30$ ; however, in a job setting it is more likely they will encounter words and verbal problems that ask them to do this same computation. That is the skill I'm hoping to strengthen with activities like this, and I feel that this lesson helped most of my students make progress. After this lesson, we built upon this vocabulary strengthening and moved into writing real-life math scenarios using these terms and concepts. The students did well because they had their "+/-" charts (see illustration) for reference.





**Melissa Harrell** of Luray, Virginia, had her students demonstrate understanding of cell-related vocabulary with a RAFT assignment. The students took on the role of a cell and wrote thank you notes to each organelle.

**Robb Watson**, math teacher at Streator High School in Illinois, offers, “Two-Column Notes were a good way to get the students to add some information to their notes. In the past, students would just copy what I wrote without adding any comments to the work, despite my directions to do so. Now, they know what kinds of things to add. These notes also look more like the author’s craft. Hence, I feel that students will be better able to use their notes AND the book.”



### Strategies for technology and vocational arts classes

- Teaching students to make a multimedia presentation using PowerPoint or a similar tool? Consider incorporating a writing strategy like Word Combining, or asking students to choose a graphic organizer to summarize the information on a slide. Alternately, have them use the program to create an organizer for use in a different class.
- In most vocational arts and tech classes, there is down time in the last few minutes of class (after computers have been shut down, etc.). Ask students to write an exit ticket summary of what they did in class that day. Or, ask them to do a quick Word Expansion on a concise statement (such as “Word has formatting tools.” or “sander is not a toy.”). Students can also write a quick RAFT entry from the perspective of someone who stands to benefit from (or receive) their creation.
- Ask students to write Authentic Questions about the topic. Encourage questions about how the topic connects to things outside of school, i.e., the discovery or history of the project, examples of jobs where it’s used, what is considered the “gold standard”, connections to celebrities, ways to make money, etc.

# Flipped Over



Khan Academy (<http://www.khanacademy.org/>) has been all over the news recently, such as in this recent *60 Minutes* segment (<http://goo.gl/zN9fr>). The website offers brief, free, online tutorials on a wide range of topics in math, science, the humanities, finance, and economics. What started as a way for Salman Khan to help tutor his niece, has turned into a powerful tool used by millions of students in and out of classrooms throughout the world.

While students often access the videos on their own as a study aide, some teachers have taken to assigning the videos as homework so they can spend less time lecturing in class and more time facilitating active learning and processing. This “flipped” classroom model has dedicated followers and detractors\*. The dedicated followers love freeing up more time in the classroom; the considerate, detailed explanations can be accessed repeatedly. Detractors of the flipped classroom question whether the explanations are always accurate or appropriately detailed—and there is certainly a question about how accessible this resource is to all students; do students all have Internet at home? What support do students need while watching the videos?

At Project CRISS, we are always excited about new tools that help students learn. We know the students in each classroom differ so much that one book, one strategy, one anything, will (mostly likely) not work for all students. And teachers differ: some are naturally engaging when providing direct instruction, while others dread being the sage on the stage for even a few short minutes. Take a minute to reflect on your style, check out the resources available for your subject area, and consider expanding your teaching toolbox to include the resources at Khan Academy.

\*Editor’s Note: You can follow discussions about the flipped classroom model on Twitter by searching for #flipclass.

**Organizing Vocabulary in a Science Classroom** *page 7*  
**Physics Classroom** <http://www.physicsclassroom.com/>

**Flipped Over Khan Academy** *page 11*  
**Khan Academy** <http://www.khanacademy.org/>  
**60 Minutes** <http://goo.gl/zN9fr>

## **CRISS PRODUCTS**

*CRISS for Students I: It's a Brain Thing ~ Learning How to Learn!*  
<http://projectcriss.com/9-criss-for-students-i>  
*CRISS for Students II: LEARNING To Succeed*  
<http://www.projectcriss.com/44-criss-for-students-ii>  
**CRISS Learning Poster Sets**  
<http://projectcriss.com/8-support-materials>