

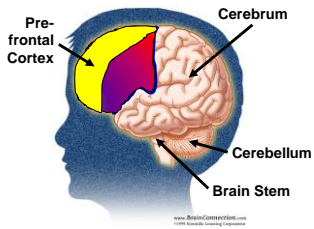
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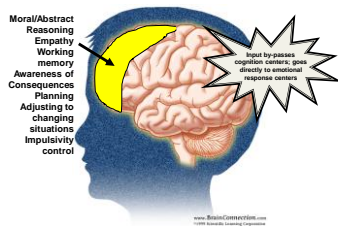
Discern the
Pattern and Fill
in the Last Row
of Numbers

- From, *Creative Thinking*, 2011, Michael Michalko,
p. 44

Unique Needs of Young Adolescents

1. Structure and clear limits
2. Physical activity every single day
3. Frequent and meaningful experiences with fine and performing arts
4. Opportunities for self-definition
5. Safe and inviting emotional atmosphere
6. Experiences in with real competence
7. Meaningful participation in families, school, and communities
8. Basics: food, water, rest, good health, physical presence.
9. To belong



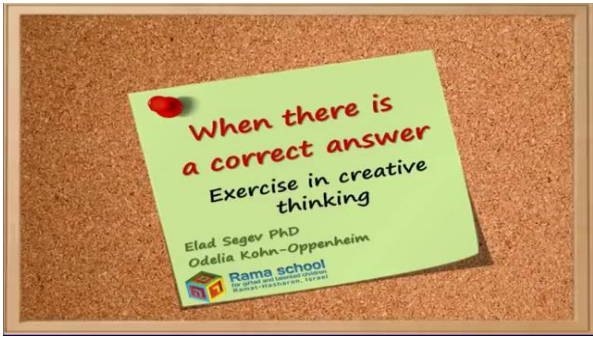


Executive Function could be key!

Build Lesson Vividness:

Several
daydreams
become real...

"a lot" – Running to
each wall to shout, "a"
and "lot," noting space
between
Comparing
Constitutions – Former
Soviet Union and the
U.S. – names removed
Real skeletons, not
diagrams
Simulations
Writing Process
described while
sculpting with clay



What tethers us to
ineffectiveness and
minimal creativity?

Honor Roll

Removing students from p.e./fine and performing arts for test preparation

Thinking we have to replicate learning conditions in later classes in order to prepare them for those classes

Denying student access to personal technology

Grades and Grading

Succumbing to Intellectual Bias

Teachers as the sole arbiters of all there is to know

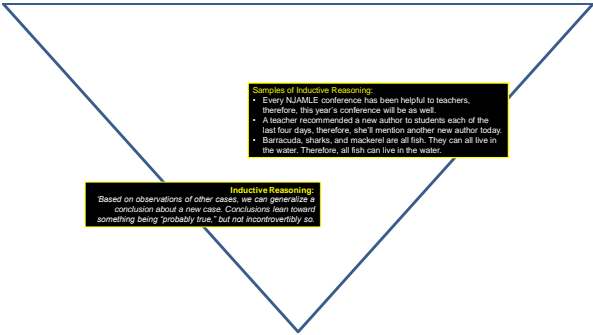
Demanding learning be on a uniform timeline

Denying student access to Vocational Training in Middle school

Teachers who teach to elicit a singular response.

Not being creative because it makes others look bad

Critical Thinking		Creative Thinking
analytic	From www.virtuallcal.com	generative
convergent		divergent
vertical		lateral
probability		possibility
judgment		suspended judgment
focused		diffuse
objective		subjective
answer		an answer
left brain		right brain
verbal		visual
linear		associative
reasoning		richness, novelty
yes but		yes and



[illegible][illegible]

Originally from: members.aol.com/jimn469897/skeptic.htm (Jim Morton)

- **Special Pleading (Stacking The Deck)** -- Using the arguments that support your position, but ignoring or even denying the arguments against.
- **The Excluded Middle (False Dichotomy, Faulty Dilemma)** -- Assuming there are only two alternatives when in fact there are more.
- **Short Term Versus Long Term** -- This is a particular case of the Excluded Middle. For example, "We must deal with crime on the streets before improving the schools." (But why can't we do some of both?)
- **Fallacy Of The General Rule** -- Assuming that something true in general is true in every possible case. For example, "All chairs have four legs." Except that rocking chairs don't have any legs.
- **Argument To The Future** -- Arguing that evidence will someday be discovered which will (then) support your point.

- **Poisoning The Wells** -- Discrediting the sources used by your opponent.
- **Appeal To Pity (Appeal to Sympathy, The Galileo Argument)** -- For example, "Scientists scoffed at Copernicus and Galileo; they laughed at Edison, Tesla and Marconi; they won't give my ideas a fair hearing either. But time will be the judge. I can wait; I am patient; sooner or later science will be forced to admit that all matter is built, not of atoms, but of tiny capsules of TIME."
- **Begging The Question (Assuming The Answer, Tautology)** -- Reasoning in a circle. The thing to be proved is used as one of your assumptions. For example: "We must have a death penalty to discourage violent crime". (This assumes it discourages crime.)
- **Argument From False Authority** -- A strange variation on Argument From Authority. For example, the TV commercial which starts "I'm not a doctor, but I play one on TV." Just what are we supposed to conclude?

- **Appeal To Authority** -- "Albert Einstein was extremely impressed with this theory." (But a statement made by someone long-dead could be out of date. Or perhaps Einstein was just being polite.)
- **Misquote a real authority.** Chevy Chase: "Yes, I said that, but I was singing a song written by someone else at the time."
- **Bad Analogy** -- Claiming that two situations are highly similar, when they aren't. For example, "The solar system reminds me of an atom, with planets orbiting the sun like electrons orbiting the nucleus. We know that electrons can jump from orbit to orbit; so we must look to ancient records for sightings of planets jumping from orbit to orbit also."
- **False Cause** -- Assuming that because two things happened, the first one caused the second one. (Sequence is not causation.) For example, "Before women got the vote, there were no nuclear weapons." Or, "Every time my brother Bill accompanies me to Fenway Park, the Red Sox are sure to lose." We confuse correlation and causation -- Earthquakes in the Andes were correlated with the closest approaches of the planet Uranus. Therefore, Uranus must have caused them. (But Jupiter is nearer than Uranus, and more massive too.)

•Appeal To Widespread Belief (Bandwagon Argument, Peer Pressure) -- The claim, as evidence for an idea, that many people believe it, or used to believe it. In the 1800's there was a widespread belief that bloodletting cured sickness. All of these people were not just wrong, but horribly wrong, because in fact it made people sicker. Clearly, the popularity of an idea is no guarantee that it's right.

•Fallacy Of Composition -- Assuming that a whole has the same simplicity as its constituent parts. Example: "Atoms are colorless. Cats are made of atoms, so cats are colorless."

•Fallacy Of Division -- Assuming that what is true of the whole is true of each constituent part. For example, human beings are made of atoms, and human beings are conscious, so atoms must be conscious.

•Argument By Half Truth (Suppressed Evidence) -- A book on the Bermuda Triangle might tell us that the yacht Connemara IV was found drifting crewless, southeast of Bermuda, on September 26, 1955. None of these books mention that the yacht had been directly in the path of Hurricane Iona, with 180 mph winds and 40-foot waves.

•Argument By Generalization -- Drawing a broad conclusion from a small number of perhaps unrepresentative cases. For example, "They say 1 out of every 5 people is Chinese. How is this possible? I know hundreds of people, and none of them is Chinese." So, by generalization, there aren't any Chinese anywhere.

•Non Sequitur -- Something that just does not follow. For example, "Tens of thousands of Americans have seen lights in the night sky which they could not identify. The existence of life on other planets is fast becoming certainty!"

•Argument By Prestigious Jargon -- Using big complicated words so that you will seem to be an expert. Why do people use "utilize" when they could utilize "use"?

•Argument By Gibberish (Bafflement) -- An invented vocabulary helps the effect. Perfectly ordinary words can be used to baffle. For example, "Each autonomous individual emerges holographically within egoless ontological consciousness as a non-dimensional geometric point within the transcendental thought-wave matrix."

•Euphemism -- The use of words that sound better. The lab rat wasn't killed, it was sacrificed.

•Least Plausible Hypothesis -- Example: "I left a saucer of milk outside overnight. In the morning, the milk was gone. Clearly, my yard was visited by fairies."

To dive deeply into logical fallacies, visit these Websites:

- www.theskepticsguide.org/resources/logical-fallacies
- utminers.utep.edu/omwilliamson/ENGL1311/fallacies.htm

Teach Debate!
<https://speechanddebate.org/>
National Speech and Debate Association

Meeting of Minds

- Students portray historical figures who've been called together to discuss modern world issues and complex ideas. This debate is moderated by the teacher.
- Each team of students researches the figure and shares a summary of what they discover with the class prior to the debate.
- Prior to the debate, each team identifies how their figure would probably respond to several the identified modern issues, and what "holes" they can poke in other figures' responses.
- Each team has 5 - 6 members: 1 performing as the historical figure, 1 - 3 who design a personalized backdrop for the figure during the debate, 1 - 3 who design and prepare an accurate costume and props for the figure.
- All team members research and discuss responses, citing evidence for how the group determined the figure's responses to the issues.

Meeting of Minds

Potential Topics for Discussion:

- *Should Earth have one language or many? What are the roles of men and women in society?*
- *Should students be required to wear uniforms in school?*
- *What are the qualities of a good leader?*
- *Should rap music lyrics be censored?*
- *Should our country have gone to war?*

What does this depict?

owher

"We went to school. We were not taught how to think; we were taught to reproduce what past thinkers thought...
...Instead of being taught to look for possibilities, we were taught to exclude them. It's as if we entered school as a question mark... ...and graduated as a period."

-- Michael Michalko,
Creative Thinking,
2011, p. 3


**"Do they know how to
ask good questions?"**

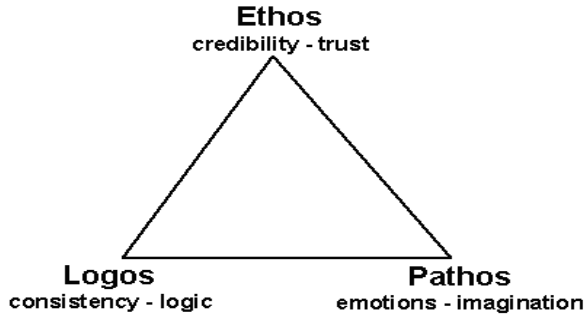
-- Tony Wagner, *The Global
Achievement Gap*, 2008

It's not an *answer chase*.

It's a question journey.

Our future depends on
this one here.





If we find ways for colleagues and ourselves to experience curiosity, awe, induction, deduction, analysis, synthesis, resilience, empathy, extrapolation, juxtaposition, and other mental dexterities in their own development, they are better thinkers of our discipline. They can solve their own problems, connect with others and among ideas, innovate their way to meaningful contributions, and persevere in the midst of challenge.

Embrace the fact that, "(l)earning is fundamentally an *act of creation*, not *consumption of information*."
-- Sharon L. Bowman, Professional Trainer

**Active Creators,
NOT Passive Consumers!**

"We can't be creative unless
we're willing to be confused."
- Writer and educator, Margaret Wheatley

You can't get creative students
from non-creative classrooms.

Creativity is making connections between dissimilar
things in such a way as to create something new.

It's often about recombining old ideas and
things for new purposes or perspectives.

From Professor Alane Starko in her book, *Creativity in the
Classroom*:

Gutenberg developed the idea of movable type
by looking at the way coins were stamped.

Eli Whitney said he developed the idea for the
cotton gin while watching a cat trying to catch a
chicken through a fence.

Pasteur began to understand the mechanisms of infection by seeing similarities between infected wounds and fermenting grapes.

Einstein used moving trains to gain insight into relationships in time and space.

“Consider Einstein’s Theory of Relativity. He did not invent the concepts of energy, mass, or speed of light. Rather he combined these ideas in a new and useful way.”

-- Michael, Michalko, *Creative Thinking*,
Machalko, 2011, p. xvii,

Combination and
Re-Combination

- Hall duty and Teacher Advisory
- Service Learning and Students in danger of dropping out
- Miniature Golf and lesson sequence
- Students’ cafeteria behavior and architecture
- Unmotivated faculty and farming, astronomy, marble tabletops.
- Parental involvement and medicine

In each pair, find a third word that is connected or associated with both of these two words.

From,
<https://sharpbrains.com/brainteasers/> and,
<https://sharpbrains.com/blog/2014/06/20/brainteaser-to-exercise-your-cognitive-skills-where-do-words-go/>

1. LOCK — PIANO
2. SHIP — CARD
3. TREE — CAR
4. SCHOOL — EYE
5. PILLOW — COURT
6. RIVER — MONEY
7. BED — PAPER
8. ARMY — WATER
9. TENNIS — NOISE
10. EGYPTIAN — MOTHER
11. SMOKER — PLUMBER

William's Taxonomy

Fluency
 Flexibility
 Originality
 Elaboration
 Risk Taking
 Complexity
 Curiosity
 Imagination

Frank Williams' Taxonomy of Creative Thinking

Fluency – We generate as many ideas and responses as we can

Example Task: Choose one of the simple machines we've studied (wheel and axle, screw, wedge, lever, pulley, and inclined plane), and list everything in your home that uses it to operate, then list as many items in your home as you can that use more than one simple machine in order to operate.

Flexibility – We categorize ideas, objects, and learning by thinking divergently about them

Example Task: Design a classification system for the items on your list.

Frank Williams' Taxonomy of Creative Thinking

Originality – We create clever and often unique responses to a prompt

Example Task: Define life and non-life.

Elaboration – We expand upon or stretch an idea or thing, building on previous thinking

Example: What inferences about future algae growth can you make, given the three graphs of data from our experiment?

Frank Williams' Taxonomy of Creative Thinking

Risk Taking – We take chances in our thinking, attempting tasks for which the outcome is unknown

Example: Write a position statement on whether or not genetic engineering of humans should be funded by the United States government.

Complexity – We create order from chaos, we explore the logic of a situation, we integrate additional variables or aspects of a situation, contemplate connections

Example: Analyze how two different students changed their lab methodology to prevent data contamination.

Frank Williams' Taxonomy of Creative Thinking

Curiosity – We pursue guesses, we wonder about varied elements, we question.

Example: What would you like to ask someone who has lived aboard the International Space Station for three months about living in zero-gravity?

Imagination – We visualize ideas and objects, we go beyond just what we have in front of us

Example: Imagine building an undersea colony for 500 citizens, most of whom are scientists, a kilometer below the ocean's surface. What factors would you have to consider when building and maintaining the colony and the happiness of its citizens?

Analyze...	Construct...
Revise...	Rank...
Decide between...	Argue against...
Why did...	Argue for...
Defend...	Contrast...
Devise...	Develop...
Identify...	Plan...
Classify...	Critique...
Define...	Rank...
Compose...	Organize...
Interpret...	Interview...
Expand...	Predict...
Develop...	Categorize...
Suppose...	Invent...
Imagine...	Recommend...

Ways for Students to
Transcend Rubric Criteria:

- Demonstrate divergent thinking.
- Add your own voice: If we left your name off the project, would we know it was you that created it?
- Make meaningful connections that the rest of us did not consider.
- Extend your investigation beyond the parameters put forth in the descriptors

Ways for Students to
Transcend Rubric Criteria:

- Give the teacher alternative proposals for how to demonstrate evidence of your learning.
- Teach the teacher and your classmates something they did not know about the topic.
- Express content from a different perspective or through a different domain:
 - ☐ Norse mythology expressed through careful cultivation of Bonsai trees?
 - ☐ Debate as a form of dance?
 - ☐ The human circulatory system could be used as a form of cryptography?
 - ☐ Cultures, furniture, languages, and technology experience entropy?

Ways for Students to
Transcend Rubric Criteria:

- Make the content your own, not something you borrow from the teacher and return passively at the end of the unit. Let the teacher see what YOU bring to learning's table. Don't subordinate who you are for the sake of what a previous generation thought was salient.

And best of all: There are no penalties for giving all of these a try, even when you fail in the first attempts.

To Increase (or Decrease) a Task's Complexity,
Add (or Remove) these Attributes:

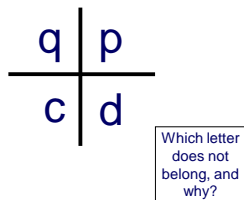
- Manipulate information, not just echo it
- Extend the concept to other areas
- Integrate more than one subject or skill
- Increase the number of variables that must be considered; incorporate more facets
- Demonstrate higher level thinking, i.e. Bloom's Taxonomy, William's Taxonomy
- Use or apply content/skills in situations not yet experienced
- Make choices among several substantive ones
- Work with advanced resources
- Add an unexpected element to the process or product
- Work independently
- Reframe a topic under a new theme
- Share the backstory to a concept – how it was developed
- Identify misconceptions within something

To Increase (or Decrease) a Task's Complexity,
Add (or Remove) these Attributes:

- Identify the bias or prejudice in something
- Negotiate the evaluative criteria
- Deal with ambiguity and multiple meanings or steps
- Use more authentic applications to the real world
- Analyze the action or object
- Argue against something taken for granted or commonly accepted
- Synthesize (bring together) two or more unrelated concepts or objects to create something new
- Critique something against a set of standards
- Work with the ethical side of the subject
- Work in with more abstract concepts and models
- Respond to more open-ended situations
- Increase their autonomy with the topic
- Identify big picture patterns or connections
- Defend their work

- **Manipulate information, not just echo it:**
 - "Once you've understood the motivations and viewpoints of the two historical figures, identify how each one would respond to the three ethical issues provided."
- **Extend the concept to other areas:**
 - "How does this idea apply to the expansion of the railroads in 1800's?" or, "How is this portrayed in the Kingdom Protista?"
- **Work with advanced resources:**
 - "Using the latest schematics of the Space Shuttle flight deck and real interviews with professionals at Jet Propulsion Laboratories in California, prepare a report that..."
- **Add an unexpected element to the process or product:**
 - "What could prevent meiosis from creating four haploid nuclei (gametes) from a single haploid cell?"

- **Reframe a topic under a new theme:**
 - "Re-write the scene from the point of view of the antagonist," "Re-envision the country's involvement in war in terms of insect behavior," or, "Re-tell Goldilocks and the Three Bears so that it becomes a cautionary tale about McCarthyism."
- **Synthesize (bring together) two or more unrelated concepts or objects to create something new:**
 - "How are grammar conventions like music?"
- **Work with the ethical side of the subject:**
 - "At what point is the Federal government justified in subordinating an individual's rights in the pursuit of safe-guarding its citizens?"

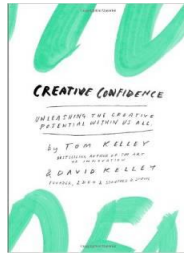


Suspend judgment.

Humans naturally categorize and judge. Fight the urge to label or automatically dismiss something – which are both hard to do when in survival mode, agreed. Discern between exploring and judging, and lean toward exploration only. “Tell me more about...” “What would happen if we...?” “Have you considered...?” Choose “Yes, and...” over, “Yes, but...” comments.

One way to embrace creativity... is to **let go of comparison**. If you are concerned about conforming or about how you measure up to others' successes, you won't perform the risk taking and trailblazing inherent in creative endeavors.

— P. 57, *Creative Confidence*, Kelley and Kelley, 2014



Share freely.

We are often better served by connecting ideas than we are by protecting them. (P. 22, Johnson)

P.61 – “Instead, most important ideas emerged during regular lab meetings, where a dozen or so researchers would gather and informally present and discuss their latest work. If you looked at the map of idea formation..., the **ground zero of innovation was not the microscope. It was the conference table.**”

The Fox television show, “House,” used this model frequently.

(Sampling from Innocentive.com, page 1, downloaded June 24, 2012)

- ☐ Seeking Orthogonally Functionalized Cyclobutanes
- ☐ Navigating the Inside of an Egg Without Damaging It
- ☐ Cleveland Clinic: Method to Reconnect Two Tissues Without Using Sutures
- ☐ Seeking 1H-pyrazolo[3,4-b]pyridin-3-amides
- ☐ Synthetic Route to a Benzazepinone
- ☐ My Air, My Health: An HHS/EPA Challenge
- ☐ Mechanistic Proposals for a Vanadium-Catalyzed Addition of NMO to Imidazopyridazines
- ☐ Seeking Highest and Best Commercial Application for Breakthrough Innovation in Building Technology/Structural Optimization
- ☐ Desafio da Educação: Como atrair pessoas talentosas para se tornar professor na rede pública brasileira

"The problem solvers...were most effective when working at the margins of their fields....While these people were close enough to understand the challenges, they weren't so close that their knowledge held them back and cause them to run into the same stumbling blocks as the corporate scientists." (p. 121, Lehrer)

Check out InnoCentive at
www.innocentive.com/ar/challenge/browse

What would this look like in education?

Regularly do automatic tasks and let the mind roam.

Walk, run, drive a long distance without listening to music, take an extended shower or bath, wash a lot of dishes, mow the lawn, weed the garden, paint a room, crochet, clean gutters, shovel snow, stare at the ocean, watch birds for 45 minutes, swim freestyle, water walk, or tread water for an extended time. All of these put us in a more associative state.

Sleep.

Seriously, 'a lot. Sleep aids creativity in many ways: It creates the relaxed, associative state of mind. It improves alertness, working and long-term memory, and positive, "Can do" attitude. It may be one of the most influential factors in thinking.

Exposure to a wide array of experiences creates is the basis for creative solutions. Insulation embalms the sentiment that the world we know is the only one that matters.

Line-up

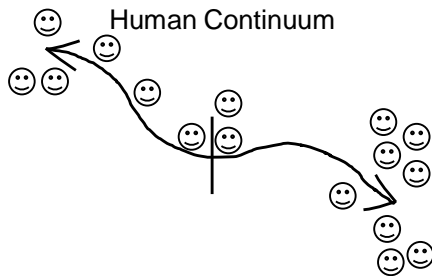
- Groups of students line up according to criteria. Each student holds an index card identifying what he or she is portraying.
- Students discuss everyone's position with one another -- posing questions, disagreeing, and explaining rationales.



Line-up

Students can line-up according to:

chronology, sequences in math problems, components of an essay, equations, sentences, verb tense, scientific process/cycle, patterns: alternating, category/example, increasing/decreasing degree, chromatic scale, sequence of events, cause/effect, components of a larger topic, opposites, synonyms



Human Continuum

Use a human continuum. Place a long strip of masking tape across the middle of the floor, with an "Agree" or "Yes" taped at one end, and "Disagree" or "No" at the other end. Put a notch in the middle for those unwilling to commit to either side. Read statements about the day's concepts aloud while students literally stand where they believe along the continuum. Be pushy – ask students to defend their positions.

_____ [Intangible thing] _____ is a
 _____ [Tangible thing] _____ because
 _____.

Include something intangible, such as suspicion or a virtue, in the first blank. The tangible comparison—a combination lock or an elliptical trainer—would fit in the second section.

Metaphors Break Down

“You can’t think of feudalism as a ladder because you can climb up a ladder. The feudal structure is more like sedimentary rock: what’s on the bottom will always be on the bottom unless some cataclysmic event occurs.”

— Amy Benjamin, *Writing in the Content Areas*, p. 80

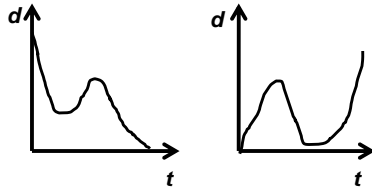
Common Analogous Relationships

- | | |
|--------------------------------------|--|
| • Antonyms | • Person : least related adjective |
| • Synonyms | • Math relationship |
| • Age | • Effect : cause |
| • Time | • Action : Thing Acted Upon |
| • Part : Whole | • Action : Subject Performing the Action |
| • Whole : Part | • Object or Place : Its User |
| • Tool : Its Action | • Object : specific attribute of the object |
| • Tool user : Tool | • Male : Female |
| • Tool : Object It’s Used With | • Symbol : what it means |
| • Worker: product he creates | • Classification/category : example |
| • Category : Example | • Noun : Closely Related Adjective |
| • Effect : Cause | • Elements Used : Product created |
| • Cause : Effect | • Attribute : person or object |
| • Increasing Intensity | • Object : Where It’s located |
| • Decreasing Intensity | • Lack (such as drought/water – one thing lacks the other) |
| • Person : closely related adjective | |

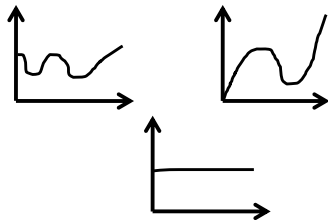
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To see this in a math curriculum, for example, look at algebraic patterns. Frances Van Dyke's *A Visual Approach to Algebra* (Dale Seymour Publications, 1998)

A submarine submerges, rises up to the surface, and submerges again. Its depth d is a function of time t . (p.44)



Consider the following graphs. Describe a situation that could be appropriately represented by each graph. Give the quantity measured along the horizontal axis as well as the quantity measured along the vertical axis.



Examples of Sponges and Thinking Critically/Creatively

- Using only base numbers with exponents, generate five equations that all equal 24.
- Give evidence to support or refute "capitalist" as an appropriate description of the main character.
- Create two great test questions on this topic we could use for tomorrow's test.
- Categorize the 26 elements in three ways with no one category consisting of less than three elements.
- Rewrite these four measures to express a different dynamic.
- Explain to your partner why integers are also rational.

- Using your hands and arms, demonstrate the difference between diffusion and endocytosis (pinocytosis and phagocytosis) in a cell.
- With a partner, identify three arguments against what I just taught you.
- Ask students to identify content/skills that weren't on the test, or ask students to come up with a great additional question for the test and to call on someone to answer it.
- Announce to students: "Be ready to say three ways in which the Civil War and Revolutionary War are exactly the same..." [Insert whatever topics you're about to study for the comparison]

- Ask students to come up with alternative titles to a book or event, or, "if [insert a real person under study] were to write a book, what would its title be?"
- Ask students who they would cast in the role of _____ in this book and why?
- Use a new term in two situations, one correct and one incorrect. Students discern which is which.
- Ask students to generate as many words as they can think of that mean the opposite of _____.
- Give students five vocabulary terms but make sure one of them doesn't fit the category or theme of the terms, and ask students to identify which word doesn't belong and a reason why it doesn't belong.
- With content, play Charades or Pictionary
- Ask students to identify one word that best describes something under study and to defend that word as a good word to describe it. Ask others to argue against the word as a good word to describe the topic.

In-Out Game: Students determine the classification a teacher's statements exemplify, then they confirm their hypothesis by offering elements "in the club" and elements "out of the club." They don't identify the club, just the items in and out of it. If the students' suggestions fit the pattern, the teacher invites them to be a part of the club. The game continues until everyone is a member.

Example: She is in the club but the class is not. They are in the club, but the penguins are not. You are in the club, but the donuts are not. Give me something in and out of the club." A student guesses correctly that the club is for personal pronouns, so she says, "We are in the club, but moon rocks are not." To make it a bit more complex, announce the club's elements and non-elements in unusual ways that must also be exemplified by the students, such as making all the items in and out of the club alliterative or related in some way. This can be as obvious or as complex as you want it to be.

3-2-1

- 3 – Identify at least three differences between acids and bases
- 2 – List two uses of acids and two uses of bases
- 1 – State one reason why knowledge of acids and bases is important to citizens in our community

Backwards Summaries

- “Make the web from which this paragraph came.”
- “Here’s the completed math solution. What would happen if I had never considered the absolute value of x ?”
- “Here’s the final French translation of this sentence. What if I had not checked the tense of each verb?”
- “Here’s a well done concerto. What happens if I remove the oboe’s eight measures on page 4?”
- “Here’s a well-done lab procedure. What happens if I don’t use distilled water?”

Exclusion Brainstorming

The student identifies the word/concept that does not belong with the others, then either orally or in writing explains his reasoning:

- Mixtures – plural, separable, dissolves, no formula
- Compounds – chemically combined, new properties, has formula, no composition
- Solutions – heterogeneous mixture, dissolved particles, saturated and unsaturated, heat increases
- Suspensions – clear, no dissolving, settles upon standing, larger than molecules

Sorting Cards

Teach something that has multiple categories, like types of government, multiple ideologies, cycles in science, systems of the body, taxonomic nomenclature, or multiple theorems in geometry. Then display the categories.

Provide students with index cards or Post-it notes with individual facts, concepts, and attributes of the categories recorded on them. Ask students to work in groups to place each fact, concept, or attribute in its correct category. The conversation among group members is just as important to the learning experience as the placement of the cards, so let students defend their reasoning orally and often.

The summarization occurs every time a student lifts an individual card and makes a decision on where to place the card. He's weighing everything he's been taught as he considers his options. If others question his placement, the discussion furthers the impact. If there is great dissent, and it results in students referencing their notes and textbooks for more information – 'learning Nirvana.' 🌀

One-Word Summaries

"The new government regulations for the meat-packing industry in the 1920's could be seen as an opportunity...."

"Picasso's work is actually an argument for...."

"NASA's battle with Rockwell industries over the warnings about frozen temperatures and the O-rings on the space shuttle were trench warfare...."

Basic Idea: Argue for or against the word as a good description for the topic.

"Word Link"

1. Each student gets a word.
2. In partners, students share the link(s) between their individual words.
3. Partner team joins another partner team, forming a "word cluster."
4. All four students identify the links among their words and share those links with the class.

-- Yopp, Ruth Helen. "Word Links: A Strategy for Developing Word Knowledge," *Voices in the Middle*, Vol. 15, Number 1, September 2007, National Council Teachers of English

Warm-up Activity: Decide at least three ways to use the economic concept of, "Supply and Demand," congruency, a young adult novel, or a thermostat (choose only one) in student learning, with each use in a separate domain or subject area.

Example: Chess can be used to describe strategies employed during a military campaign or hierarchal strata during the middle ages in history class, logic in a computer class, and use of motif when analyzing plot in suspense novels.

Petals Around the Rose

The name of the game is, "Petals Around the Rose." The name is very important. For each roll of the game, there is one answer, and I will tell you that answer.

Petals Around the Rose

Answer:

6

0

10

29

Petals Around the Rose

Clues to give students if they struggle:

1. *All the math you need to solve this problem you learn in kindergarten or before.*
2. *The sequence of the dice patterns has no bearing on the answer.*



In some schools, there is a pervading, anti-intellectual bias.

It is more effective to build teacher professionalism and intellect than it is to enslave teachers to thoughtless automations.

Build It, and They Will Think
– A Starter Kit for the Intellectual Life of Teachers:

Start or participate in an Edcamp experience. It's the organic, unconference for those of us tired of unmeaningful in-service training where one listens passively to someone at the front of the room for hours. To find a dynamic Edcamp experience near you, visit <http://edcamp.wikispaces.com/>.

For these and more ideas, check out Rick's article on developing the intellectual life of teachers at www.rickwormeli.com/articles/

**For your own Professional Development,
Write Education Articles and Blogs**

• Create an actual committee dedicated to the intellectual life of teachers in the school or district. Identify courses at local museums/universities, invite guest speakers on diverse, innovative topics, and provide programs to cultivate teachers' robust intellectual engagement as a companion to the many courses already offered in the district's staff development catalog. Encourage teachers to take courses unrelated to the subjects they taught and to try something with which they have no previous experience.

• Play Minecraft and other world-building, interactive, on-line or single-player games.

• Study video production (you can get editing suites fairly cheaply today, even for Smart phones), then write and produce short education videos you and others can use in the classroom. Invite former students join you. If ambitious, begin your own channel of instructional videos on Youtube.com or use the videos to provide some on-line tutorials and flipped classroom experiences.

- Get exercise. Getting the heart rate up, endorphins pumping, muscles loose, and oxygen to the brain does wonders for the mind. Walk, hike, jog, kayak, climb, bike, blade, dance, swim, lift weights, jump rope, play basketball, do workout DVD's, or do yoga, but get moving for 45 minutes or more at least three times a week. It might be time to get a personal trainer, if you can.
- Hydrate. Seriously, water your brain and it will grow.
- Change your physical location. When we're in different countries or different regions of our own country or town, it stimulates the mind. On a smaller scale, rotate classrooms and meeting spaces for department/faculty meetings.

Try bike tourism. There are many agencies that facilitate bike tours, even for the occasional biker. Explore new geographic regions, cities, historical sites, and more.

- Change to a heart-healthy diet. It turns out what's good for the heart is often good for the mind.
- Learn to use at least five technologies new for you: Twitter, virtual tours, VideoScribe, QR codes, apps, on-line tutorials, Google Docs, MOOCs, crowd-sourcing, MIT Open Courseware, screencasts, Voicethread, Fivver, Moodle, Prezi, iMovie, Edmodo, Promethean/Smartboards. Take an on-line course.
- Learn to play a new musical instrument, incorporate a new art technique, or speak a foreign language.

Learn to play chess or Bridge. Contact the American Contract Bridge League for instructors in your area.

- Get involved in a community theater production, summer youth sports programs, or play in a local musical performance.
- Turn off the t.v. Listen to audio books or radio theater productions. Cultivate the theater of the mind.

- Try your hand at stand-up comedy at a local club.
- Participate in a group ropes course with colleagues and friends.

Consider Using Google's Policy

For every four hours spent working on

...official company projects, we are required to work for one hour on something that really interests us.

"I used to
think...,
but now
I think..."

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