

Active Learning Strategies to Use If You Want...

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Active Learning Strategies to Use If You Want...

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Anticipation Reaction Guide

Anticipation Reaction Guide, developed by Bean and Peterson, can be completed in its usual written form or students who cannot yet read can signal with hand signs or signal cards which of the statements they think is true or false.

Purpose:

- To establish a purpose for reading
- To access prior knowledge
- To help students reframe their thinking as necessary

Process:

- Prepare a series of statements related to the reading or other input source.
- Have students, before reading, indicate whether they think the statement is true or false.
- Have students read the selection or watch the video or demonstration.
- Have students, after reading, answer the same questions again.
- Have students discuss where they found the information that changed their thinking.

Earthquakes Anticipation Reaction Guide

Before Reading

- _____ 1. Earthquake experts are called meteorologists.
- _____ 2. Most earthquakes happen along a fault.
- _____ 3. California has 5-10 earthquakes each year.
- _____ 4. Most earthquakes are felt by humans.
- _____ 5. The San Andreas Fault stretches 600 miles and is located in California.
- _____ 6. Scientist estimate that a huge earthquake will occur in California within the next 25 years.
- _____ 7. Earthquake drills occur in southern California schools.
- _____ 8. Missouri has suffered more major earthquakes than California.

After Reading

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Chemistry Anticipation Reaction Guide

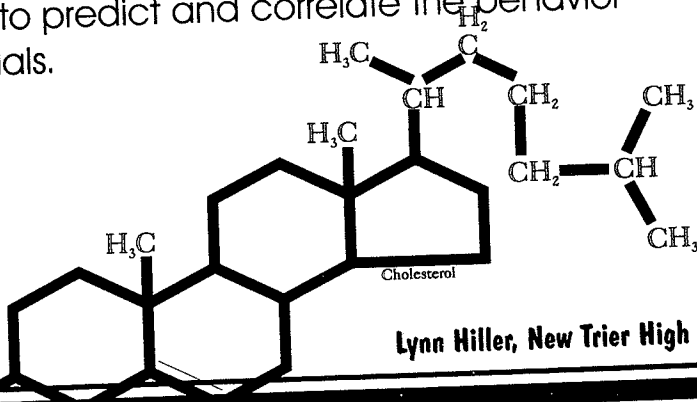
Directions:

1. Respond to each statement before you read. T=true F=false
2. Read section B.9, page 11.5.
3. Respond to each statement after you read. T=true F=false
4. Rewrite the statements that are false so that they are true.

Before Reading

After Reading

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Many properties of elements are determined largely by the number of protons in their atoms and how these protons are arranged. 2. Metal atoms lose their outer electrons more easily than do nonmetal atoms. 3. Active metals can give up one or more of their electrons to ions of less-active metals. 4. Stronger attractions among atoms of a metal result in higher boiling points. 5. Understanding the properties of atoms does not help to predict and correlate the behavior of materials. | <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> |
|---|--|



Lynn Hiller, New Trier High School, Winnetka, IL

Biopoems

Line one First Name

Line Two Three or four adjectives that describe the person/object

Line Three Important relationship (daughter of..., mother of..., etc.)

Line Four Two or three things, people, or ideas that the person/object loved/was attracted to

Line Five Three feelings the person experienced

Line Six Three fears the person experienced

Line Seven Accomplishments (who composed..., who discovered..., etc.)

Line Eight Two or three things the person wanted to see happen or wanted to experience

Line Nine His or her residence

Line Ten Last name

Biopoems

Para

Opposite sides & angles equal, no line of symmetry

Relative of square, rectangle & rhombus

Love to rotate

Feel slanted left & right most of the time, need kite by my side

Fear being stretched out of shape

Give square & rectangle all my properties

Would like to see rhombus, my child

Resident of Quadrilateral

Llelogram

Chua Guat Kheng, Raffles Girls' Secondary School, Singapore

Harry

Magic, Young, Friendly

Friend of Hermione

Quidditch, Hedwig the Owl

Happy, Sad, Scared

Slytherin, Malfoy, Lord Voldemort

Winning the House Cup for Gryffindor

Win at Quidditch, Not get Hagrid in trouble

Hogwarts

Potter

Written by Mike Rutherford, representing all nine year olds around the world

Connection Collections

Purposes

- to help students make personal meaning
- to connect learning to life beyond the classroom
- to promote creative thinking

Process

- Either the teacher or the students collect objects that represent literal or metaphorical connections to the content under study and place them in a bag, baggie, or box.
- Students identify the connections between the items and the content under study or make predictions about an upcoming study.
- The objects can be pictures or actual artifacts.
- Optional: Prepare five bags of five objects and call it "Facts in Five."

Examples

● THE RENAISSANCE

Joanne Fusare White, Rush-Henrietta School District, Henrietta, New York, introduced the idea to her middle school students by preparing bags of artifacts connected to important people from the Renaissance. She used these bags combined with short readings about each person to provide information on figures such as Michelangelo, the Medicis, and Leonardo de Vinci. Students were given a purpose for reading and were able to speculate about the meaning of the objects as they learned new material.

● BOOKS IN A BAG

Linda Denslow, second grade teacher, Rush-Henrietta, New York used **Connection Collections** as a culminating activity for the books and stories she and her students had read during the year. She created a model connections bag for one of the stories, then asked students to choose a favorite story for which to create a bag. She wrote the directions so she could keep the bags to use the next year when she introduced each story.

● PHOETRY (photo poetry)

A third grade teacher in Chapel Hill, North Carolina, had her students create connections or artifacts bags as a prewriting assignment at the conclusion of a unit on poetry. They were given small brown bags and were asked to return the next day with a picture and two other items in the bag that related to the picture but were not actually in the picture. The students then wrote their poems about the item and the picture.

Through the Voice of...

Biography in a Bag

You are a member of a team of anthropologists studying the leaders of the Renaissance/Reformation. You and your team are to collect artifacts representing significant information about your leader to place in a Biography Bag. All data will be documented in your individual journals. Each team on the expedition is responsible for gathering the data on one leader. The leader for which your team is responsible will be identified by the Expedition Leader. The leaders to be studied are as follows:

- Leonardo da Vinci
- Martin Luther
- Queen Elizabeth I
- John Calvin
- Raphael
- Michelangelo Buonarroti
- William Shakespeare
- Henry VIII
- Niccolo Machiavelli

Research findings are to include:

- Information about your leader as a person.
- Information about your leader as a leader.
- Information about your leader as a person influenced by the time in which he or she lived.
- Information about how your leader not only influenced his or her own country, but how he or she had an impact on another region of the world.

In your teams, you are to conduct a basic study that should yield at least six important facts about your leader. Use readily available resources, such as your library available here in our home office (a.k.a. your classroom). After you identify the important facts, document them in your journals and then locate an artifact that describes/relates to each of the facts you have identified. The artifacts might be a painting, drawing, a piece of jewelry, etc. Once again, document the artifacts and their relationship to the important information about your leader in your journals and place the artifacts in your Biography Bag.

Through the Voice of...

Biography in a Bag

It is now time to do research beyond the confines of the home office. You may choose to visit other establishments that contain printed material about your leader, or you may decide to sail along the World Wide Web. In any case, you are to identify ten more significant bits of information about your Renaissance or Reformation leader, and then locate an artifact to support each of these new tidbits. Once again, place the information you identified in your individual journals and the artifacts in your team bag.

When you have gathered all sixteen of the artifacts and placed them in your Biography Bag, as well as recorded the information about the leader and the artifacts in your journals, it is time for each team member to write a brief report. This typed report should be one page long. It, and each of your journals, will be submitted to the Expedition Leader.

As the final step in preparation for your presentation, please decorate the Biography Bag to represent your leader.

After all the written reports are submitted, the teams will come together and present information about their leaders using only the artifacts in the Biography Bags to guide the presentations. These presentations will be made to the Expedition Leader and the other teams.

This Collection Connection in a RAFT format was designed by Tami Loftus, Global History teacher, Rush-Henrietta High School, Rush-Henrietta Central School District, Henrietta, NY. See page 102 for information on RAFT.

Consensus Conclusions

Facts in Five

- Have students individually generate a personal list of the five most important concepts or facts they have learned about the topic being studied.
- Have students move into groups of five.
- Have the group reach consensus on the five most important facts or concepts and clarify their rationale for selecting each.
- Have each group present their selections and the rationale for each selection to the larger group.
- Lead a discussion about the content identified, the similarities and differences and about the process.
- If time is short, post the choices on the bulletin board for later examination.

1-3-6

- Have students follow the same sequence as in Facts in Five but after they work individually, have them move to groups of three and then to groups of six.
- This format takes longer, but may be most effective if students have little experience with building consensus. In fact, you could start with 1-2-4 to help students learn how to talk with each other about the rationale for including certain concepts.
- Students could complete the "1" component as homework in preparation for the discussions the next day.

Formative Assessment Note: This is a great way to gather formative assessment data about the connections students are making, about the levels of thinking they are doing, and about the clues they are picking up from you about what is important.

strategy 10

Consensogram

Have learners place a Post-it note next to the percentage that represents how much they think they currently know about the subject under consideration. An alternative use is to ask how much they like something or what percentage of the class they predict knows, thinks, likes, etc. Young children could use 8" x 11" pieces of paper to make a bar graph on the floor or they could simply line up in columns to create a human bar graph.

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

1 Corners

Corners 2

Process

- Pose a question that has multiple answers or asks students to rank order several options.
- Give students time to consider their own thinking about the topic; then have them move to the corner of the room that has been designated as the meeting place of all those holding the same opinion or view.
- In the corner meeting places, have students discuss why they think or believe the way they do. If the groups are large, have students divide into pairs or triads so that all can voice their opinions and their rationales.
- As appropriate, have selected students or volunteers report for their corner. Large group sharing can be oral or the corner groups can generate and share charts listing their rationales for choosing that particular answer/viewpoint.
- This exercise can be followed by presentation of new material, by journal entries, or research exercises.

Sample Topics

- CEOs of major corporations salaries should be... Post alternative amounts, ratios, and rationales for setting salaries
- Which character in the book would you most like to meet?
- What volleyball skill would you most like to develop?
- If you were the leader of your country/state, which issue would be your top priority...A, B, C, or D?
- Favorite season
- Most interesting/important biome
- How strongly do you agree or disagree with the statement, "All forms of violence should be censored on television"?
- Post the names of four inventions. Have students decide which is most significant?
- Post the names of four historical figures. Have students decide who changed the world the most?

4 Corners

Corners 3

Frame of Reference

TOOL
272

Purpose

These initial notations help students surface prior knowledge or related experiences. They are also helpful to the teacher in understanding where students are coming from as they start studying new material.

Process

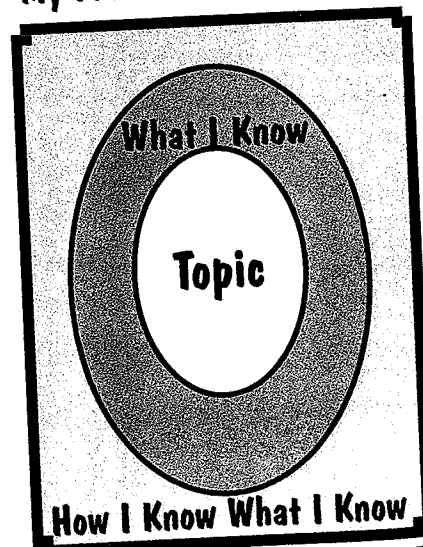
- The **topic or issue** to be discussed is placed in the center of the matted frame where a picture would be placed in a picture frame.
- Students are given several minutes to individually jot down **words or phrases** that come to mind when they hear or see the term "pictured." These words go in the "mat" area of their frame of reference.
- Students are then asked to jot down how they came to know what they know or think...that is the sources, people, events that have **influenced their thinking**. These reactions go in the "frame" area of the graphic.
- Following the individual reflection and writing, students are asked to share their "frames of reference" with a partner or a small group.

Variations

A variation of **Frame of Reference** can be used to process learning by having students place the name of a historical character in the center. The students then jot down how this person would describe his or her own life and times, and then the events and people who influenced his or her thinking. Assigning different students different persons/perspectives can lead to powerful "in the voice of" discussions when the historical frames of references are completed.

Frame of Reference can also be used as an introductory and community building exercise. Students put their own names in the center, describe themselves, and then cite those people and events that have shaped their thinking and lives.

My Frame of Reference...



Graffiti

Process

- Write problems, formulas, sentences to be translated, ideas to brainstorm on pieces of large chart paper, and post them around the room. Students move in small groups from chart to chart.

or

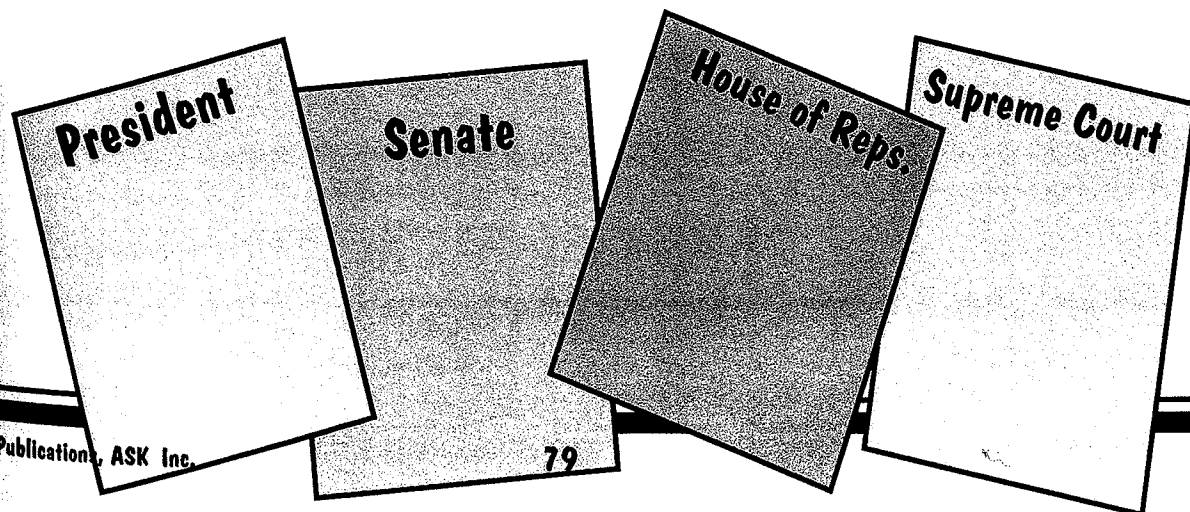
- Give each piece of chart paper to a group of three or four. Students work at their tables and the charts move from table to table. Kathy Anderson of New Trier High School, Winnetka, Illinois, calls this version **Ready...Rotate**.

In either case,

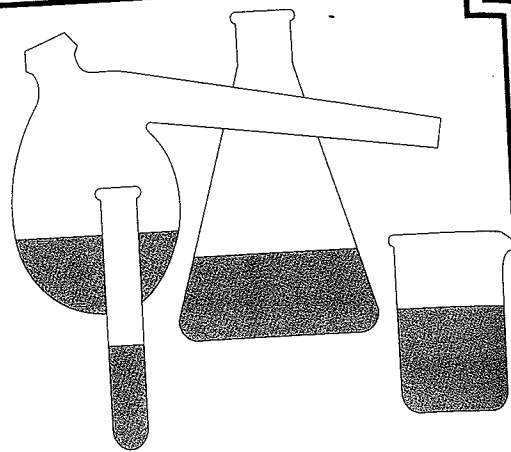
- each group works on a different question, topic, issue, or statement related to the concept being studied and writes responses or "graffiti" which can be short words, phrases, or graphics on their chart paper.
- After the allotted time period, have the students or the charts move.
- Repeat the process until all groups have reacted to all charts.
- Post the charts and have students react to the statements or topics, identify patterns, and/or make predictions based on what is written/drawn on the charts.

Variations

- This strategy can be used any time during a lesson or unit. At the beginning, you and your students can find out what they already know and can do; in the middle of a lesson, it is a useful way for you and them to check on their learning. At the end of study, it can serve as a great review for an exam or even for predicting what might be on the exam.
- Individuals or groups can use different color markers to track contributions.



Chemical Graffiti



- Divide students into groups of 3 or 4.
- Place 5 or 6 multi-process chemical problems on separate sheets of paper. Post the charts around the room or spread problems around the table. Each group will eventually work each of the problems.
- Have each group work on a problem for 90 seconds and then rotate clockwise to the next problem on the cue.
- When a group comes to a new problem, the students check the work of the previous group, make any needed changes, and continue with the problem.
- Have students initial all work and final answers they believe to be correct.
- Students may cycle through problems 2 or 3 times as appropriate.
- As appropriate, use the completed problems to review the concepts under study.

Tim Taylor, Jennings County High School, North Vernon, IN

Amazing Adjectives Graffiti

Students essentially created their own Word Wall with this exercise.

- Post five pieces of chart paper with one of the following five words in the center of each: **Water, Apple, House, Dog and Alien.**
- Have students then move around the room in small groups and write adjectives that might be used to describe each noun.















Results included:

- **For water:** cool, clear, icy, cold, hot, bubbling, dirty, cloudy, fast, meandering, blue, shimmering, beautiful, muddy, deep.
- **For dog:** big, small brown, black, friendly, gruff, aggressive, scary, loud, quiet, happy, sad, grumpy, wild, sleek, funny, gross, hungry.

Shared by a teacher from the International School of Beijing, Beijing, China







Journals

Possible Uses of Journals in any classroom setting

-  To record daily thinking and learning...aha's and questions, implications, general musings
-  To prepare for discussions...questions, key ideas, etc.
-  To summarize lessons and ideas...such as 3-2-1 or "As a result of today, I..."
-  As an alternative to homework assignments when unclear as how to proceed
-  To make predictions about next steps, rationales, effects of actions
-  To identify and solve problems
-  To make connections to prior learning and/or life beyond the classroom
-  To respond to discussions, printed text, videos, demonstrations or lectures (See next page entitled "Response Journals.")
-  To generate possible topics for research
-  To let off steam
-  To set priorities and schedules
-  To record and evaluate study habits, efforts, and academic progress
-  Alternatives to "journal writing," such as creating graphic organizers, pictures, poems, charts, etc.
-  As an interactive notebook

Through the Voice of...

Response Journals

-  **First Thoughts!** Take some time to write down anything that comes to you in relation to the text, the speaker, the video; capture your initial reactions or responses. If the topic or presentation bores you, write that down. If you're intrigued by certain components, if you're attracted to characters or issues or problems, write that down. Just write! Try to capture your reactions in writing whenever you've finished an assignment, or when you've put your book down for a break. Keep your journal close by when you read and learn. You may want to make note immediately of something that strikes you as significant, rather than waiting until you're finished.
-  **Make Connections!** What does the reading or presentation make you think of? Does it remind you of anything or anyone? Make connections with other texts or concepts or events. Do you see any similarities between this material and other books you've read or experiences you've had? Does it bring to mind other issues or contexts that are somehow related?
-  **Question!** What perplexes you about some passage or some point that the writer or speaker is making? Try beginning, "I wonder why..." or "I'm having trouble understanding how..." or "It perplexes me that..." or "I was surprised when..."
-  **Take a Stand!** Think of all the points you can make to support the speaker's or writer's ideas. On what points, or about what issues, do you disagree? Think of your journal as a place to carry on a dialogue with the writer or speaker. Speak to him or her. You might pretend you are the author or speaker and respond to your own comments "through the voice of ..."
-  **Speculate!** Jot down words, images, phrases, details that strike you as interesting or curious. Why are they there? What do they add? Why did you notice them? You could use your interactive notebook to "splash" words, sketches, phrases and then make speculations about why they were used.
-  **Perspective!** Identify the speaker's or author's point of view, and her attitude toward what is being said. Ask yourself how this attitude shapes the way the material is presented, and how the main points are developed.

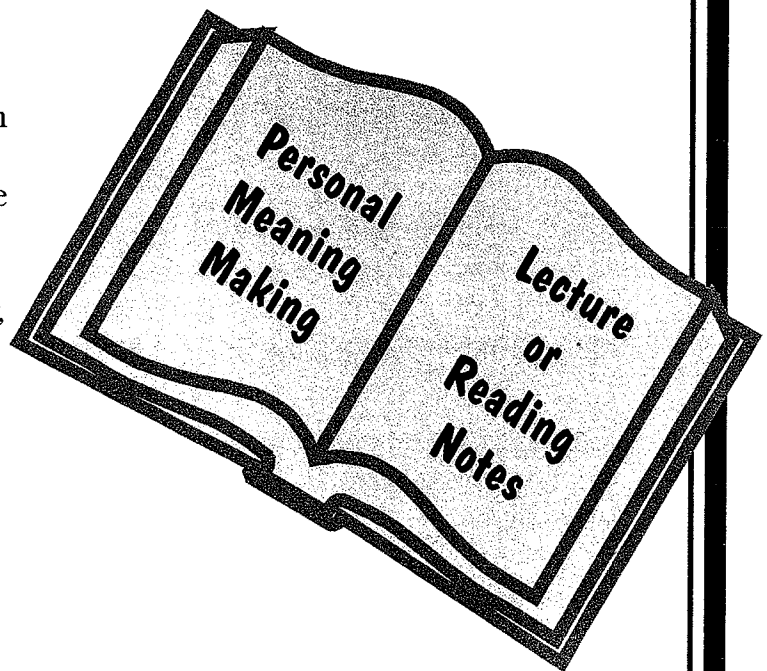
Interactive Notebooks

One of the most exciting innovations to promote student processing of new learning is the **Interactive Notebook**, described in Addison Wesley's *History Alive!* and widely used by teachers of history and other social sciences. The uses of the **Interactive Notebook** extend to all areas of study and to all ages because the structure and potential contents capture the essence of active participation, multiple intelligences, and the variables of the brain-compatible classroom.

To get started with the **Interactive Notebook** process, ask students fourth grade or older to purchase and bring to class each day an 8-1/2" by 11" inch spiral notebook with at least one hundred pages, as well as a container holding a pen, a pencil with an eraser, at least two felt tip pens of different colors, and at least two highlighters of different colors. Other desirable equipment includes a small pair of scissors and a glue stick. If the cost is prohibitive for some students, create classroom supply kits. For younger students, the pages can be collected in a portfolio and later bound into a book.

Teach students productive methods of note taking during lectures, readings, or other presentations, and have them record their notes on the **RIGHT** side of their notebooks. Encourage them to vary size of letters, boldness of letters, the use of upper and lower case letters, indentations, underlining, and bullets. If a well-designed worksheet is necessary, simply have the students use a glue stick to attach it to the right side of their notebook.

The **LEFT** side of the notebook is reserved for student processing of the information recorded on the **RIGHT** side. Students can be asked to review and preview, draw maps, think of a time when..., summarize in a sentence, create graphic organizers, create a metaphor, respond to what if questions, take a stand, etc. Additionally, encourage them to add newspaper clippings or political cartoons, drawings and illustrations, or other such personal touches. The use of color and visual effects is highly encouraged! The **LEFT**, or processing side, can be completed in class or as **homework**.



Interactive Notebooks

It is difficult for teachers to collect exemplars of interactive notebooks because students become so attached to them. They are no longer simply a set of class or reading notes but a scrapbook of personal meaning. They are the makings of the "memory drawers" that parents keep for their children.

Interactive Notebooks in Action

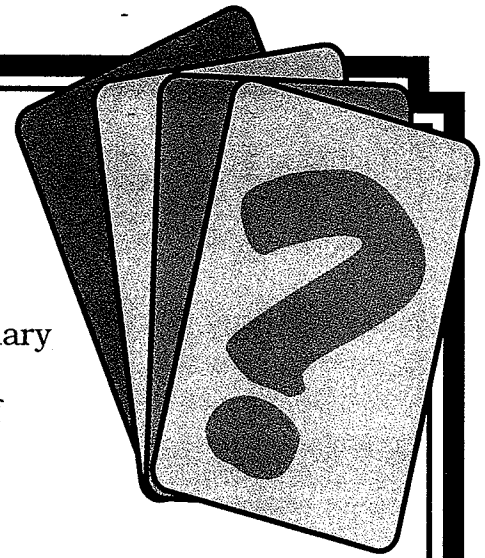
Interactive notebooks provide a wonderful transition from one grade to another. In Virginia where the Standards of Learning assessments at the **middle school** level cover multiple years in social studies and science, teachers collect the interactive notebooks from seventh grade and pass them on to the eighth grade science and social studies teachers. The materials for a cumulative review are already prepared...by the students.

Stephanie Bice, who teaches **English 10** in Greece Central School District, Greece, New York, assigned her students an interactive notebook for their reading of **Animal Farm**. Students were directed to reflect, clarify, predict and pose questions at approximately twenty page intervals during their reading. Additionally they kept a character log, selected ten quotes of significance to them and did a book reflection. The essential question given to focus the reading was, "How and when are the same kind of things happening every day around me?" Students interacted with their notes by connecting the character log, the quotes and the book reflections to poems, songs, people or events of their lifetime and by drawing pictures or symbols and making collages to represent the connections.

Vera, an English teacher, shared the interactive notebook from one of her students at **Jurong Institute in Singapore**. The student who created the interactive notebook had not scored high enough on her O Level exams to enroll in Junior College so she enrolled at Jurong Institute for an extended secondary school experience. On the first pages of her interactive notebooks there was little color, variation in size and only a few words. As she gained experience with the process she continued to take incredibly neat and comprehensive notes on the right side of her notebook and the left side blossomed into beautiful pieces of meaning-making art. She attributed her score on her A Level exams to the process.

The **second grade students** of Michelle Korn, Mary Jo Fichtner, and Shannon Zimmerman at Autumn Lane Elementary School in Greece Central School District, New York, study poetry throughout the school year. For each poem they read or write, they illustrate their interpretation of it. The teachers collect the student work and hold it for the end of the year when they put together a poetry notebook. This process is a combination portfolio/interactive notebook because they not only have their poetry collection, they have interacted with each poem.

It's All in the Cards



Once you or the students have prepared cards with vocabulary words or problems with matching definitions, solutions, examples or translations, you can use them in a multiple of ways. You can use pictures with primary-age learners.

I Have the Question, Who Has the Answer?

Purposes

- Review concepts through active participation.
- Heighten attention and engagement of all students.

Materials

- Prepare two sets of index cards or slips of paper approximately 3" x 5". One set contains questions related to the unit of study. The second set contains the answer to the questions.
- To keep students engaged, prepare more answer cards than question cards.
- To promote cumulative review and connections between units of study, on occasion, mix in key concepts, events, or terms from previous units.

Process

- Distribute answer cards to students.
- Place a stack of question cards face down in the middle of each of the student tables.
- Designate a student to start the process of turning over a question card. The student says, "The question is...Who has the answer?"
- All students check their answer cards to see if they have the correct answer or a possible one. If the student thinks he/she has an answer, she reads the answer. If it is a match, the student with the answer turns over the next card, reads the question aloud, and the process continues.

See pages 93-94 on "Sort Cards" for more ways to have students "handle" their learning and make connections through the use of index cards.

It's All in the Cards

Mix & Match

Process

- Distribute questions and answers, vocabulary words and definitions, equivalent fractions, or any set of information.
- Use as many sets as you need to ensure that each student has one card and that another student has the "matching" card.
- Have the students move about and pass or "mix" the cards. When you call "Match!" they read their card and then find their match and discuss why and how they go together.
- For advanced "matching" use sets of three, such as a vocabulary word, a definition and an example, or have students cluster in larger "matching" sets by decades, beginning letters or blends, countries on continents, etc.

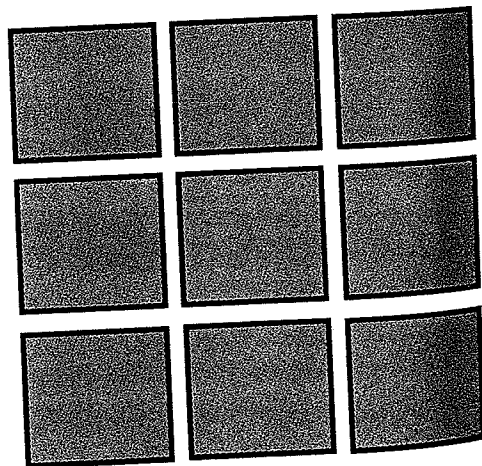
Tic-Tac-Toe

Purpose

To have students go beyond memorizing definitions and to look for patterns and connections embedded in the vocabulary words and concepts being studied.

Process

- Place, or have students place, vocabulary words or important concepts on index cards.
- Give each student or group a set of cards.
- Have students shuffle their cards and deal out nine cards in a 3 x 3 format.
- Ask students to form eight sentences each including the three words straight across in a row, straight down in a column, or on the diagonals.
- Have the students or groups share the sentences that capture important connections, or "misconnections," between words and concepts being studied.
- For primary age learners, consider using only one row. Use pictures and/or a combination of pictures and words.



Inside-Outside Circles

Process

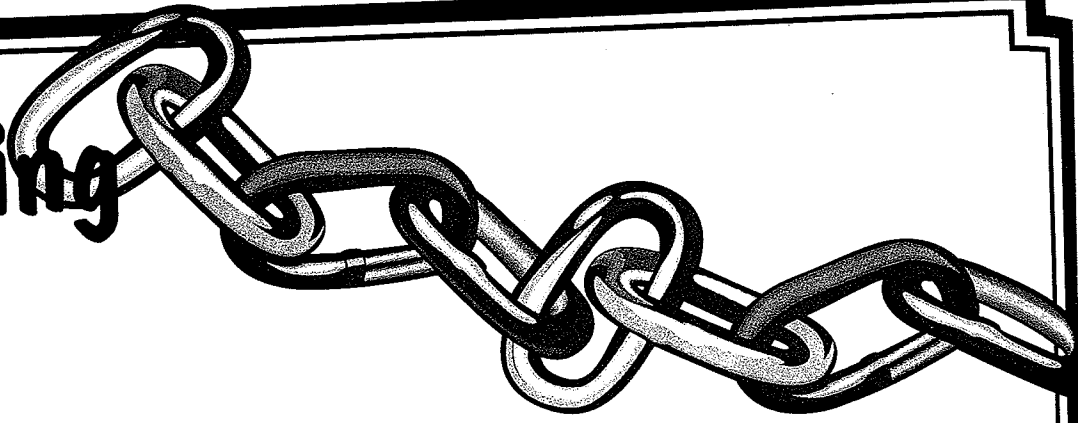
- On index cards, write vocabulary words, math or science problems, or questions about important points in the unit. Give a card to each student. Have students turn the cards over and write the answer to their question on the back of the card.
- Have the students number/letter off as "1s" and "2s" or "As" and "Bs". Ask one subset to stand and form a circle. When the circle is formed, have them face the outside of the circle. The remaining students then go and stand facing a student in the "inside" circle.
- Have students ask each other their questions. Advise them that if their partner does not know the answer, to immediately show them the question and the answer.
 - **As ask their questions of the Bs.**
 - **Bs then ask their questions of the As.**
 - **At the signal, students switch cards. Now the As have the Bs cards and vice versa.**
- Have the outside circle move to the left or the right until they reach the second or third person in the inside circle.
- These new partners quiz each other as before. Continue this sequence for as long as is appropriate.
- It is important to **have the students exchange cards** after each questioning session or they will get bored asking the same question over and over and won't learn nearly as much.

Variation on a theme...

Cake Walk

- Questions are written on the board or on an overhead transparency.
- Students form concentric circles.
- The teacher or a student plays music. While the music plays, the circles move in opposite directions. When the music stops, students in the outer circle turn to face students in the inner circle.
- Students discuss the question to which their attention is directed.
- Repeat the process for as long as it is appropriate.

Learning Links



Purposes

- To focus students on the key concepts, big ideas and essential understandings
- To help students access prior knowledge
- To establish purpose for reading or listening
- To help students make meaning
- To help students see patterns and connections

Process

Key Concepts Identified

- Teacher provides students with a list of key concepts from the material to be discussed. Students do not write on the original list. Notes are taken on another sheet of paper keeping original list intact.

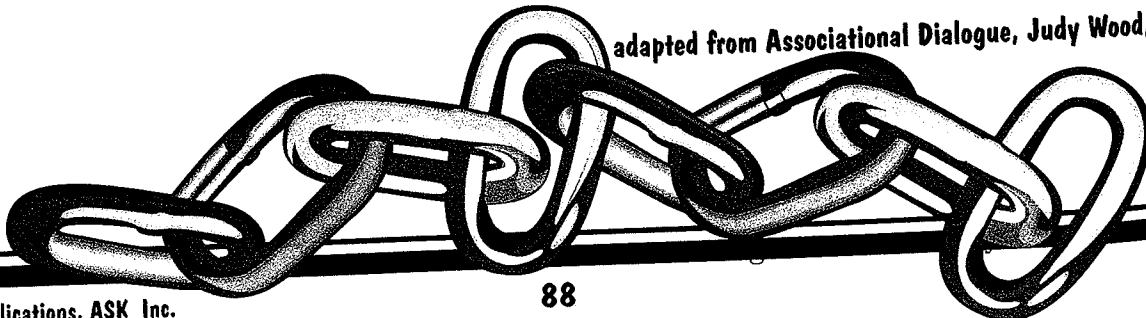
Key Concepts Explored

- Students take notes from their textbooks, class lectures, and discussions to organize details around the major concepts, as listed by the teacher, until they have clusters of information around each of the concepts.
- Students choose how to graphically display the "details" to the key concepts. For instance, they might create a web or mind map about the concepts. These graphics would be great journal or interactive notebook entries.

Key Concepts Understood

- Working independently, students review their lists of the key concepts (with no notes by them) to mentally review the information they have gathered until they can readily associate newly learned information with each listed key concept.
- Following the individual review, students work in pairs to discuss the concepts in their own words. Students are encouraged to add personal meaning and background knowledge to the discussion to help each other learn.

adapted from *Associational Dialogue*, Judy Wood, 1987



Line-Ups

Purposes

- To get students to take and defend a position on a topic
- To evoke curiosity and heighten attention/focus during instruction
- To help students fine tune their estimation skills
- To help students develop their ability to articulate their rationale

Process

- Have students take a stand, make a prediction, or make an estimation pertaining to the topic of instruction. Have them write their predictions on a small piece of paper or a Post-it note.
- Designate one end of the room as the low end/beginning and the other as the high end/ending. Have students line up in the order of their predictions or estimates. Have students hold their written estimate where it can be seen and line up without talking.
- Have students report their estimates so that all students can see the wide range of responses.
- Fold the line on itself so the person with the highest estimate or the end is facing the person with the lowest response. Or, find the center of the line and have the students move so that the person holding the highest estimate is facing someone with a mid-level response.
- The partners share their estimates, as well as the rationales and strategies they used to determine their responses. Students can be asked to report on their partner's answers and rationale or on their own.
- If there is a correct answer, you may want to have them determine it or do research to find out the answer or the opinions of experts in the field.

Examples

- **Sequence the steps in changing a tire. Place one step on each slip of paper and distribute randomly.**
- **Distribute cards with numbers represented as square roots, fractions, decimals, exponents, etc. Have students line up from smallest to largest.**
- **Distribute steps in a process or events in history. Have students line up in what they think is the correct sequence.**
- **Estimate the percentage of Americans (French) who exercise the right to vote.**

Numbered Heads Together



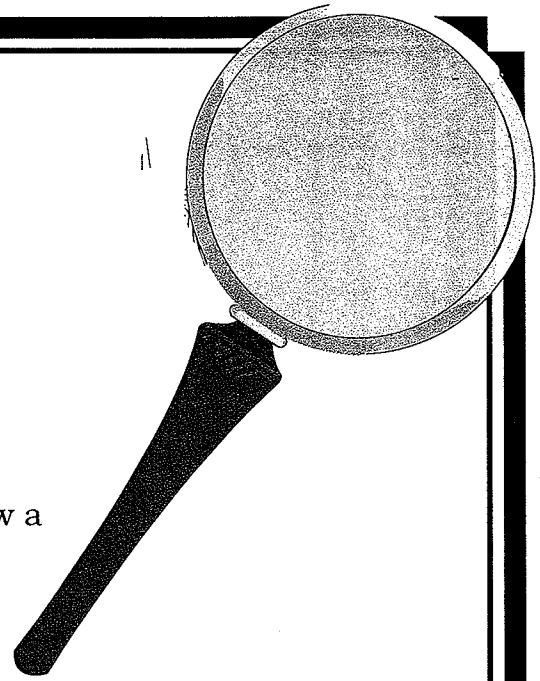
Process

- Have students form teams of 4 or 5.
- Have students within each team count off from 1-4 or 5 (depending on the number of group members). If teams are uneven, when #5 is called to answer, the #4 person on 4 member teams answers with the #5 people from 5 member teams.
- The teacher asks a question.
- Students put their heads together and collaboratively generate an answer.
- Members of the team make sure each member can answer the question.
- The teacher calls a number at random. All students assigned that number stand or raise their hands; one of these students is selected to answer the question.

Variations

- Using a spinning wheel, dice, or playing cards to identify the spokesperson makes this structure even more engaging.
- If the answer has several parts, #1 from one table can answer the first part, then another #1 adds the second part, etc.
- When a student gives a partially correct answer, another person with that number can be called upon to add to the response. Another variation is to have all teams put their heads together again to check understanding and supply the missing information.
- When divergent answers are the goal, use Numbered Head Ambassadors to have the identified group member move to the next table to tell that group what the ambassador's "home" group thinks.

Scavenger Hunt



Purposes

- To review, preview, and expand a topic
- To demonstrate to students that collectively they know a great deal
- To build in movement

Process

- Prepare a set of questions on a topic.
- If students are not already in table groups or teams, they will need to be in groups to discuss their work after the scavenger hunt.
- Have students individually read through the questions, select one for which they will be the expert, and answer only that question on their sheets. As an alternative, you may assign a specific question to each student or have them draw the question number out of a hat.
- You may wish to initial the answers before they start the hunt to ensure that a "virus" does not spread around the room, or you may wish to let students discover and deal with any errors.
- Students can use all the people and materials in the room as resources to obtain the rest of the answers. Students may only obtain one answer from each person they ask.
- Answers can "flow through" one person to another, but the "third party" and middle person should be prepared to fully explain the answer. The name the student lists as a resource is the person from whom they actually obtain the answer.
- When time is called, students return to their table groups or teams, verify answers, and complete any unfinished answers.
- Only unresolved issues need be discussed with the entire class.

Show 2 different formulas for finding area:

a =
a =

Sign. _____

1 mm = _____ cm
1 cm = _____ m
1 m = _____ km

Sign. _____

What is the reciprocal of:

$1\frac{3}{6}$ =
 $4/7$ =

Sign. _____

The formula for finding volume is:

Sign. _____

Math Scavenger Hunt

The product is the _____ in a _____ problem.

Sign. _____

Show 3 formulas for finding perimeter:

P =
P =
P =

Sign. _____

Give the decimal values for:

$1/4$ =
 $1/2$ =
 $3/4$ =

Sign. _____

Define:
Mean =
Median =
Mode =
Range =

Sign. _____

Math Scavenger Hunt

Show the formula for finding the circumference of a circle.

Sign. _____

PEMDAS stands for what:

Sign. _____

What are the next 3 place values after a decimal?

Sign. _____

Show an example of an obtuse angle:

Sign. _____

Math Scavenger Hunt

Define a greatest common factor (GCF):

Sign. _____

Define a least common denominator (LCD):

Sign. _____

When you're dividing fractions do you need to find a LCD? and why?

Sign. _____

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Sort Cards

Kinesthetic learners need to "handle the information." Index cards, Post-it notes, or the backs of old handouts cut into 4" x 6" segments will work equally well.

Process at the Beginning of Learning

- Students, working individually, generate words and short phrases that come to mind when they think of a designated topic. They record each idea on a separate index card.
- Working in small groups, students:
 - share ideas
 - clarify similar ideas
 - eliminate duplicates
- Students sort the ideas generated by the group into categories. The categories can be created by the students, or the teacher can identify categories for student use.
- When the sorting and labeling is completed, the students take a tour around the room to observe and analyze the work of other groups. One student stays behind at the base table to answer questions.
- Groups return to tables to discuss what they observed and to revise or add new ideas/categories.
- Groups use the generated ideas and categories as a basis of future study or discussion.
- Ask students to do meta-cognitive processing; that is, have them process how they went about their thinking as they generated, sorted, categorized, labeled, and analyzed the work of others.
- Once these cards are generated, they can be used for a multitude of other instructional purposes. Students could sort them again later in the lesson or unit based on new learning or they could see which important words or phrases were missing. They could identify twenty or so to use when writing about the topic.

During the Learning Process or When Checking for Understanding

Give each student a set of index cards with the key ideas, vocabulary terms, events, etc., recorded on them or have the students create their own cards. They could use the cards they generated at the beginning of the lesson. They could sort them again based on new learning and/or identify which important words are missing. They could identify twenty or so words or phrases to include in a journal entry about the topic or they could use them for **Tic-Tac-Toe**.

Sort Cards

This pack of index cards can work miracles in helping you and your students know who knows what! Students use the cards to "sort" their learning. Some possibilities include:

- **vocabulary terms and definition matching**
- **sequencing historical events or scientific processes.** See Joe O'Shea's example on the next page.
- **categorizing**
- **"I know," "I sort of know," and "I haven't a clue" piles**

The World of Plants Sort Cards Assessment

Julie Wenzloff gave her students these words on 2" x 4" slips of paper:

cold
harsh
permafrost
destruction
extinction
tundra
frozen
deforestation
peril
pollution

needles
alternate leaves
deciduous
whorled leaves
water
nonseed plant
ferns
simple leaves
liverworts
monocots

wind
animals
opposite leaves
succulents
birds
mosses
conifers
seed plant
horsetails
compound leaves

The students were asked to sort the cards into two categories. The assessment on "The World of Plants" was to label the two lists of words and then to write a rationale for why the words were placed as they were placed. This approach matches the "list-group-label" steps that are the first phase of Hilda Taba's model. The teacher's addition of having students give the rationale for the grouping causes students to think about their thinking and communicate it in writing.

Julie Wenzloff, Farmington Elementary School, Kewaskum, WI



Photosynthesis: The Light Reactions

H_2O

Photosystem
I

Electron
Carrier

Photosystem
II

$NADP^+$

$NADP^+$

H^+

$NADPH_2$

$ADP+P$

H^+

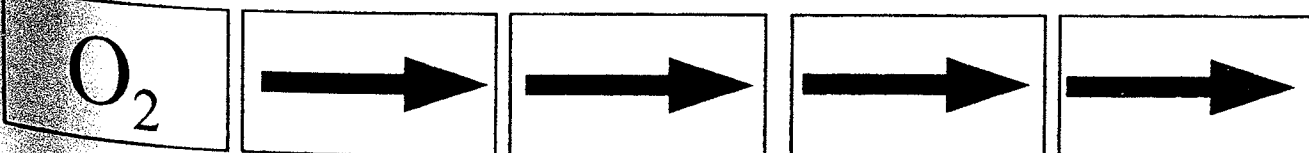
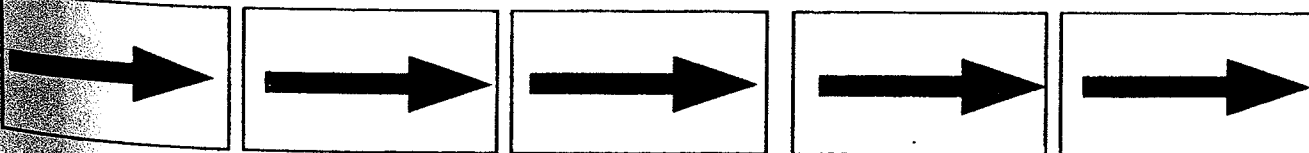
H_2O

ATP

e^-

Electron
Transport
System

ATP
Synthetase



O_2

Stir the Class

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Process

- Provide each student with a data collection sheet with ten to twenty lines or have them number their own sheets.
- Have each student write, as directed, three reasons, three causes, three points of interest, etc. about the topic/concept to be studied. Ask them to make the third one on their list unique.
- At a signal, students move around the room collecting/giving one idea from/to each student. Ideas received from one student can be passed "through" to another student.
- After an appropriate amount of time, students return to their seats.
- At this point, you can have students compare lists, prioritize, categorize, identify cause and effect, sequence, design research projects, etc.
- Now students can continue with a lesson format appropriate to the level of thinking you want them to do. They have had time to focus on the subject and to hear ideas from classmates.

Possible Topics

- Ways we use **AVERAGES** in daily life...
- Potential problems with a **FLAT INCOME TAX**...
- Significant pieces of **LITERATURE** you've read...
- Animals that live in **AFRICA**...
- Causes of **PREJUDICE**...
- Places you see or use **METRIC MEASUREMENT**...
- Primary causes of **EROSION**...
- Facts about **INUIITS**...
- Effects of human behavior on the **ECOSYSTEM**...
- **HEROES, HEROINES, EXTRAORDINARY LEADERS, VILLAINS, GREEK GODS, COMMUNITY HELPERS**, etc. ...
- Spanish words related to **TRAVEL**...
- Ways we use **FRACTIONS**...
- Most significant events in the **20th CENTURY**...
- Words that begin with **B** or **F** or **Gr** or have **THREE SYLLABLES**...

Teammates Consult

Purposes

- To structure the learning experience so all learners participate
- To promote development of communication skills
- To cause students to think before they "fill in the blanks"

Process

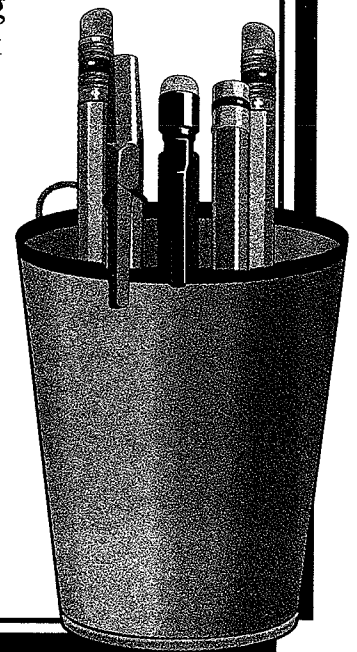
The teacher selects or prepares a set of questions that the students are to work with collaboratively to find the answer. The complexity of the information and the level of understanding required by the question determines the level of difficulty of the task. At no time during this process are students both talking and writing.

- Students work in teams of three to five.
- All students put their pencils or pens in the center of their team's work space. Providing a pencil holder, such as a can or beaker, formalizes this step.
- A student reads the first question.
- Student teams seek the answer -- from text material, notes, and discussion.
- The student sitting to the left of the reader checks to see that all the group members understand and agree with the answer.
- WHEN THERE IS AGREEMENT, all students pick up their own pencils or pens and write the answer in their own words on their own papers.
- When the students are finished recording their answers, the writing implements are returned to the container in the middle of the work space.
- Groups then move on to the next question and repeat the process.
- Students take turns reading the questions.

Remember!

All writing implements are in the container while discussion is ongoing! This is a great way to keep students from just "filling in the blanks" based on a brief look at a text or on what someone else said. You may want to give each group red, yellow and green "signal" cups or cards so that they can let you know when they are functioning smoothly (green), struggling (yellow) or stuck (red).

Spencer Kagan writes about this strategy in his book *Cooperative Learning*.



Think-Pair-Share

Process

- Ask a question.
- Ask students to think quietly about possible answers to the question; this is usually only thirty seconds to one minute, unless the question is quite complex. **(THINK)**
- Have students pair with a neighbor or a learning buddy to discuss their thinking. The discussion usually lasts two to three minutes. **(PAIR)**
- Ask students to share their responses with the whole group or with a table group. Not all students have to share their answers with the large group. **(SHARE)**

Some teachers use hand signals, pointers, bells, cubes, etc., to mark transition points during the cycle. When appropriate, students can write notes, web or diagram their responses during the "Think" or "Pair" time. Students can either explain their own thinking, their partner's thinking, or the consensus they reached together. Think-Pair-Share can be used 2-5 times during an instructional period.

Benefits to Students

- Provides the processing time called for in 10:2 theory
- Builds in wait time
- Provides rehearsal
- Enhances depth and breadth of thinking
- Increases level of participation

Benefits to the Teacher

- Provides opportunities to check for understanding.
- Provides time for the teacher to make instructional decisions.
- Provides time for the teacher to locate support materials and plan the next question.
- Allows the teacher to intervene with one or two students without an audience.

3 - 2 - 1



The 3-2-1 process provides a structure for student meaning making and summarizing of key points in a learning experience. The stems for 3 - 2 - 1 can be created to match the kind or level of thinking you want students to do about the material being studied.

3 most important events in this person's life

2 questions you would ask this person if you could talk with him/her

1 way in which you are like this person

At the end of a discussion, a reading, a video or a field trip students might be asked to write:

3 things that really interested you

2 things you'd like to know more about

1 idea that you will write about tonight in your journal

Joanne Mayers-Walker, ESL teacher, Lee High School, Fairfax County Public Schools, Springfield, Virginia, asked her second language learners following a film on the Civil War to respond to:

3 important facts or events I would like to discuss

2 questions I have about the film

1 event similar to an event that happened in my country's history

Three Column Charts



Purposes

- To help students access prior knowledge through brainstorming
- To identify areas of student interest or concern
- To aid the teacher in planning lessons as well as checking for understanding
- To track student learning throughout the unit
- To identify areas for further student research/study

Process

- Use this strategy prior to, during, or at the close of any unit of study. The process can be done individually, in small groups, or as a class activity.
- Announce topic and column titles; post on charts, or have students record in table groups.
- Have the teacher or students record student responses to the stems. The student who offers the idea tells the recorder which column to put it in.
- During the brainstorming phase, emphasize getting lots of ideas rather than debating or discussing the ideas as they are generated. Debates, clarifications, and discussion of ideas occur once the brainstorming is over. The teacher does not clarify any confusions or react in any way other than to record the data. Conflicting data may be recorded.
- During the lesson or unit of study, points of misconception, confusion, or curiosity are addressed.

Choose any ONE of the following SETS of column headings or create your own.

	What I Knew...	What I Now Know...	What I Still Don't Know...
OR	What I know...	What I don't know...	What I wish I knew...
OR	Productive...	Somewhat productive...	Unproductive...
OR	Most important...	Somewhat important...	Not important at all...
OR	Already know...	Want to know...	Learned...
OR	In reading vocab...can read, use in writing & use in discussion...	In reading vocab...can read, but don't use it...	Never heard/saw it before...

Through the Eyes Of... Through the Voice Of...

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Powerful learning can occur if we have students make meaning of their learning through real world connections and the use of complex thinking skills. Assuming the persona of a character from literature or a person in history and/or creating products for such people causes students to process the learning at a much deeper and more enduring level.

Discussions Over Time & Place

- Place an essential question in the square in the middle of the page.
- Place the names of characters from various pieces of literature, people from various countries, people from various time periods, or any set of people who would have differing viewpoints on the question under study.
- Students speak, discuss, debate, or write about the question from the perspective of one or more of the persons.

Tom Loftus, Greece Central School System, Greece, New York, uses the essential question, "Is the world a fair and just place?" He has his students discuss and write about that question from the perspectives of The Pearl Buyer from Steinbeck's *The Pearl*, of Cora and Juana from Langston Hughes' "Cora Unashamed," and Romeo and Juliet from Shakespeare's *Romeo and Juliet*.

Simulations

A simulation is a learning experience in which students create an "as if" environment. Simulations cause learners to move into another time period, another place, or assume the perspective or role of another person. Such learning experiences move from the contrived nature of readings and worksheets to situations that help students make personal meaning of the concepts being studied.

Simulations can be brief and spontaneous ("Pretend you have just landed at the Cairo airport") or highly structured and ongoing (a recreation of the Renaissance or a simulation of life in a rainforest). The latter requires considerable preparation and orchestration. Fortunately, there are many commercially prepared simulations available to supplement your creativity and that of your students. Before creating or selecting and using a longer simulation, be sure to ask yourself if it is worthy of the instructional time that will be consumed. Be sure that you review the standards and check your pacing plans to ensure that this engaging exercise is the best use of time.

Through the Eyes or Voice Of

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Simulations provide students opportunities for cognitive and social development. Be sure to do an analysis of the plans for extensive simulations to identify the needed academic and social skills, and take action to ensure that students can be successful in this experience you are designing.

While simulations and role plays can be very powerful learning experiences, it is easy to fall into the activity completion trap where the focus is on completion of the activity, rather than on the learning outcomes. The feeling tone can go off the chart into the "fun" zone and the purpose of learning can be lost.

Role Audience Form Time

The RAFT technique, which is explained in many journals and attributed to various sources, requires students to create scenarios about the content being studied. RAFT allows students to consider the information from a variety of perspectives and use a wide range of formats to present information to limitless audiences. This brain compatible approach causes students to rethink, rewrite, and discuss an event or concept in another place or time, or through the eyes or voice of the famous or familiar.

Laramie Brown, Director of the Teacher Learning Center, West Irondequoit Central School District, Rochester, NY, created the following RAFT for her middle school science students.

Problem: The Green Grocer, having learned that "vegetable" is a street term without scientific meaning, decided to classify the produce in his store into groups representing the six plant parts. The follow ad appeared in the local newspaper.

Immediate Help Wanted

Local grocery market needs knowledgeable STOCK PERSON to reorganize produce into display groups representing the six plant parts. Interested individuals must demonstrate their ability to identify plant parts by selecting five examples of each of the six plant parts (total 30) and submitting a response in one of the following forms that would represent the new produce market design.

1. Labeled diagram of produce department
2. Graphic organizer
3. Memo explaining the new plant classification in paragraph form

Direct all responses to: Green Grocer Produce Manager within two days.

Through the Eyes or Voice Of...

Great Impersonators

When students are asked to draw, much to the dismay of art teachers everywhere, some of them immediately say, "I can't draw!" An amazing thing happens when you have them draw "through the eyes of..." AND they learn a little bit about art in the process.

- Locate either the ART DECK cards, which include 52 paintings by 13 impressionist artists, postcards from art galleries, or paintings off the internet.
- Give each group of students a set of paintings by a given artist and have them study how the artist paints...the genre, the colors, the use of space and light, etc.
- When they have had time to explore the artist's style, have each member of the group select a colored marker. Whenever that marker is used on the work they are going to create, the person holding that marker has to be the one to use it.
- Give the students a stem or set of stems based on the current area of study. Their task is to draw the concept "through the eyes of" the artist whose work they have been studying. The artistic renderings and the explanations thereof are amazing!

The Hats

A middle school teacher from Churchville-Chili School District, Churchville, New York, has collected an assortment of hats that her students wear when they are assuming the persona of a historical figure in role plays, simulations, and RAFTs. The props seem to help her students go to the next level of creativity.

And That All Time Favorite...

Let's Play Teacher

Set this up any way that works in your classroom and watch them be **just like you!** Glasser is clear that the best way to have students remember what we want them to remember is for them teach what they know to someone else. Turn on the video camera for this one.

Ticket to Leave

Purposes

- To have students sort through all they have learned
- To have students make personal meaning/cognitive connections with the concepts studied
- To provide the teacher with formative assessment data

Procedure

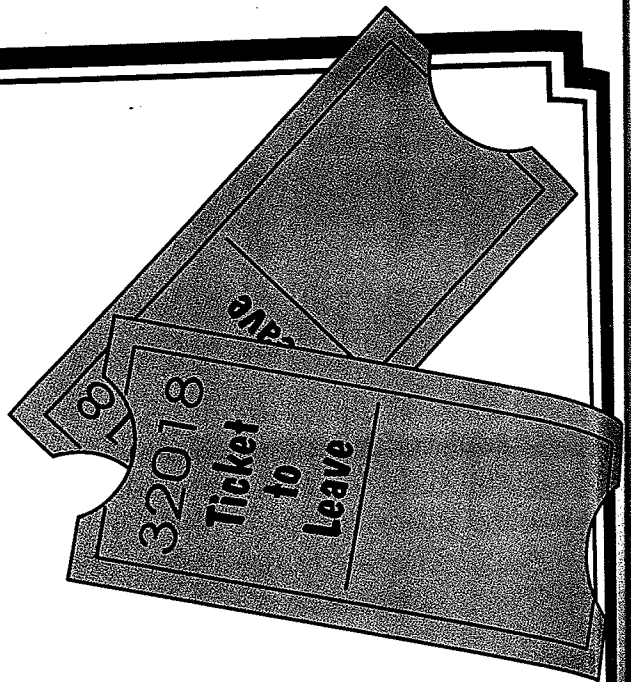
- Use at the end of an instructional period.
- Have students use either their own paper, an index card, or a "ticket" you have drawn and copied for this purpose. Alternatively, students could draw or tell their thinking.
- Select an appropriate stem and provide time for students to write their responses. The stem will be determined by the kind of thinking you want the students to do.
- Stand at the door and collect the "tickets" as they leave.

Possible Stems

- List the most interesting thing you learned today and tell why you chose it.
- When you get home, what will you tell your parents you learned today?
- Write one reason why today's lesson may help you in the future.
- List as many occupations as you can that need the skills we practiced today.
- Describe one thing you accomplished that you feel good about today.
- Write one question you have related to the content studied/process used today.
- Write one question that would be a good test question on this material. Write the answer on the back.

Kathy Adasiak, a French teacher at Irondequoit High School in Rochester, New York, stands at the door as her students leave and has them use the target language to tell her such things as their birthday, favorite color, or age, or to use a simple sentence to identify or describe a picture she is holding. She finds that the flash cards for primary students available at teacher supply stores are useful for this process.

Carol Cummings, Jon Saphier, Maryann Haley, Bruce Wellman and Laura Lipton include this strategy in their publications.



Walking Tour

Purposes

- To introduce complex texts, provocative ideas, or discrepancies
- To emphasize key ideas of content material
- To raise curiosity and increase speculation about a subject

Process

- **Compose five to eight charts** that represent the content material, pictorially or verbally. Use photographs of places or objects, direct quotes from the text, or other means to convey one idea per chart. For example, for a study of France, charts might contain postcards, phrases in French, and/or a map of France.

Hint: If the tour is used to introduce complex concepts or a complex reading, isolate the primary points and create one chart for each point.

- **Post the charts** around the classroom and number each chart. Divide students into "touring groups" to fit the classroom space, age of students, and complexity of the material.
- **Assign one group per chart** as a starting point. Groups spend two to five minutes at that chart, taking notes on and/or discussing the idea presented.
- **Rotate the groups** until all groups have "toured" each chart. When students return to their seats, allow some time for discussion and reactions.

Variations

- **Jigsaw Walking Tour** - If time to tour is limited, form groups made up of the same number of students as there are charts around the room (4 charts means there should be 4 members in a group). Have group members number off and send one representative to each chart. Students form new groups at the charts and react. They then return to their original groups to take turns reporting on the information on each chart and their reactions to it.
- **Gallery Walk** - Pictures or other works of art are displayed around the room and the students move from display to display responding to questions or statements given as guidelines for analyzing the artwork.

A-B-C... to ...X-Y-Z The End of the Lesson

There are dozens of ways to use the alphabet and random words to summarize learning.

ABC #1

Randomly assign a letter of the alphabet to each student. Give them one minute to think of a word that summarizes the lesson or captures the essence of the concept being studied. Do a whip around the room to hear the words.

ABC #2

Have students draw a magnetic letter from a basket. Each student must share a word that begins with that letter to summarize the day.

ABC #3

Have students write the alphabet down the left hand margin of their paper and then work in small groups to think of words beginning with each letter of the alphabet related to the topic being studied.

WORDS #1

Have each student quickly jot down a word that captures the essence of the day's lesson. Have small groups combine their words, adding others as necessary, to make a complete sentence. The only rules are that it must be a complete sentence and they have to use all the words jotted down by individuals.

WORDS #2

Give students a key word related to the topic being studied. Have students write it down the left margin of their paper one letter to a line. The task is for them to create an acrostic using each letter.

WORDS #3

Write two to four nouns on the board. Students are to brainstorm how what they have studied today is like one of those objects. An object with moving parts adds to the possibilities. For example, "The US Government is like a television because one channel often does not know what the other is doing."