

SUMMARIZING & NOTE TAKING

As Ms. LaFortune prepared for the upcoming unit on the U.S. Constitution, she thought about how students had responded to the unit in previous years. Students always seemed to understand the gist of the Bill of Rights, but seemed to have trouble connecting limitations on the government's powers to the protection of individual civil rights. Ms. LaFortune wondered if students were overwhelmed by the amount of material they worked with during the unit. She decided to help students with their summarizing and note taking skills when she taught the unit this time.

After an introduction to the essential elements of American constitutional government, students read several primary source documents, including excerpts from the Constitution and the Declaration of Independence. Ms. LaFortune thought summarizing passages would help students analyze the content of the documents. First, she modeled summarizing using the Preamble to the Constitution as an example. She used a "rule-based" summary strategy and showed students how to delete trivial and redundant material, substitute superordinate terms for lists, and select a topic sentence. After she finished the summary, students worked on the Bill of Rights for homework. Students said that the summary strategies made them really think about the information they were reading.

After their intensive work with the primary source documents, Ms. LaFortune passed out notes she had prepared on the essential ideas of American constitutional government. The notes were useful to students in two ways --- they gave students a clear picture of the ideas Ms. LaFortune considered important and served as a model for students to follow as she taught them about the elements of effective note taking. Twice during the next week, students turned in notes they had taken during a lecture or a film. Ms. LaFortune gave each student written feedback about her or his notes and later reviewed various strategies with the entire class.

At the end of the unit, students debated limitations on the power of government and protection of civil rights. Ms. LaFortune was pleased with students' understanding of the connection between the power of the government and civil rights and their ability to make well-supported arguments for their positions.

Summarizing and note taking are part of the same category of instructional strategies because both require students to distill information. Although these processes may seem relatively straightforward for students, in fact they require a great deal of them. In order to make decisions about points that are important to a summary and those that are not, students must analyze the information in depth. Similarly, in order to decide what information is important to make notes about and information that is not, students must be able to mentally sift through and synthesize information. The following sections include suggestions for ways in which teachers might use these strategies in the classroom to enhance students' understanding of specific academic content.

SUMMARIZING

1. Use the “Rule-Based” Summarizing Strategy. (See Illustration 1)

One summarizing strategy developed by Brown, Campione, and Day (1981) is referred to as the *rule-based summarizing strategy*. As the name implies, the strategy is one of following a set of rules or steps that help students construct a summary:

1. Delete trivial material that is unnecessary to understanding.
2. Delete redundant material.
3. Substitute superordinate terms for more specific terms (e.g., “flowers” for “daisies, tulips, and roses”).
4. Select a topic sentence, or invent one if it is missing.

To make these rules “come alive” for students, a teacher might initially demonstrate them in some detail. For example, the teacher might present students with a passage and then walk them through the rules by “thinking aloud” as she summarizes the passage, as shown in Illustration 1.

2. Use Summary Frames. (See Illustrations 2.1–2.6)

A summary frame is a series of questions that a teacher gives to students. Because these questions are designed to highlight the critical elements of specific types of information, they can help students develop accurate, written summaries of information. Different summary frames are useful for different types of information because each frame captures the basic structure of a different pattern of text. The elements of six patterns that are commonly found in text are reviewed below:

- **Narrative or Story Pattern** — text commonly found in fiction. It has seven elements. Of the following elements, 3–7 are sometimes repeated to create an *episode*.

Setting: The time, place, and context in which the story took place.

Characters: The main characters in the story.

Initiating event: The event that starts the action rolling in the story.

Internal response: How the main characters react emotionally to the initiating event.

Goal: What the main characters decide to do as a reaction to the initiating event — the goal they set.

Consequence: How the main characters try to accomplish the goal.

Resolution: How the story turns out.

- **T-R-I Pattern** — text commonly found in expository material. It has the following elements:

Topic (T): a general statement about the information to be discussed

Restriction (R): statement that limits the information in some way

Illustration (I): statement that exemplifies the topic or restriction

The T-R-I pattern can have a number of restrictions and accompanying illustrations.

- **Definition Pattern** — text that describes a particular concept and identifies subordinate concepts. This pattern contains the following elements:

Term: The subject to be defined.

Set: The general category to which the term belongs.

Gross characteristics: Those characteristics that separate the term from other elements in the set.

Minute differences: The different classes of objects that fall directly beneath the term.

- **Argumentation Pattern** — text that attempts to support a claim. This pattern contains the following elements:

Evidence: Information that leads to a claim

Claim: The assertion that something is true

Support: Examples of or explanations for the claim

Qualifier: A restriction on the claim or evidence counter to the claim

- **Problem/Solution Pattern** — text that introduces a problem and then identifies one or more solutions to the problem:

Problem: A statement of something that has happened or might happen that is problematic.

Solution: A statement of a possible solution to the problem.

Solution: Another possible solution.

Solution: Another possible solution.

- **Conversation Pattern** — a verbal interchange between two or more people. Commonly, a conversation has the following components:

Greeting: Some acknowledgment that the parties have not seen each other for a while.

Inquiry: A question about some general or specific topic.

Discussion: An elaboration or analysis of the topic. Commonly included in the discussion are one or more of the following elements:

Assertions: Statements of facts by the speaker.

Requests: Statements that solicit actions from the listener.

Promises: Statements that assert that the speaker will perform certain actions.

Demands: Statements that identify specific actions to be taken by the listener.

Threats: Statements that specify consequences to the listener if demands are not met.

Congratulations: Statements that indicate the speaker values something done by the listener.

Conclusion: End of the conversation.

To create a summary frame from these patterns, a teacher first identifies the pattern of text students are reading, then uses the pattern elements to develop a set of guiding questions, which students then use to summarize a text, as exemplified by Illustrations 2.1–2.6. For example, a teacher who wants students to analyze a conversation between two characters in a story would turn each of the elements of a conversation pattern into a question (e.g., How did the participants in the conversation greet one another? What question or topic was brought up or referred to?). Students would use their answers to summarize the conversation.

3. Use the Reciprocal Teaching Process.

(See Illustration 3)

Reciprocal teaching, developed by Palincsar and Brown (1984, 1985), is an instructional technique that incorporates the process of summarizing but also engages students in cognitive processes that go well beyond summarizing, as Illustration 3 exemplifies. The strategy has been the subject of a number of empirical studies, many of which have been summarized by Rosenshine and Meister (1994).

The summary statement that begins the reciprocal teaching strategy might be considered a “first draft” of a summary. The other phases of reciprocal teaching — questioning, clarifying, and predicting — help students analyze the information they are attempting to summarize. Strategies that emphasize the analytic aspect of summarizing produce powerful effects in terms of student’s ability to summarize (see Rosenshine & Meister, 1994; Rosenshine, Meister, & Chapman, 1986). The following is an adaptation of the strategy:

Summarizing — After students have silently or orally read a short section of a passage, a single student acting as teacher (i.e., the student leader) summarizes what has been read. Other students, with guidance from the teacher, may add to the summary. If students have difficulty summarizing, the teacher might point out clues (e.g., important items or obvious topic sentences) that help them build good summaries.

Questioning — The student leader asks some questions to which the class responds. The questions are designed to help students identify important information in the passage. For example, the student leader might look back over the selection and ask questions about specific

pieces of information. The other students then try to answer these questions based on their recollection of the information.

Clarifying — The student leader then tries to clarify confusing points in the passage. He might point these out or ask other students to point them out. For example, the student leader might say, “I’m confused about why the butler said the owner of the house wasn’t home. Can anyone explain this?” Or, the student leader might ask students to ask clarification questions. The group then attempts to clear up the confusing parts. This might involve rereading parts of the passage.

Predicting — The student leader asks for predictions about what will happen in the next segment of the text. He or she writes these on the board or asks students to write them in their notebooks.

ILLUSTRATION 1: USING THE RULE-BASED STRATEGY

solar wind

Passage: Studying Solar Wind

Most scientists believe the solar system was formed 4.6 billion years ago by the gravitational collapse of the solar nebula, a cloud of interstellar gas, dust, and ice created from previous generations of stars. As time went on, the grains of gas and dust were pulled together by gravity to form the sun, while other grains of ice and dust stuck to one another, eventually forming the planets, moons, comets, and asteroids as we know them today.

How this transition from the solar nebula to planets took place has fascinated and mystified scientists. Why did some planets, like Venus, develop thick, poisonous atmospheres, while others, like Earth, become hospitable to life? Partial answers are available from the study of the elemental and isotopic composition of the solar system bodies, which suggests that moons, planets, and even asteroids, are significantly different in composition. Although this information helps scientists model various evolutionary processes, they are still hampered by one major question: What was the original solar nebula made of?

Our sun may help us find the answer. It contains well over 99 percent of all the material in the solar system and, although its interior has been modified by nuclear reactions, its outer layers are composed of very nearly the same material as the original solar nebula. By collecting and studying solar wind, the material flung from the sun, scientists may find more answers to this mysterious puzzle. (Adapted from <http://www.genesismission.org>)

Think Aloud

“I’ll think aloud as I use the rules of the strategy. See if my thinking makes sense to you.

“The rules say to ‘delete trivial material, delete redundant material, and substitute superordinate terms for more specific terms.’ The first paragraph is almost all background,

(Illustration continued on next page.)

ILLUSTRATION 1 (continued)

but it doesn't seem trivial. There are also a couple of lists. Let's see. '*Cloud of interstellar gas, dust, and ice*' I'll substitute '*interstellar material*.' For '*planets, moons, comets, and asteroids*,' I'll substitute '*heavenly bodies*.' But now I see something redundant. '*Solar nebula*' and the '*cloud of interstellar material created from previous generations of stars*' are the same thing, so I'll delete one of them. And come to think of it, the expression '*stuck to one another*' seems redundant. I think I can take it out, too. Here's my first paragraph now:

Most scientists believe the solar system was formed 4.6 billion years ago by the gravitational collapse of the solar nebula. As time went on, grains from the solar nebula were pulled together, eventually forming the heavenly bodies we know today.

"Now I'll apply the rules to the second paragraph. Let's see. '*Fascinated and mystified*' is a little redundant. I'll just say '*intrigued*,' which sort of combines them. Also, the examples about Venus and the Earth are interesting, but I don't need them to understand the paragraph. I think I'll take them out.

"The rest of the paragraph explains what scientists already know and what they need to know. It's not really trivial, but for a summary I'll try to say it more simply. I'll take the part that begins with '*partial answers are available*' and ends with '*What was the original solar nebula made of?*' and just say '*They have some of the answers, but they really need to know what the original solar system was made of.*' How's this?

How this transition from the solar nebula to planets took place has intrigued scientists. They have some of the answers, but they really need to know what the original solar nebula was made of.

"The third paragraph is full of interesting information. How can I apply the rules here? Is anything redundant, trivial, or unnecessary to my understanding?

"The first sentence says '*our sun may help us find the answer.*' That seems important, so I'll keep it. The second sentence explains why the sun may contain the answer. Only part of that sentence — '*its outer layers are composed . . . the original solar nebula*' — is necessary to my understanding so I'll delete the rest. In the last sentence, '*solar wind*' and '*the material flung from the sun*' are the same, so I'll keep only one. Now I've got:

Our sun may help us find the answer. Its outer layers are composed of nearly the same material as the original solar nebula. By collecting and studying the material flung from the sun, scientists may find more answers to this mysterious puzzle.

"Finally I can put it all together. What do you think of my final summary?"

(Illustration continued on next page.)

ILLUSTRATION 1 (continued)

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ILLUSTRATION 2.1: THE NARRATIVE FRAME

Little Red Riding Hood

Passage: [the story *Little Red Riding Hood*]

Frame Questions:

1. When and where did the story take place? What was the place like? *Near a wood long ago. The cottage where Red Riding Hood lives is at the edge of the woods. To get to her grandmother's house, Red Riding Hood must go through the woods.*
2. Who are the main characters in the story? *Little Red Riding Hood, her grandmother (Granny), the wolf, and the woodsman.*
3. What happens at the start of the story? *Little Red Riding Hood's mother wants her to take some food to Granny, who is ill.*
4. How do the main characters react to what happens at the start of the story? *Little Red Riding Hood is excited to go visit Granny.*
5. What goals do the characters set? *Little Red Riding Hood decides to go see Granny.*
6. What are the characters' actions and how do they interact? *Red Riding Hood sets off through the woods to take the food to Granny. She runs into a wolf along the way. She has never seen a wolf and he seems kind, so she tells him where she is going.*
7. How does the story turn out? *The wolf runs ahead and gets into Granny's bed, pretending to be Granny. The wolf almost eats Little Red Riding Hood, but a passing woodsman hears her scream and saves her.*

Summary: *Little Red Riding Hood takes place near a wood long ago. The little girl's mother wants her to take some food to Granny, who is ill. Little Red Riding Hood sets off through the woods to take the food to Granny. She runs into a wolf and tells him where she is going. The wolf runs ahead and gets into Granny's bed, pretending to be Granny. The wolf almost eats Little Red Riding Hood, but a passing woodsman hears her scream and saves her.*

ILLUSTRATION 2.2: THE T-R-I FRAME

mammoths

Passage: Mammoths

Millions of years ago, giant animals that are now extinct lived on Earth. One of these giant animals was the mammoth, which could be up to 14 feet tall. The mammoth is a lot like the elephant. Both have a long trunk and tusks. No one knows for sure why all the mammoths died, but scientists think there were a number of reasons. One reason was the weather, which became much warmer. Another reason was that mammoths were hunted by people, who ate their meat and used their fur and bones for warmth and protection.

Frame Questions:

- Topic (T):** What is the story about in general? *Giant animals that lived long ago, but are now extinct.*
- Restriction (R):** What information author give that narrows or restricts the general topic? *One giant animal was a mammoth.*
- Illustration (I):** What examples does the author present to illustrate the restriction? *The mammoth could be as tall as 14 feet. The mammoth is like the elephant — both have long trunk and tusks. Mammoths may have died because weather got warmer and because people hunted them too much.*

Summary: A mammoth is a giant animal that lived long ago, but is now extinct. It's related to the elephant, but could be as tall as 14 feet. Warmer weather and hunting may have caused the extinction of mammoths.

ILLUSTRATION 2.3: THE DEFINITION FRAME

parallelogram

Passage: Parallelogram

There are many types of four-sided figures — or quadrilaterals — that we learn about when we study geometry . Some of them have unusual names that tell us something about the shape or figure. For example, one type of quadrilateral is the “parallelogram.” Its name tells us something important about how this shape looks. A parallelogram is a four-sided shape whose opposite sides are parallel and the same length.

But this general description fits a number of different shapes. One type of parallelogram that often comes to mind when people first learn about them is a square, which is a shape with four equal sides that meet at right angles. But a square is only one example of a parallelogram. Two others are the rectangle — opposite sides are parallel and meet at right angles — and the rhombus — whose opposite sides are parallel but don't necessarily meet at right angles.

(Illustration continued on next page.)

ILLUSTRATION 2.3 (continued)

Frame Questions:

1. What is being defined? *A parallelogram*
2. To what general category of things does the item belong? *Quadrilaterals, four-sided shapes*
3. What characteristics separate the item from other things in the general category? *Opposite sides are parallel and the same length*
4. What are some types or classes of the thing being defined? *Square, rectangle, rhombus*

Summary: A parallelogram is a four-sided shape whose opposite sides are parallel and the same length. Examples of parallelograms are the square, the rectangle, and the rhombus.

ILLUSTRATION 2.4: THE ARGUMENTATION FRAME

crowded highways

Passage: Highway Driving

Driving a car in this state has become a huge problem. The highways are so crowded that it takes twice as long to get where you want to go. It's a real mess. As far as I'm concerned, the source of the problem is the unrestrained growth policies of the last two administrations.

The governor and his supporters led the parade of developers and short-sighted business owners who sold citizens on the idea that economic growth and new jobs would benefit the state and that a state either "grows or dies." Whenever environmental protection bills were introduced in the legislature that seemed to put restraints on businesses, the governor argued against them and, when necessary, vetoed them.

Over the last five years, so many businesses and people have moved into the state that the population has doubled. There's not much room for growth in the downtown areas of the state's major cities, so developers have bought up thousands of acres of what used to be beautiful farm land. Now people have to commute long distances to their jobs, making the highways jam-packed with vehicles almost all day long.

I suppose one reason so many people and businesses have moved here is that our state is beautiful. Plus, states farther west were — and still are — so crowded and polluted that this state's relatively open spaces and clean air looked like heaven to many people.

(Illustration continued on next page.)

ILLUSTRATION 2.4 (continued)

Frame Questions:

1. What information is presented that leads to a claim? *Highways are crowded.*
2. What claim does the author make about a problem or situation? What does he or she assert is so? *Growth policies of former administration caused the problem.*
3. What examples or explanations does the author present to support this claim? *Governor vetoed environmental protection laws that would have restrained growth a little. He sold us on the idea that growth was good.*
4. What restrictions or explanations does the author present to support his or her claim? *But we have a beautiful, less polluted state — so that's appealing to people.*

Summary: The population has doubled, and people commute long distances, making the highways very crowded. The former governor caused the problem. He vetoed laws that would have restricted growth a little and sold us on the idea that growth would be a good thing. But our state is beautiful and less polluted than others, so that might be one reason so many people have moved here.

ILLUSTRATION 2.5: THE PROBLEM/SOLUTION FRAME

drug abuse

Passage: The Problem of Drug Abuse

Drug abuse is a problem in most countries, including the United States. Many people think that the best way to decrease the number of people who abuse drugs is to wage a “war” on drugs. Thus, laws have been passed aimed at selling and using drugs, and much money is spent each year for drug enforcement agents to patrol the border, particularly the border between the United States and Mexico, to arrest drug smugglers.

Many people disagree with this approach to the drug problem. Some agree that selling and using drugs should be illegal, but they also believe that more time and effort should be spent educating people about the dangers of drug use and abuse. Others believe that marijuana should be legalized so that resources can be directed to combating more dangerous drugs. Still others argue that the best way to solve the problem is to legalize drugs to make them less enticing, an idea that most of those who support the “war on drugs” vehemently oppose.

In addition to these approaches to the issue, there are a variety of solutions to the problem along the continuum between a total war on drugs and complete legalization — some of which are being used in conjunction with other approaches. For example, in the 1980s, President and Mrs. Reagan led an educational campaign aimed at teaching young children to “just say no” to drugs, while the legal war on drugs was also being waged.

(Illustration continued on next page.)

ILLUSTRATION 2.5 (continued)

Frame Questions:

1. What is the problem? *Drug abuse*
2. What is a possible solution? *Wage a “war” on drugs.*
3. What is another possible solution? *Keep drugs illegal, but spent money on education.*
4. What is another possible solution? *Legalize marijuana, so more effort can be spent on other, more dangerous drugs.*
5. What is another possible solution? *Legalize all drugs, making them less enticing.*
6. What is another possible solution? *Educate children to “just say no.”*

Summary: Drug abuse is a problem. One solution is to pass tougher laws and patrol our borders — wage a “war.” Another is to make drugs less enticing by legalizing some or all of them. Another solution is education.

ILLUSTRATION 2.6: THE CONVERSATION FRAME

Winnie-the-Pooh

Passage: Excerpted from Winnie-the-Pooh*

Outside his house [Pooh] found Piglet, jumping up and down trying to reach the knocker.

“Hallo, Piglet,” he said.

“Hallo, Pooh,” said Piglet.

. . . The first thing Pooh did [when they went in the house] was to go to the cupboard to see if he had quite a small jar of honey left; and he had, so he took it down.

“I’m giving this to Eeyore,” he explained, “as a present. What are you going to give?”

“Couldn’t I give it too?” said Piglet. “From both of us?”

“No,” said Pooh. “That would not be a good plan.”

“All right, then, I’ll give him a balloon. I’ve got one left from my party. I’ll go and get it now, shall I?”

“That, Piglet, is a very good idea. It is just what Eeyore wants to cheer him up. Nobody can be uncheered with a balloon.”

So off Piglet trotted; and in the other direction went Pooh, with his jar of honey.

**Note: Passage excerpted from *Winnie-the-Pooh* (pp. 78–79), by A.A. Milne, 1954, New York: Dell. Copyright 1954 by A.A. Milne.*

(Illustration continued on next page.)

ILLUSTRATION 2.6 (continued)

Frame Questions:

1. How did the participants in the conversation greet one another? *Hello.*
2. What question or topic was brought up or referred to? *Gifts for Eeyore's birthday.*
3. How did the discussion progress?
 - Did anyone state facts? *Pooh said he was giving a jar of honey to Eeyore.*
 - Did anyone make a request? *Piglet asked if they could both give the honey.*
 - Did anyone demand a specific action? *No.*
 - Did anyone threaten specific consequences if a demand was not met? *No.*
 - How did the other characters say in respond to the request, demand, or threat? *Pooh said that he thought they should not give the gift together.*
 - Did anyone say something that indicated that he or she valued something that someone else had done? *Pooh said that Piglet's idea to give Eeyore a balloon was a good one.*

Summary: Pooh and Piglet meet at Pooh's house. Pooh says he will give Eeyore a jar of honey for Eeyore's birthday. Piglet asks if they can share the gift, but Pooh says he thinks that's not a good idea. Piglet decides to give Eeyore a balloon, which Pooh thinks is a great idea.

ILLUSTRATION 3: RECIPROCAL TEACHING

poetry

Students in Mrs. Webster's class were studying poetry. Mrs. Webster asked several students to serve as student leaders for an upcoming task. As part of the unit, students read several passages about poetry that Mrs. Webster printed from an encyclopedia CD in the classroom. Megan, one of the student leaders, **summarized** the first passage:

"Poetry is a lot like music. Like music, there is great variety in what is considered poetry. Like music, rhythm or meter is a central device in the art of poetry for expressing ideas and feelings. However, there is not a black-and-white difference between poetry and regular prose. It's more like a continuum with distinct rhythm and meter at one end and no discernable rhythm or meter at the other. Even free verse poetry has a rhythm, although in general, authors who write in free verse, use the rhythm of natural speech."

Mike, another student, added, "Much of the poetry written in English is iambic — that means the lines use a certain combination of stressed and unstressed syllables. Many poems also

(Illustration continued on next page.)

ILLUSTRATION 3 (*continued*)

have a rhythm or structure to the lines. One example is the four-line stanza where the second line rhymes with the fourth. There are a number of different types of poetry. Among these are lyric poetry, narrative poetry, and dramatic poetry.”

Megan then initiated the **questioning** phase of the process by asking a number of questions about specific information from the passage students had read:

“What are the two types of lyric poetry that the Japanese are particularly known for? What other techniques do poets use besides rhyme?”

After students answered the questions, Megan asked the class if anyone had questions they wanted to ask to **clarify** confusing points in the passage. Ben said he was a little confused about what the author of the passage said about poetry as art and “didactic” poetry. Brian, another student, answered, “There’s a difference between poetry that is artistic and writing that is only considered *technically* to be poetry because it rhymes — for example, sayings that help people remember facts, like ‘thirty days hath September, April, June, and November. . . .’ They’re technically poetry, but not very poetic.”

Finally, Megan asked students to **predict** what they thought the next passage, entitled “How Poetry Has Changed Over the Centuries,” might say. Nicole said that she predicted that the passage would say that poetry has changed over time as people have changed the way they express their feelings and ideas just like music has changed over time. She predicted that the passage would say that free verse poetry has become much more commonplace, a reflection of the more casual and open attitude people have about self-expression in general.

NOTE TAKING

3. Give Students Teacher-Prepared Notes. (See Illustration 1)

A good way to introduce note taking is to provide students with notes. Doing this gives students a clear picture of what the teacher considers important, as exemplified by Illustration 1. It also gives students a model of how notes might be taken.

4. Teach Students to Use Different Formats for Taking Notes. (See Illustrations 2.1 and 2.2)

There is no one correct way to take notes. In fact, different students might prefer different note-taking formats. Thus, it is advisable to present students with a variety of formats for taking notes. Two common formats are the *informal outline* and the *web*. The informal outline uses indentation to indicate major ideas and their related details, as shown in Illustration 2.1. Students simply indent ideas that are more subordinate. Webbing is a note-taking strategy that uses the relative size of circles to indicate the importance of ideas and lines to indicate relationships. More important ideas are in larger circles than less important ideas. Lines from one circle to another indicate that the concepts in the connected circles are related in some way. One advantage of the webbing strategy is that it provides students with a visual representation of the relationship between ideas or elements, as Illustration 2.2 exemplifies. One disadvantage of the strategy is that it somewhat limits the amount of information a student can record simply because the circles themselves can hold only so many words.

5. Help Students Learn to Take Combination Notes. (See Illustration 3)

A very flexible note-taking strategy that uses both the informal outline and pictures or graphic representations is referred to as a *combination technique*, exemplified in Illustration 3. Each page of notes is divided into two parts by a line running down the middle of the page. The left-hand side of the page is reserved for notes taken using some variation of informal outlining. The right-hand side of the page is reserved for graphic representations. Finally, a strip across the bottom of the page is reserved for summary statements.

To use this note-taking strategy, students must stop periodically and make a graphic representation of their notes or portray the information in some visual way. At the end of their note taking, or periodically throughout the process, students record summary statements of what they have learned in the section at the bottom of the page. This note-taking method takes extra time, but is very useful because students review the information a number of times — first, as they record their notes; second, as they create drawings or other graphics for their notes; and third, as they record summary statements of what they have learned.

ILLUSTRATION 1: TEACHER-PREPARED NOTES

ants

I The Basics

- A. Ants are part of a family of insects that have a very organized social life.
- B. Nearly 9,000 species exist.
- C. Ants are found around the world, except in the polar regions and at the highest altitudes.

II Characteristics

- A. Ants are related to wasps — have an abdomen that is joined to the thorax by a “pedicel.”
- B. Have antennae that have “elbows” or joints in the middle.
- C. Some ants have a sting that the workers use to defend the colony or themselves.
- D. Many species secrete a type of acid that is a strong repellent.
- E. The way particular ants look and act often relates to the type of work they do in the colony.

III Environmental Helpers

- A. Ants play several critical roles in the environment:
 - 1. Population control of pests
 - 2. Recycling of plant material
 - 3. Turning over the soil
 - 4. Dispersing seeds

IV Life Span

- A. Queens and workers of some species can live more than 15 years.
- B. Most ants live only a few months.
- C. Male ants die soon after they mate with the queen.

V Social Organization

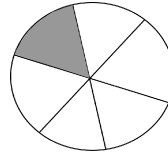
- A. Ants are masters of social organization.
- B. Ants live together in extended families of just a few to 500,000 or more.
- D. Colonies have two classes of ants: reproductive and nonreproductive.
 - 1. The queen and the male ants are reproductive.
- E. Most ants in a colony are workers.
 - 1. Workers are generally female, wingless, and don’t reproduce.
 - 2. Workers gather food, care for the young, and defend the colony.
 - 3. Largest workers are soldiers.
 - 4. Medium-sized workers gather food.
 - 5. Smallest workers act as nurses, taking care of the young.
 - 6. Some workers have very specialized jobs, such as cracking open seeds for other ants to eat.

ILLUSTRATION 2.1: NOTE TAKING — INFORMAL OUTLINE

fractions

Fractions are part of a number – like $3/4$, $1/6$, $5/8$

like a piece of pie → → → → → → →



- Numerator is the top number → 3

- Denominator – bottom number → 4

it tells how many pieces the number has been divided up into

Adding and subtracting fractions:

- bottom number has to be the same → $\frac{1}{5}$ → $\frac{3}{5}$
 - then just add or subtract top numbers

Examples: $1/4 + 2/4 = 3/4$

$3/5 - 2/5 = 1/5$

When bottom number is different —

find Least Common Denominator (LCD)

Step 1: Find multiples of each denominator

Step 2: Identify the Least Common Multiple – the first number that is the same – also the LCD

Then multiply each denominator and numerator by the appropriate number

Then reduce number to lowest terms.

Examples:

++Adding –

$1/3 + 1/4 = ?$

Multiples of 3 = 3, 6, 9, 12, 15... Multiples of 4 = 4, 8, 12, 16...

LCM is 12. → ↗ → → → → → ↗

$1/3 \times 4/4 = 4/12$

$1/4 \times 3/3 = 3/12$

$4/12 + 3/12 = 7/12$

– Subtraction:

$5/6 - 1/4 = ?$

Multiples of 6 = 6, 12, 18, 24, 36... Multiples of 4 = 4, 8, 12, 16, 20, 24, 28...

LCM is 24. → ↗ → → → → → ↗

$5/6 \times 4/4 = 20/24$ $1/4 \times 6/6 = 6/24$

$20/24 - 6/24 = 14/24$

ILLUSTRATION 2.2: NOTE TAKING — WEBBING

the Olympic Games

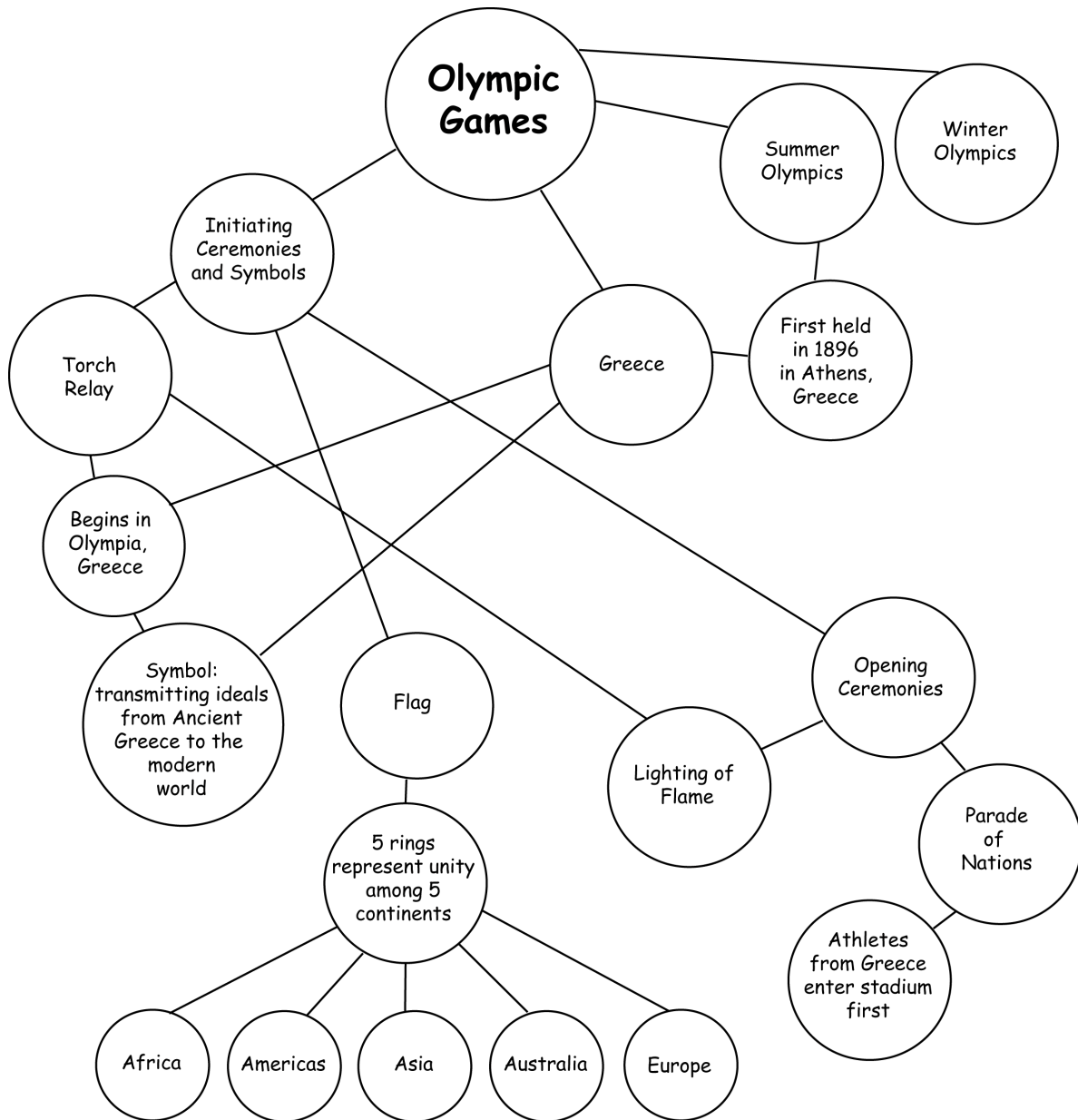


ILLUSTRATION 3: COMBINATION NOTES	inflation
<p><i>Inflation —</i></p> <p><i>Increases ...</i> <i>When the money supply is greater than value of nation's output of good and services</i></p> <p>OR</p> <p><i>when expenditures for food, goods, investment, government spending, and net exports are greater than the value of nation's output of G&S</i></p> <p><i>Decreases ...</i> <i>When the money supply is smaller than the value of nation's output of G&S</i></p> <p>OR</p> <p><i>when expenditures are less than value of nation's output</i></p>	
<p><i>Summary: Inflation results from the relationship between the money supply and the value of a nation's output of goods and services.</i></p>	

THEORY AND RESEARCH IN BRIEF • • •
Summarizing and note taking

SUMMARIZING — The process of summarizing is a well-studied phenomenon. Table 3.1 reports findings from some of the meta-analyses that synthesize the research on the effectiveness of summarizing.

Cognitive psychologists (see Kintsch, 1979; van Dijk, 1980) have found that summarizing involves at least two highly related elements: (1) filling in missing parts, and (2) translating information into a synthesized form. The first aspect of summarizing — filling in the missing information — can be illustrated using the following short scenario:

Two card players stared at each other from across the table. Both appeared tense, although the man smoking the cigar seemed to have a slight smile on his face. He laid down his cards in a fanning motion that displayed one card at a time. With each new card that was shown, his opponent in the silk shirt seemed to sink lower and lower into his chair. When all of the cards had finally been shown by the cigar-smoking antagonist, the silk-shirted man got up and left the table without showing his cards and without saying a word.

As you read these sentences, your mind quite naturally fills in many unstated elements. For example, you probably inferred that both men had bet substantial amounts of money on the hand; the cigar-smoking man knew he had a winning hand as soon as it was dealt to him; the silk-shirted man lost the hand, and so on. Inferences like these are sometimes referred to as *default inferences* (Holland, Holyoak, Nisbett, & Thagard, 1986). Unless explicitly stated otherwise, we expect certain things to occur in certain situations.

Table 3.1: Research Results for Summarizing Strategies

Synthesis Study	No. of Effect Sizes	Ave. Effect Size	Percentile Gain ^a
Pflaum, Walberg, Karegianes, & Rasher, 1980 ^b	2	.62	23
	2	.73	27
Crismore, 1985	100	1.04	35
Rosenshine & Meister, 1994	10	.88	31
Hattie, Biggs, & Purdie, 1996	15	.88	31
Rosenshine, Meister, & Chapman, 1996	16	.87	31
Raphael & Kirschner, 1983	3	1.80	47

^aThese are the maximum percentile gains possible for students currently at the 50th percentile.

^bTwo categories of effect sizes are listed for the Pflaum et al. study because of the manner in which the effect sizes were reported. Readers should consult that study for more details.

The second aspect inherent in summarizing most likely would be evident a few hours from now if you were asked to retell what you had read in the passage. In your retelling, you probably would not give a verbatim account of the passage. Rather, you might provide a brief, synthesized version like the following:

Two men had a large bet on a single hand of poker. As soon as the cards were all out, one of the men knew he had won the hand. After he showed his hand, his opponent silently got up and left, knowing he had lost.

The synthesized version of information we read or hear is sometimes referred to as a *macrostructure* (see Kintsch, 1974; van Dijk, 1980). Apparently, human beings quite naturally generate macrostructures for information they read, hear, or even see. This explains why we tend to remember the “gist” of movies we see rather than a scene-by-scene account.

NOTE TAKING — A number of studies have been conducted on the effects of note taking on student achievement. A useful source for a review of many of these studies is the monograph entitled *Note-Taking: What Do We Know About the Benefits* (Beecher, 1988).

The results of some of these studies are reported in Table 3.2.

There are a number of generalizations that can be induced from the research on note taking. First, although note taking generally improves student achievement, verbatim note taking is probably the least effective technique (see Bretzing & Kulhary, 1979). In fact, it is safe to say that it should be strongly discouraged.

Second, notes should be considered a work in progress. That is, once students initially

take notes they should be encouraged to continually add to them and revise them as their understanding of content deepens and sharpens (for discussions, see Einstein, Morris, & Smith, 1985; Anderson & Armbruster, 1986; Denner, 1986).

Table 3.2: Research Results for Note Taking

Synthesis Study	No. of Effect Sizes	Ave. Effect Size	Percentile Gain ^a
Henk & Stahl, 1985 ^b	25	.34	13
	11	1.56	44
Marzano, Gnad, & Jesse, 1990	3	1.26	40
Hattie, Biggs, & Purdie, 1996	3	1.05	35
Ganske, 1981	24	.52	20

^aThese are the maximum percentile gains possible for students currently at the 50th percentile.

^bTwo categories of effect sizes are listed for the Henk and Stahl study because of the manner in which the effect sizes were reported. Readers should consult that study for more details.

Third, one of the most powerful uses students can make of their notes is to review them before tests. If notes have been well designed and students have systematically elaborated on them, they are perfect tools for test preparation (for discussions, see Carrier & Titus, 1981; Van Matre & Carter, 1975).

Finally, one of the common misconceptions about note taking is that “less is more.” Sometimes students are advised to keep their notes very short. Researchers Nye, Crooks, Powlie, and Tripp (1984) explain that their examination of guides prepared by universities to teach students how to take notes found that “five out of ten guides examined emphasized the importance of keeping notes ‘brief’ and not putting too much material in notes” (p. 95). Yet, in their study of the effects of note taking, Nye et al. found a very strong relationship between the amount of information taken in notes and students’ achievement on examinations.