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IDENTIFYING SIMILARITIES AND DIFFERENCES

- IDENTIFYING SIMILARITIES AND DIFFERENCES
- SEMI-STRUCTURED AND NOTE-TAKING
- REINFORCES EFFORT AND PROVIDES RECOGNITION
- MONITORING AND PRACTICE
- HEURISTIC REPRESENTATIONS
- CONCRETE LEARNING
- SETTING OBJECTIVES AND PROVIDING FEEDBACK
- GENERATING AND TESTING HYPOTHESES
- CLUES, QUESTIONS, AND ADVANCE ORGANIZERS

As part of their study of the decade of the 1960s, students in Mrs. Jackson's American History class read about and listened to Martin Luther King, Jr.'s speech, "I Have A Dream." Mrs. Jackson knew that these students had been exposed to this speech many times before and, therefore, was not surprised when they offered only predictable comments in the class discussion. In order to help students understand the speech in a different way and to build on the knowledge they had gained throughout the year, Mrs. Jackson presented the following incomplete analogy:

"I Have a Dream" was to the Civil Rights Movement as _____ was to _____.

In small groups, students were to complete the analogy using another historical event or document in the first blank and a movement or event in the second blank. The students were asked to be ready to explain their completed analogy to the entire class.

To Mrs. Jackson's surprise, students were quite adept in designing and explaining their analogies. To the students' surprise, this activity deepened their understanding of the effect the "I Have a Dream" speech had on the Civil Rights Movement.

Mrs. Jackson has engaged her students in a complex and abstract form of identifying similarities and differences by having them generate and explain analogies.

Research and Theory on Identifying Similarities and Differences

This first general category of instructional strategies is entitled "identifying similarities and differences." Researchers have found these mental operations to be basic to human thought (see Gentner & Markman, 1994; Markman & Gentner, 1993a, 1993b; Medin, Goldstone, & Markman, 1995). Indeed, they might be considered the "core" of all learning.

The overall power of identifying similarities and differences is, perhaps, best illustrated by an experiment conducted by Gick and Holyoak (1980). They presented their subjects with the following problem (which was adapted from a study by Duncker, 1945):

Suppose you are a doctor faced with a patient who has a malignant tumor in his stomach. It is impossible to operate on the patient, but unless the tumor is destroyed the patient will die. There is a kind of ray that can be used to destroy the tumor. If the rays reach the tumor all at once at a sufficiently high intensity, the healthy tissue that the rays pass through on the way to the tumor will also be destroyed. At lower intensities the rays are harmless to healthy tissue, but they will not affect the tumor either. What type of procedure might be used to destroy the tumor with the rays and, at the same time, avoid destroying the healthy tissue (pp. 307-308)?

In general, only 10 percent of people can solve this problem when first presented with it. Gick and Holyoak, however, also presented their subjects with the following story:

A small country was ruled from a strong fortress by a dictator. The fortress was situated in the middle of the country, surrounded by farms and villages. Many roads led to the fortress through the countryside. A rebel general vowed to capture the fortress. The general knew that an attack by his entire army would capture the fortress. He gathered his army at the head of one of the roads, ready to launch a full-scale direct attack.

However, the general then learned that the dictator had planted mines on each of the roads. The mines were set so that small bodies of men could pass over them safely, since the dictator needed to move his troops and workers to and from the fortress. However, any large force would detonate the mines. Not only would this blow up the road, but it would also destroy many neighboring villages. It therefore seemed impossible to capture the fortress. However, the general devised a simple plan. He divided his army into small groups and dispatched each group to the head of a different road. When all was ready he gave the signal and each group marched down a different road. Each group continued down its road to the fortress so that the entire army arrived together at the fortress at the same time. In this way, the general captured the fortress and overthrew the dictator (p. 351).

With this comparison in mind, 90 percent of the subjects were able to solve the problem. Why is it that people find the problem

FIGURE 2.1

Selected Research Results for Identifying Similarities and Differences

Synthesis Study	No. of Effect Sizes (ESs)	Ave. ES	Percentile Gain
Stone, 1983	22	.88	31
Sahl & Fairbanks, 1986	9	1.39	42
Ross, J. A., 1988	20	1.76	46
(i.e., undated)	2	1.26	38
	2	1.28	39

Two categories of effect sizes are listed for the Sahl and Fairbanks study because of the manner in which the effect sizes were reported. Readers should consult this study for more details.

so easy to solve after hearing the story?

Quite simply, once the similarities are identified between the story, which is easy to understand, and the problem, which is difficult to solve, the solution becomes obvious. Figure 2.1 shows results from some of the major studies that have attempted to synthesize the research on identifying similarities and differences.

We can draw at least four salient generalizations from the research and theory in this area:

1. Presenting students with explicit guidance in identifying similarities and differences enhances students' understanding of and ability to use knowledge. Probably the most straightforward way to help students identify similarities and differences between topics is to simply present these similarities and differences to them. In fact,

a great deal of research attests to the effectiveness of this rather direct approach (see Chen, Yanowitz, & Daehler, 1996; Gholson, Smither, Buhman, & Duncan, 1997; Newby, Ertmer, & Stepich, 1995; Reeves & Weisburg, 1994; Ross, B. H., 1984; Solomon, 1995). Being direct in pointing out similarities and differences, however, does not mean that instruction must be rigid or didactic. In many of the studies that support this generalization, the presentation of similarities and differences was accompanied by a great deal of rich discussion and inquiry on the part of students.

2. Asking students to independently identify similarities and differences enhances students' understanding of and ability to use knowledge. There is a strong research base supporting the effectiveness of having students identify similarities and differences without direct input from the

teacher (see Chen, 1996; Flick, 1992; Gick & Holyoak, 1980; Mason, 1994, 1995; Mason & Sorzio, 1996). At first, this generalization might appear contradictory to the first, but it is not. Both "teacher-directed" and "student-directed" activities focused on identifying similarities and differences have their place in the classroom. One might assume that teacher-directed activities result in more homogeneous conclusions by students—the identification of "highly similar" similarities and differences by students; whereas, student-directed activities result in more heterogeneous conclusions by students. It would follow, then, that if a teacher wishes students to focus on specific similarities and differences, then she should provide students with a teacher-directed activity. If the teacher's goal is to stimulate divergence in students' thinking, however, then he should provide students with a student-directed activity.

3. Representing similarities and differences in graphic or symbolic form enhances students' understanding of and ability to use knowledge. One of the more powerful findings within this general category of instructional strategies is that graphic and symbolic representations of similarities and differences enhance students' understanding of content (see Chen, 1999; Cole & McLeod, 1999; Glynn & Takahashi, 1998; Lin, 1996; Mason, 1994). In Chapter 6, we discuss why the use of graphic and symbolic representations deepens knowledge. Here, we simply note that

their use greatly enhances students' ability to understand and generate similarities and differences.

4. Identification of similarities and differences can be accomplished in a variety of ways. The identification of similarities and differences is a highly robust activity. Research indicates that four different "forms" of this activity are highly effective:

- ♦ Comparing (see Chen, 1996; Chen et al., 1996; Flick, 1992; Ross, 1987; Solomon, 1995).
- ♦ Classifying (see Chi, Feltoich, & Glaser, 1981; English, 1997; Newby et al., 1995; Ripoll, 1999).
- ♦ Creating metaphors (see Chen, 1999; Cole & McLeod, 1999; Dagher, 1995; Gottfried, 1998; Mason, 1994, 1995).
- ♦ Creating analogies (see Alexander, 1984; Lee, n.d.; Ratterman & Gentner, 1998; Sternberg, 1977, 1978, 1979).

Figure 2.2 defines these forms.

Obviously, identifying similarities and differences is explicit in the process of comparing. It is also critical to classifying. To illustrate, when classifying, an individual first identifies similarities and differences within a set of elements and then organizes these elements into two or more categories, based on the identified similarities and differences. Creating a metaphor involves identifying abstract similarities and differences between two elements. Finally, creating analogies involves identifying how two pairs of elements are similar and different.

FIGURE 2.2
Definitions

Comparing is the process of identifying similarities and differences between or among things or ideas.

Classifying is the process of grouping things that are alike into categories on the basis of their characteristics.

Creating metaphors is the process of identifying a general or basic pattern in a specific topic and then finding another topic that appears to be quite different but that has the same general pattern.

Creating analogies is the process of identifying relationships between pairs of concepts—in other words, identifying relationships between relationships.

Note. Technically, the term *comparing* refers to the process of identifying similarities, and the term *contrasting* refers to the process of identifying differences. Most educators, however, use the term *comparing* to refer to both.

Classroom Practice in Identifying Similarities and Differences

Comparing

The key to an effective comparison is the identification of important characteristics. These characteristics are then used as the basis for which similarities and differences are identified.

Teacher-Directed Comparison Tasks. Although the process of comparing might

seem simple, it is not. We suggest that teachers introduce the process of comparing by presenting students with highly structured tasks. This means that a teacher identifies for students the items they are to compare and the characteristics on which they are to base the comparison. These tasks, by definition, focus (even constrain) the type of conclusions students will reach. Consequently, they should be used when a teacher's goal is that all students obtain a general awareness of the same similarities and differences for the same characteristics. The following example shows a teacher-directed comparison task that a history teacher might present to students.

During "Women in History" month, Ms. Collier wanted her students to increase their understanding of the changing role of women in America. To begin the unit, she guided her students through a comparison of several First Ladies, including Martha Washington, Mary Todd Lincoln, Florence Kling Harding, Anna Eleanor Roosevelt, Mamie Eisenhower, and Hillary Rodham Clinton. Using information from the White House Web site (<http://www.whitehouse.gov>), students were to compare these women on the following characteristics: their backgrounds, their major responsibilities as First Lady, and things for which they were praised. Whereas students all focused on the same characteristics and the same first ladies, the information they gathered from the White House Web site was quite diverse. After they presented what they had found, all students agreed that they had gained a broad perspective on women's changing roles in American society.

Student-Directed Comparison Tasks.

Student-directed comparison tasks are those in which the students select the characteristics on which the items are to be compared, or the students select both the items to compare and the characteristics on which they are compared. Examples A and B, respectively, depict these two versions of student-directed comparison tasks.

A At the beginning of a unit on fairy tales, Mr. Webb asked each of his students to select two fairy tales with which they were familiar. He then introduced the major elements of literature that students would be applying to these fairy tales. As he introduced each element, such as universal theme, character-plot interactions, and point of view, Mr. Webb helped the students identify these characteristics in their two fairy tales. Students then were asked to compare their two fairy tales on the literary elements Mr. Webb had described. When reporting their results, students not only had to describe what they learned about the fairy tales they selected, but they also had to explain what they learned about the literary characteristics.

B Julia loved her year in Ms. Anchor's music class; she was even enjoying the final test. She had to select any four pieces of music and compare them according to any of the elements of music that they had learned that year. Julia didn't own that many CDs, but students were allowed to come in after school and select from Ms. Anchor's incredible selection of music. She decided to compare a classical piece, a country-western song her mom liked, a current pop hit, and one of her favorite Disney songs. She even thought that

listening to these tunes over and over as she did the comparison was going to be fun.

Graphic Organizers for Comparison. Two types of graphic organizers are commonly used for comparison: the Venn diagram (Figure 2.3) and the comparison matrix (Figure 2.4).

As depicted in Figure 2.3, the Venn diagram provides students with a visual display of the similarities and differences between two items. The similarities between elements are listed in the intersection between the two circles. The differences are listed in the parts of each circle that do not intersect. Ideally, a new Venn diagram should be completed for each characteristic so that students can easily see how similar and different the elements are for each characteristic used in the comparison.

As Figure 2.4 illustrates, the comparison matrix provides for a more detailed approach to comparison than does the Venn diagram. Teachers use slightly more

FIGURE 2.3
Venn Diagram

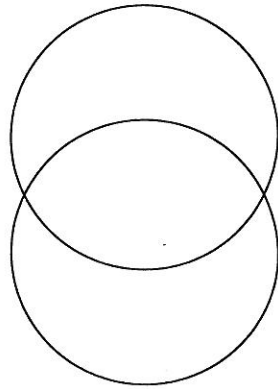


FIGURE 2.4

Comparison Matrix

Characteristics	Items to be compared			Similarities	Differences
	#1	#2	#3		
1.				Similarities	Differences
2.				Similarities	Differences
3.				Similarities	Differences
4.				Similarities	Differences

detailed directions for students when they use the comparison matrix. Example A contains directions to a task that involves the comparison matrix; Example B is a task that involves the Venn diagram.

A Over the past several weeks, we have been learning about the explorers who helped settle the western United States. We have learned, for example, about the incredible expedition of Lewis and Clark and the exciting story of Zebulon Pike. You are now going to compare several explorers, using the comparison matrix. You may select some of your own characteristics for the comparison, but you must include the following: "who commissioned the exploration," "the kinds of risks involved," and "how people's lives have been influenced by the exploration."

After you have completed the center portion of the matrix, you are to create a new matrix using the same characteristics. This time, you will take this new matrix to your science class. Your teacher will present information to you about scientists who, in their own way, have engaged in exploration. For each characteristic in the comparison matrix, fill in information about these scientists. If you think of additional characteristics, add them to your matrix but also apply the new characteristics to the explorers' matrix. Finally, place the two matrices side by side. Examine the information for all of the explorers, both from this class and from science class, and identify similarities and differences that strike you as important or interesting.

B The first graders in Mrs. Bolton's class worked together to create a Venn Diagram

to examine the similarities and differences between life today and life in the pioneer days (two of the diagrams are shown in Figure 2.5). Using these diagrams, one for each major characteristic, helped them to see clearly how their lives are similar to and different from the pioneers.

Classifying

Classifying involves organizing elements into groups based on their similarities. One of the critical elements of classifying is identifying the rules that govern class or category membership.

Teacher-Directed Classification Tasks.

Teacher-directed classification tasks are those for which students are given the elements to classify and the categories into which the elements should be classified. In these tasks, the focus is on placing items into their appropriate categories and understanding why they belong in those categories. The following example depicts the use of a teacher-directed classification task in a physical education class.

Mr. Trella wanted his elementary physical education students to increase their general understanding of sports. He provided them with an ongoing task to be completed as they watched the Olympic events, both at home and at school. The students were given a complete list of events in the Olympics and were asked to classify them into the following categories:

- ◆ Events that require mainly strength and agility.
- ◆ Events that require mainly precision and accuracy.

- ◆ Events that have about equal requirements for strength/agility and precision/accuracy.

In class, students were asked to describe how they categorized events and defend why specific events belonged in specific categories.

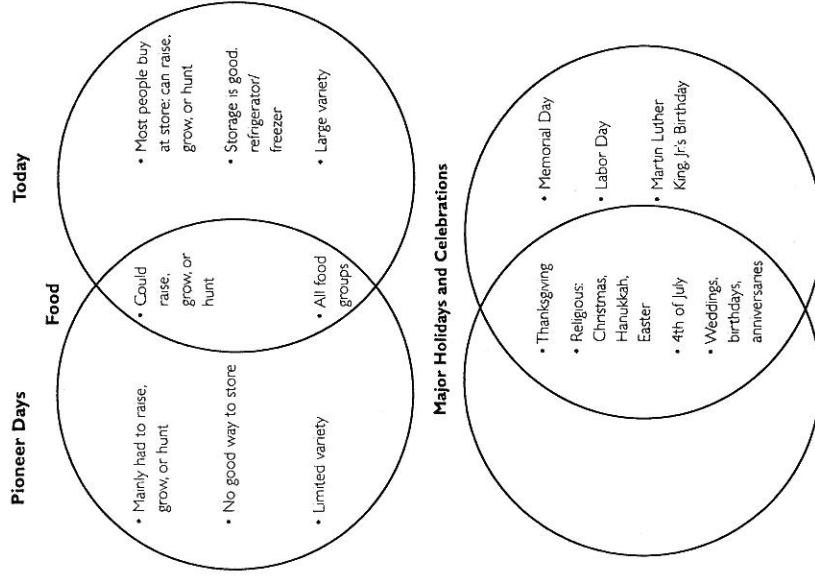
Student-Directed Classification Tasks.

Student-directed classification tasks are those in which students are given the items to classify but must form the categories themselves. Additionally, students can be asked to generate both the items to classify and the categories into which they are organized. The following example shows a student-directed classification task in which students have control over the items they categorize and the categories into which they place items.

An advanced placement literature class had just finished the last book they were to read for the year. As a culminating activity, Mrs. Blake, a teacher many students had for two years, asked them to do the following activity, both to use what they know and to discover some new connections they had possibly missed through the years.

With a partner, make a list of as many characters as you can recall from the books we have read. Then, classify them into categories of your choosing. Stay away from obvious categories such as gender or nationality. Use categories that show your understanding of character development. When you are finished, reclassify the characters, using new categories. Find another pair of students and discuss your work.

FIGURE 2.5
Venn Diagram: Pioneer Days and Today

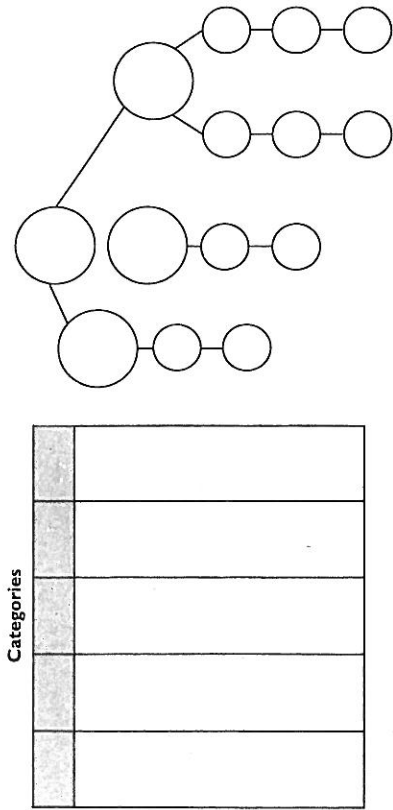


Graphic Organizers for Classification.

Figure 2.6 shows two popular graphic organizers for classification. The graphic organizer on the left (which looks like a boxed

table) is most appropriate when all categories are equal in terms of their level of generality. The graphic organizer on the right (a "bubble" chart) is better used when

FIGURE 2.6
Graphic Organizers for Classification



some categories are more general than others.

Students can be encouraged to use these graphic organizers as they complete their teacher- and student-directed classification tasks. The following example describes a task that requires students to use a classification graphic organizer.

The following characters are from books we have read in class this year. Using the graphic organizer for classification, organize these characters into two or more categories. Be prepared to explain the rules that govern membership in each category and why particular characters belong in that category.

- ◆ Ponyboy Curtis in *The Outsiders* by S. E. Hinton
- ◆ Johnnycake in *The Outsiders* by S. E. Hinton
- ◆ Cherry Valance in *The Outsiders* by S. E. Hinton

- ◆ Jake Barnes in *The Sun Also Rises* by Ernest Hemingway
- ◆ Brett Ashley in *The Sun Also Rises* by Ernest Hemingway
- ◆ Pedro Romero in *The Sun Also Rises* by Ernest Hemingway
- ◆ Cella in *The Color Purple* by Alice Walker
- ◆ Mr. in *The Color Purple* by Alice Walker
- ◆ Shug Avery in *The Color Purple* by Alice Walker
- ◆ Ethan Frome in *Ethan Frome* by Edith Wharton
- ◆ Zenobia Frome in *Ethan Frome* by Edith Wharton
- ◆ Mattie Silver in *Ethan Frome* by Edith Wharton
- ◆ Gene Forrester in *A Separate Peace* by John Knowles
- ◆ Finny in *A Separate Peace* by John Knowles

should always address the abstract relationship between the elements.

Teacher-Directed Metaphors. Teacher-directed metaphors are those in which the teacher provides the first element of the metaphor and the abstract relationship. This structure provides a “scaffold” on which students can build. The following example depicts a teacher-directed metaphor activity in the context of a science class.

- Mrs. Blair started her science unit on extinction by handing out an article about the Dodo bird (see next page)
- Mrs. Blair then guided the students through a process of identifying the general, abstract pattern from the information about the Dodo bird. As a group, they extracted the following pattern:
1. Something was thriving in a specific environment.
 2. This thing changed over time because of changes in its surroundings. Some of the changes actually limited it in some ways.
 3. Yet another influence came along and cut off what it needed to survive and destroyed where it used to exist. Because of its limitations, there was no way it could move to a new place.
 4. The thing no longer exists.

Mrs. Blair then asked students to use this general pattern, which was derived from the story of the Dodo bird, to identify something else that fit the pattern.

Student-Directed Metaphor Tasks.

Once students become familiar with the concept of an abstract pattern or relationship, they might be provided with tasks in

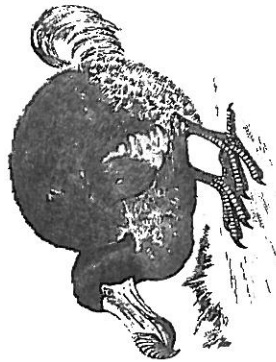
- ◆ Antonio Marez in *Bless Me, Ultima* by Rudolfo Anaya
- ◆ Ultima in *Bless Me, Ultima* by Rudolfo Anaya
- ◆ Scout in *To Kill a Mockingbird* by Harper Lee
- ◆ Atticus Finch in *To Kill a Mockingbird* by Harper Lee
- ◆ Boo Radley in *To Kill a Mockingbird* by Harper Lee

Metaphors

The key to constructing metaphors is to realize that the two items in the metaphor are connected by an abstract or nonliteral relationship. For example, “Love is a rose” is a metaphor. On the surface, love and a rose have no obvious relationship. At an abstract level, however, they do. Here’s how one can say love is a rose:

- Literal:** Rose: The blossom is sweet to smell and pleasant to touch, but if you touch the thorns, they can stick you.
- Abstract:** Something is wonderful and you want to go near it, but if you get too close, you might get hurt.
- Literal:** Love: Makes you feel happy, but the person you love can end up hurting you.

It is at the abstract level only that *love* and *rose* appear related. It follows, then, that instructional strategies involving metaphors



The Dodo Bird—A Lesson in Extinction

The Dodo bird was first sighted around 1600 on Mauritius, an island in the Indian Ocean. It was extinct less than eighty years later. The Dodo's stubby wings and heavy, ungainly body tell us that the bird could not fly. Moreover, its breastbone was too small to support the huge pectoral muscles a bird this size would need to fly. Yet scientists believe that the Dodo evolved from a bird capable of flight. When an ancestor of the Dodo landed on Mauritius, it found a habitat with plenty of food and no predators. Because there was no reason for Dodos to leave the ground, they eventually lost their ability to fly. Other factors also contributed to the Dodo birds' extinction.

For example, many birds were eaten by the Dutch sailors who discovered them. However, the two most influential factors in terms of the Dodo birds' extinction were the destruction of the forest (which cut off the Dodo's food supply), and the animals that the sailors brought with them, including cats, rats, and pigs. These animals destroyed Dodo nests.

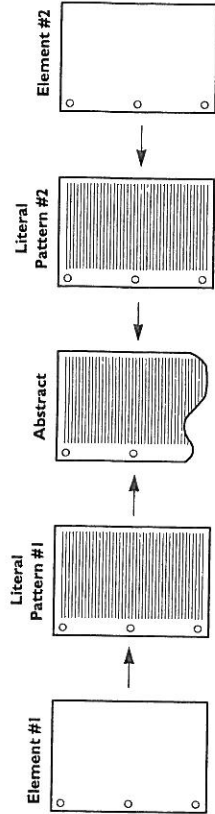
Scientists at the American Museum of Natural History and other institutions around the world have learned from the Dodo bird. They hope that the lesson of the Dodo can help prevent the extinction of other forms of animal life and aid us in preserving the diversity of life on earth.

which they are presented with one element of a metaphor and asked to identify the second element and describe the abstract relationship. Such tasks are more student-directed. The following example shows such a task in the context of a science class.

Two science students were standing in front of the class pointing to the diagram of the Starship Enterprise (from *Star Trek*) as they presented their project. Their assignment was to identify the major structures of a cell and describe the function of each. They were then to restate the information in more general, abstract terms and, finally, to identify another system that is similar to the cell, at an abstract level. These two students had selected the Enterprise as the second element of the metaphor, and identified the following abstract pattern connecting a cell with the starship:

Cell	General, Abstract	Enterprise
Nucleus	The part that runs the system	The bridge
Selectively permeable membrane	Part that keeps out bad things and lets in the good	Transporter Room

FIGURE 2.7
Graphic Organizer for Metaphors



In a detailed and articulate way, students described how each aspect of the cell was like a feature of the Enterprise.

A Graphic Organizer for Metaphors. Graphic organizers are not as common with metaphors as they are with comparison and classification tasks. Figure 2.7 shows a graphic organizer that can be used to provide a visual representation of the nature and function of a metaphor.

The key aspect of this graphic organizer is that it depicts the fact that two elements might have somewhat different literal patterns, but share a common abstract pattern. Using the graphic organizer, students can fill in the elements of a metaphor, the literal pattern for each element and the abstract pattern that connects them. The following is an example of how a teacher might adapt this graphic organizer.

Mrs. Zeno was trying to get her primary students to understand the steps of writing a paragraph. She started by writing the phrase "making a Sandwich" (see next page) in the

Making a Sandwich	Another Way to Say It	Writing a Paragraph
What are you hungry for?	What is my goal?	What is the topic or purpose of the paragraph?
What kind of bread?	What will hold it together?	What will be my first and last sentences?
What will I put in the sandwich that will make it tasty?	What will go in the middle that will all go together?	What sentences do I need to help the topic of my paragraph?
Should I add something to make it better? Pickles? Mustard? Banana slices?	How can I make it even better?	What can I do to make it more interesting or easier to understand? Adjectives? Another detail?

box on the left, and the phrase "Writing a Paragraph" in the box on the far right. She then wrote the questions you might ask to make a satisfying sandwich. As a class, they translated these questions to a more abstract form in the box labeled "Another Way to Say It." With these in place, the class identified the questions they would need to answer to write a good paragraph.

Analogies

Like metaphors, analogies help us see how seemingly dissimilar things are similar, increasing our understanding of new information. Typically, analogies take the form A:B::C:D (read as, "A is to B as C is to D"). For example:

- ♦ hot:cold::night:day ("hot is to cold as night is to day"); cold and day are opposites as are hot and night.

♦ carpenter:hammer::painter:brush ("carpenter is to hammer as painter is to brush"); hammer and brush are tools used by a carpenter and a painter, respectively.

Analogies are probably the most complex format for identifying similarities and differences in that they deal with "relationships between relationships." Just like other forms of identifying similarities and differences, analogies can be used in teacher-directed or student-directed activities.

Teacher-Directed Analogies. By definition, teacher-directed analogies are those for which students are provided a great deal of structure. For example, a teacher might present the following analogy:

thermometer is to temperature
as
odometer is to distance

The teacher would then ask students to explain how the relationship between ther-

monometer and temperature is similar to the relationship between odometer and distance. Specifically, a thermometer measures incremental changes in temperature and an odometer measures incremental changes in distance. In addition, a teacher might present students with one element missing within the four parts of an analogy. Examples A and B depict these two forms of teacher-directed analogy tasks, respectively.

A The following analogies were included on a study sheet students were given to help them study for their final exam.

- Oxygen is to humans
as
carbon dioxide is to plants
- tsunami is to wave
as
earthquake is to tremor
- core is to earth
as
nucleus is to atom
- frequency is to sound
as
ampere is to electricity
- Newton is to force and motion
as
Bernoulli is to air pressure

B A math teacher presented students with the following analogy problems to help increase their understanding of math concepts.

- eighty is to eight
as
dime is to _____

- pint is to quart
as
1000 lb is to _____
- acute is to triangle
as
square is to _____
- circumference is to circle
as
perimeter is to _____
- 1/2 is to fraction
as
5 is to _____
- mean is to average
as
mode is to _____

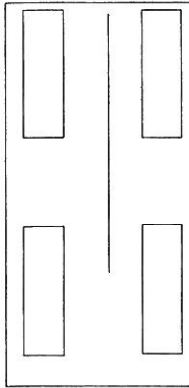
Student-Directed Analogies.

Student-directed analogy tasks ask students to provide more elements of an analogy than do teacher-directed analogy tasks. For example, a teacher might present students with the elements of the first pair of an analogy and ask them to generate the elements of the second pair. Obviously, this type of analogy task would require much more explanation from the student. The following example shows student-directed analogy tasks that might be presented in a literature unit.

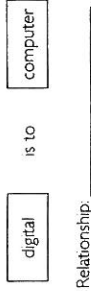
- Robert Frost is to poetry
as
_____ is to _____
- _____ is to _____ in the novel _____ 1984
- as
_____ is to _____ in *The Scarlet Letter*

FIGURE 2.8

Graphic Organizer for Analogies



With his class Mr. Waters has been discussing the impact the computer has had on modern society. As a way of deepening their thinking about this topic, he presents students with the following analogy graphic organizer:



as is to

Even though the elements in the first pair of the graphic organizers have been filled out, Mr. Waters spends some time discussing the relationship between these elements with the class. After the discussion, students work in groups of three to fill out the elements in the second pair of the analogy graphic organizer. The next day, each group presents their completed analogy graphic organizer and explains and defends the relationship linking the two pairs.



Identifying similarities and differences can play out in many ways in the classroom. Students can be engaged in tasks that involve comparisons, classifications, metaphors, and analogies. In addition, these tasks can be either more teacher directed or student directed.

- IDENTIFYING SIMILARITIES AND DIFFERENCES
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SUMMARIZING AND NOTE TAKING

In previous years, Mrs. Zimmers taught her middle school unit on mythology by assigning the students a selection of myths to read and asking them to construct their own myths using a story structure in which many of the characters undergo dramatic changes. While the students often enjoyed the storytelling nature of the task, they seemed to miss the deep historical importance of the myths to the people who created them. This year she had a plan to change things. To gain a deeper understanding about the history of ancient Greece, students were asked to read two essays and view a short film on Greek mythology. Additionally, students were asked to summarize each essay as homework. Finally, Mrs. Zimmers asked students to turn in the notes they took during the film.

Mrs. Zimmers was taken aback with what she received. When she read the first summaries, she realized that many students did not really summarize the information or did not understand the nature and purpose of a summary. They simply reworded information from the text and made no attempt to translate it into a synthesized form. To her dismay, she concluded that her students did not know how to summarize. Mrs. Zimmers set for herself the goal of teaching her students a specific summarizing strategy. Mrs. Zimmers also realized that she would have to teach note-taking strategies and skills. Most of the students took far too few notes, although a couple of students tried to record everything they heard or read.

After realizing a skill weakness in her students, Mrs. Zimmers has chosen to explicitly teach two of the most useful academic skills students can have: summarizing and note taking. We have assigned these skills to the same instructional category because they both