Here are some realities of today's classrooms:

- Rooms are filled with students whose learning needs stretch across a wide-ranging continuum.
- The movement to educate students with special needs in least restrictive environments, which are often general education classrooms, adds to the challenges facing both general and special education teachers.
- Most students with learning difficulties are expected to learn the same rigorous content as their typical peers.

These realities leave many teachers frustrated and overwhelmed. Fortunately, educators have a vast number of research-based teaching techniques, strategies, and devices to assist them in meeting students' needs (Fisher & Schumaker, 1995). Deciding which instructional tools to use is a daunting responsibility. The task becomes more complex when students have special educational needs that make it difficult for them to understand, organize, or recall important concepts or content (Fountas & Pinnell, 2001).

Graphic organizers are a specific instructional organization tool available to teachers; these tools have proven to be successful for all students in inclusive classrooms. Visually displaying key content ideas can benefit learners who have difficulty organizing information (Fisher & Schumaker, 1995). As a result, graphic organizers are commonly used in many classrooms (Egan, 1999). Unfortunately, simply incorporating graphic organizers into weekly lesson plans does not necessarily result in students' understanding of the curriculum (Merkley & Jefferies, 2000).

To be effective, especially for students with special learning needs, three general principles for the use of graphic organizers emerge from research and practice (see box, "What Does the Literature Say?"). Graphic organizers must be used coherently, consistently, and creatively. This article focuses on these three basic principles and provides examples of how common graphic organizers can be used in inclusive classrooms.

Guiding Principles for Effective Graphic Organizers

As a full-time special education coteacher in an inclusive classroom, I have had the opportunity to work with a wide range of students. My general education coteacher, Mary DelVecchio-Floro, and I have taught fourth graders who are identified with learning disabilities or mental retardation, those who are classified as academically gifted, and every ability level in between.

Teaching a diverse population has allowed us to witness the effectiveness of graphic organizers. Consistent, coherent, and creative graphic organizers have been instrumental in helping students succeed in their learning.
graphic organizers can have on the performance of all students. When using graphic organizers in our classroom, we have established three principles to guide our instructional practices, which we refer to as “our three Cs”: Be consistent, make the graphic organizers coherent, and find creative ways to integrate them into lessons (see Figure 1). After a brief overview of these principles, I will provide specific examples of instructional practices that we have found to be successful for our students.

Be Consistent Across Subject Areas
In our classroom, we have observed that students’ organizational skills and content retention improve when they are exposed to graphic organizers in a consistent manner. Because most students with special needs benefit from routine and structure, we try to incorporate graphic organizers in similar situations across subject areas, a practice that is supported in the literature (Griffin et al., 1995; Griffin & Tulbert, 1995). For example, we use a brainstorming web when beginning instruction on a new topic in any academic area. In a similar manner, when looking at the sequence of events in any subject, we usually create a sequence chart, following a standard model. By being consistent with our implementation of graphic organizers, we have found that our students will independently use organizing techniques.

Another way that we try to maintain consistency during instruction involves our incorporation of different graphic organizers into academic units. When introducing a unit in science or social studies, we provide students with a main-idea-and-detail organizer, which offers a unit overview. During instruction, we complete individual lesson graphic organizers that focus on one important idea from the unit. Students then have access to these organized notes to help them practice and review for unit tests. Students with disabilities benefit from the consistency of this instructional approach and the familiarity of the graphic organizer’s structures. They are more likely to internalize and reapply, or generalize, the skills associ-

What Does the Literature Say About Graphic Organizers?
A graphic organizer, also commonly referred to as a content or concept organizer, map, or web, has been defined as a visual representation(s) of knowledge. It is a way of structuring information, or arranging important aspects of a concept or topic into a pattern using labels. (Bromley, Irwin-DeVitis, & Modlo, 1995, p. 6)

Graphic organizers help students see how ideas are organized within a text or concept. Learners can then apply this structure to their own ideas. Learners are thus better able to understand relationships between complex ideas or to arrange information to facilitate retention and recall. Finally, graphic organizers provide concrete representations for structuring abstract ideas and help students see the hierarchy or sequence of concepts (Fountas & Pinnell, 2001).

Improving Learning. Graphic organizers were developed on the basis of Ausubel’s theory of meaningful verbal learning, which states that when students are introduced to material for which they have little background knowledge, their learning will be improved if they have a structured and clear method for organizing the information (Ausubel, 1963). Boosting students’ cognitive-structuring strategies also improves their ability to learn and retain new information (McEneney, 1990). A wealth of research describes the impact that graphic organizers can have on students’ ability to comprehend and organize information.

Secondary School Uses. Many studies focus on the effectiveness of graphic organizers as instructional tools for secondary students who are achieving at a lower academic level or who have been identified with learning disabilities (Bos & Anders, 1992; Guastello, Beasley, & Sinatra, 2000; Jitendra, Hoff, & Beck, 1999).

Elementary School Uses. Use of these instructional tools with elementary students has risen because of the movement to meet strict academic standards at all grade levels (Fish & Schumaker, 1995). Research has subsequently confirmed that graphic organizers are valuable devices for younger students with general and special education needs. Studies have linked the use of graphic organizers with advanced student achievement and recall in reading comprehension and application, retention and understanding of science or social studies content, and greater organization and structure within written compositions (Griffin, Malone, & Kameenui, 1995; Griffin & Tulbert, 1995).

Based on the literature, the question facing all educators no longer centers on whether graphic organizers are valuable instructional tools, but rather on how to use these learning devices effectively to meet the diverse learning needs of students.

Figure 1. The Keys to Effective Use of Graphic Organizers

Consistent—
• Create a standard set of graphic organizers.
• Establish a routine for implementing them in the classroom.

Coherent—
• Provide clear labels for the relationship between concepts in graphic organizers.
• Limit the number of ideas covered.
• Minimize distractions.

Creative—
• Use during all stages of lesson design.
• Incorporate during homework and test review.
• Add illustrations.
• Implement with cooperative groups and pairs.
aded with given graphic organizers because of consistent application.

Finally, my school is working to expand buildingwide use of graphic organizers to ensure consistency across grade levels. Recently, a multigrade team of teachers created a standard set of organizers and implementation ideas to distribute throughout the school. By establishing consistent use of graphic organizers for all students at all grade levels, educators now devote less instructional time each year to teaching students how to use particular graphic organizers. As a result of these efforts, we hope all students will develop advanced organizational and academic skills.

Make Relationships Coherent

Research studies confirm that graphic organizers are not effective instructional tools unless they are clear and straightforward (Boyle & Yeager, 1997; Egan, 1999). Relationships shown in graphic organizers must be obvious and easily understandable, or instructional benefits will be limited. Poorly constructed graphic organizers can result in students becoming confused and disorganized in their understanding of new concepts (Robinson, 1998). This may be especially true in inclusive classrooms, where student ability levels are often diverse.

When developing and using graphic organizers, remember that the primary purpose is to make abstract concepts and relationships clear. When using graphic organizers with our students, we use designs that are free of distracting information or visuals. Our students’ attention often gets diverted by minor details that are not important, and they lose sight of the central concept. We use graphic organizers to help students focus on main ideas. Many textbooks and curriculum guides provide reproducible graphic organizers that contain too much information for some learners. Using computer drawing programs or Inspiration 6 (a computer program for creating graphic organizers), we design our own graphic organizers, which are customized to meet the specific needs of our students.

One method for assuring coherence is to clearly label the ideas or concepts on graphic organizers. When making a main-idea-and-detail chart, we identify the main idea as the central concept and place the details off center, so students have a visual reminder of the hierarchical relationship between the concepts. We follow the same approach for cause-and-effect diagrams and sequence charts. We use arrows, lines, and numbers to assist students in seeing the flow of ideas. By labeling the relationships and concepts, we help our students understand and internalize particular content.

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Find Creative Ways to Integrate

To be most effective, graphic organizers should be integrated in creative and engaging ways into different areas of the curriculum (Bromley et al., 1995). Students are more likely to retain the information contained in a graphic organizer if it is presented in an inviting manner. This is especially true for students with special needs, who may be easily distracted or have difficulty focusing their attention for long periods of time.

Because graphic organizers are now more common, they can no longer stand alone as engaging learning devices for learners. We have implemented many strategies to keep students engaged with graphic organizers. For example, we modify graphic organizers previously used during classroom instruction for homework or test review. During these activities, students must fill in missing information or put ideas in the correct location. We also encourage students to enhance their graphic organizers with illustrations. This allows students to have both word and picture cues to help them recall ideas. Pictures are particularly beneficial to many of our students with special needs, who often struggle with written communication but excel in artistic displays. We provide specific areas for illustrations so the graphic organizers do not become too busy and over-
whelming. We stress to students that their illustrations must add to their understanding of the content, not distract them from it.

Graphic organizers can also be implemented creatively in cooperative groups and learning pairs. Our students enjoy working in groups or with partners where each person is responsible for creating or compiling information for one aspect of the graphic organizer. Members then put all of the pieces together and present their display to the whole class. By implementing these tools in a creative manner, we strive to ensure that our students are participating in active learning situations that stimulate greater content understanding.

Next, let’s examine some graphic organizers that many teachers and students have found helpful. The next section will focus on several of the most common types of graphic organizers and some of the best methods that we have found for incorporating them into our inclusive classroom. Note that the principles of consistency, coherence, and creativity, which are reviewed in Figure 1, are the central focus of these examples.

**Common Graphic Organizers**

Graphic organizers can be categorized according to many different approaches.

- They may be separated according to their approach for arranging information: hierarchical, conceptual, sequential, or cyclical (Bromley et al., 1995).
- They can be organized according to content area.
- A vast number of graphic organizers focus solely on reading and prereading strategies (Merkley & Jeffries, 2000).

To maintain consistency and coherence for our students, Mary and I focus on four of the most common graphic organizers during instruction and practice:

- Cause-and-effect diagrams.
- Sequence charts.
- Main-idea-and-detail charts.
- Compare/contrast diagrams.

**Cause-and-Effect Diagrams**

The concept of cause and effect cuts across all subject areas, making the cause-and-effect graphic organizer one of the most common and beneficial instructional tools in our classroom. We use these diagrams while reading fiction and nonfiction stories to demonstrate the results of a character’s actions. We incorporate them into writing instruction to help organize student compositions. In social studies, we use cause-and-effect diagrams to show the events leading up to major issues in history and the results of these events. When performing science experiments or observations, we use cause-and-effect organizers as visual reminders about why certain scientific phenomena occur and what their results might be.

To make these concepts coherent for students, we integrate two different cause-and-effect diagrams into instruction. The first uses arrows to help students visualize the direct relationship between a single cause and a single effect. This graphic organizer is useful when reading a story which has several events in a given chapter with distinct causes and effects. It is also useful for primary students who are just beginning to understand the concept of cause and effect. Figure 2 represents the second type, which focuses on a single “main event” and its primary causes and effects. This student example was created as an individual assessment after working in a reading group. Cause-and-effect diagrams allow students to understand the many reasons and results which surround a particular situation.

Both types of cause-and-effect diagrams can be used creatively in classrooms. During instruction, we often provide students with a partially completed graphic organizer. Students complete them with appropriate information.

**The Cause-and-Effect Graphic Organizer Is One of the Most Common and Beneficial Instructional Tools in the Classroom.**

![Figure 2. Cause-and-Effect Graphic Organizer](image)

**Note:** This graphic was created by a student with special needs during guided reading group instruction.
Figure 3. Sequence Chart
Comparing Fractions - The Criss-Cross Method

1. Check to see if the denominators are the same or different.
2. If they are different, multiply the numerator of one fraction with the denominator of the other fraction.
3. Write the product under the side of the numerator where you started.
4. Repeat the steps for the other numerator and denominator.
5. Compare the two products using <, >, or =. Place this symbol in the original fraction.

Note: This chart was created by the classroom to assist in solving math problems.

during independent reading or class discussion. We also let students work in pairs where one writes a cause while the other determines the corresponding effect. Our students relish the challenge of forcing their partner to think beyond the literal results and to make inferences from the content. Cause-and-effect diagrams also lend themselves to illustrations, so we encourage our students to illustrate ideas represented in their diagrams, reminding them to follow the principle of maintaining a coherent visual. We also use illustrations for whole-class instructional review. We display pictures that depict key events then encourage cooperative groups to brainstorm causes and effects associated with the illustrations. Another use for cause-and-effect organizers centers on discussions regarding social or behavioral issues (e.g., peer pressure, smoking, classroom misconduct). Students, either individually or working in groups, can work through the reasons and results of a particular issue or problem using graphic organizers.

Figure 4. Main-Idea-and-Details Graphic Organizer

Sequence Charts

Sequence charts can be implemented throughout the elementary curriculum. Mary and I use them to display the chain of events in various academic areas. We use them in reading to review the key elements in a story, in writing to organize "how to" paragraphs or short stories, and in social studies to create timelines. In science, we use sequence charts to help students visualize the procedures in a scientific experiment or to illustrate scientific cycles. Sequence charts also can be beneficial in math when solving multistep word problems or calculations.

During a recent fractions unit, we created sequence charts on large paper listing the steps required to perform a
variety of complex operations, including how to change mixed numbers into improper fractions and improper fractions into mixed numbers, how to compare fractions with unlike denominators, and how to find the fraction of a set. These charts, an example of which is shown in Figure 3, were then displayed around the classroom to serve as reminders while students internalized the processes.

We also have used sequence charts in pre- and postfield trip activities. Before going on educational trips, we create a sequence chart together so students have an understanding of what to expect for the day. This is especially beneficial for some of our students with special needs who have difficulty dealing with changes in routine. By previewing the sequence of events for the day, students are prepared to make the most out of new experiences. After returning from trips, students create their own sequence chart of what they did and learned.

When creating sequence charts in our classroom, Mary and I have found that it is important to make the order of events visually clear to the students. Many sequence charts provided in textbooks shift from one row of information to another. Even though the flow of events is displayed with arrows, many students have difficulty with visual processing get confused by the change in direction (Griffin & Tulbert, 1995). The sequence charts that we use all flow in one direction, either from left to right or from top to bottom. Information boxes are always numbered and connected by arrows so students have a clear understanding of the relationship between one event and the next. Displaying the sequence of events in a coherent manner is vital for student understanding.

As a review activity, we provide each member of a cooperative group with a piece of paper and a topic. Papers are then passed around the group, with each member being responsible for adding the next step in the sequence chart they receive. When papers return to the first student, all steps will have been completed and students can check charts for accuracy.

Main-Idea-and-Detail Charts
Determining the main idea and details of an instructional topic is a difficult skill for many students with special needs. Learners struggle to flesh out important ideas and tend to focus on minor details. A main-idea-and-detail graphic organizer is a beneficial tool to use in all subject areas to help students with this vital academic skill.

When reading a given passage or section in literature, science, or social studies, students in our classroom use this tool to separate important facts from extraneous information. Once the main idea has been established, students then provide supporting details which highlight the main idea's importance.

In writing, these graphic organizers assist students in composing focused five-sentence paragraphs. We also use main-idea-and-detail charts as follow-up assessments after movies, assemblies, or independent reading.

Because of the countless applications of main-idea-and-detail charts, it is important to consistently use a clear and coherent graphic organizer. In our inclusive classroom, Mary and I have a standard main-idea-and-detail graphic organizer that we use for instruction and review, represented in Figure 4. In this example of a group application, the main idea is more prominent, making the hierarchy of information apparent. Students were each given a graphic organizer with a different main idea, then passed their paper around to their group members. Use of this tool, along with explicit use of the terms, helps students visualize and internalize the difference between the main idea and the details.

We are continually coming up with new ways to make main idea organizers interesting and accessible to all stu-

![Figure 5. Venn Diagram](image)

**Figure 5. Venn Diagram**

<table>
<thead>
<tr>
<th>Venn Diagram</th>
<th>Customary Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric Units</td>
<td>Both</td>
</tr>
<tr>
<td>liter</td>
<td>quart</td>
</tr>
</tbody>
</table>
ruler        | ounce           |
|gram         | inch            |
|meter        |                 |

Write the terms in the correct area of the Venn diagram:

1. meter 4. measures weight 7. gram
2. ounce 5. a ruler 8. liter
3. inch 6. balance or scale 9. quart

Note. This diagram was used as a homework assignment to review the similarities and differences between the metric and customary measurement systems.
stents. We often complete a main-idea-and-detail chart while we are reading from a social studies or science text.

Together, Mary and I take turns filling out a graphic organizer on the overhead using student input. Because we already have an idea of the concepts we want to focus on during the lesson, we provide students who need extra writing assistance a partially completed graphic organizer. During instruction, these students fill in missing information, add meaningful illustrations, and use highlighters to denote key phrases while other students are completing blank graphic organizers. This creative approach allows for all students to work on the same skills according to their strengths. For homework and review, we provide blank charts with the key information at the bottom and have students put the concepts in the correct place.

During small group reading instruction, students will first read a chapter and complete organizers independently. Next, they will share their work with the group to compare and contrast what each reader felt was the most important information. This technique has proven beneficial because it requires students to explain the rationale behind their thinking.

A final strategy is to incorporate main-idea-and-detail charts into cooperative group activities, such as Jigsaw. Each student works with an expert group to complete a graphic organizer on a given topic and then teaches their core group the important concepts.

**Compare-and-Contrast Diagrams**

Compare-and-contrast diagrams have become standard instructional tools in educational settings. The most common form of this graphic organizer, the Venn diagram, is an excellent visual display of the similarities and differences between two or three main ideas. The practical uses of this diagram stretch across the curriculum. In literature, Venn diagrams can be used to compare characters, stories, genres, problems, and solutions. In writing, this graphic serves as a prewriting device for paragraphs of comparison.

The Venn diagram can be used in math when finding the common multiples between two or three numbers. Figure 5 illustrates a comparison between metric and customary units of measurement that we used as a homework activity in our classroom.

There are countless applications of this diagram in science and social studies. Students can compare leaders in history, geographic regions, cultures, significant events, or lifestyles of different economic classes. They can use Venn diagrams to differentiate between animal types or kingdoms, body parts, weather systems, planets, or ecosystems. Consistency with Venn diagrams is easy because their purpose is applicable in all subject areas.

Mary and I have found that when creating Venn diagrams for our students, we must make both the layout of the graphic organizer and the rules for using it coherent. We have discovered that to make the most of this tool, we must include adequate space for students to fill in information. In many Venn diagrams, the center section for similarities is the smallest component of the graphic. If our students have ideas they want to include in this section but are not provided enough space, the diagram stifles their performance. They feel confined to the given area and will stop writing when that space is filled, despite the fact that they have more ideas to add. Making the layout coherent in terms of adequate space is important for successful application of this graphic organizer.

An additional observation is that our students often do not use the diagram to its fullest potential. Some students will write one idea in each section of the graphic organizer and feel satisfied with their performance, even if they have the ability to contribute more information. To help deal with this problem, we have established rules in our classroom for completing Venn diagrams. First, students must include a minimum of three ideas in each area. Second, students know that they must go beyond obvious or general similarities and differences when completing a Venn diagram. For example, when comparing George Washington and Thomas Jefferson, students are not allowed to write the fact that both men are dead in the center section. We have found that establishing high expectations for completing quality Venn diagrams early in the school year is crucial to fostering student growth.

Because Venn diagrams have become standard instructional tools, making them creative and inviting to students is a challenge. We have found many ways to incorporate them to maintain student interest.

- We use Venn diagrams at the beginning of the school year to help students get to know each other. We put students in groups of two or three to complete a Venn diagram comparing their interests, families, and favorite subjects. Student presentations of their organizers are excellent opportunities for the class to learn about one another. Mary and I model the process by creating our own Venn diagrams about ourselves.

- As another beginning-of-the-year activity, we use paper or tape to make large circles on the classroom floor and have students move to the area that best characterizes them. For example, students with cats move to one side and students with dogs move to the other, while students with both go to the center and students without either remain outside the circles.

- We use the graphic organizer to help students review information after a lesson or before a test. We include a word bank to eliminate the possibility that students will leave out key information on their organizer.

**Final Thoughts**

Creative uses of graphic organizers can help elementary students comprehend difficult academic standards. These tools serve as vital learning devices for
students who have difficulty organizing content information. Inclusive classrooms are one of the best settings for using graphic organizers due to their benefits for all learners. Educators must continue to discover ways to incorporate graphic organizers and other instructional devices into their inclusive settings to assure academic success for all students.

References
McInerney, J. E. (1990). Do advance organizers facilitate learning? A review of sub-

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