

Using Foldables® in the Classroom

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Graphic organizers are powerful learning tools. Most of us are familiar with common graphic organizers such as diagrams, maps, outlines, and charts, all of which are two-dimensional. Foldables® are three-dimensional, interactive graphic organizers that were created more than 30 years ago by educator Dinah Zike. Foldables “encourage student ownership of study material, provide a kinesthetic component to teaching strategies, and promote long-term retention of academic lessons” (Casteel & Narkawicz, 2006, p. 6).

Based on current research, graphic organizers are extremely useful teaching and learning tools. Graphic organizers are visual representations combining line, shape, space and symbols to convey facts and concepts or to organize information. Graphic organizers, when designed and used appropriately:

- Speed up communication
- Help organize information
- Are easy-to-understand
- Show complex relationships
- Clarify concepts with few words
- Convey ideas and understanding
- Assess comprehension

Graphic organizers help students organize information in a visual manner. The old saying that “a picture is worth a thousand words” gets a new twist when applied to graphic organizers. This is a profound concept, especially as the number of non-native English-speaking students increases. A student is able to utilize graphic organizers to clarify concepts or to convey ideas and understandings with fewer words.

Graphic organizers also make complex relationships or concepts easier to understand, particularly for visual learners. Foldables take that process to the next level, and most notably,


for tactile/kinesthetic learners. For example, once students have made a “three-tab Foldable” they will never forget there are (insert appropriate subject area example: for Social Studies: three branches of the government; for Science: three types of rock; for Math: three measures of central tendency; for generic elementary: three primary colors, etc.).

When to use graphic organizers

Graphic organizers may be used at any point during instruction, but just as with any other instructional strategy, they are most successful when they are built into the instructional plan, rather than presented as an ‘extra’ activity.

Graphic organizers can be used to supplement note-taking and outlining. Many students do not know how to take classroom notes. They often write profusely, attempting to catch every word, but sometimes missing key words or concepts along the way. Graphic organizers, including concept maps, tables, and tree diagrams, may work better than outline notes in helping students discover relationships between concepts (Robinson & Kiewra, 1995). Foldables help teach students how to take notes by visually and kinesthetically chunking information into sections and providing limited space for note-taking. Some studies indicate that it may be more valuable to learn to analyze information and to select only the important points rather than writing verbatim notes (Bretzing & Kulhavy, 1979; Van Meter, et al., 1994).

Graphic organizers are often used to reinforce understanding, or to review information. Students use them to organize ideas or to show relationships between concepts. Foldables may be used as an alternative form of assessment in the classroom. Because the Foldable has readily identifiable sections, a teacher can quickly see gaps in student knowledge!

 This example of Foldables references within the text of the Student Edition gives both a visual prompt and written clues for students, with additional information and support in the Teacher Edition. See Integrated iScience (Tiger), Student Edition, Chapter 6, pp. 192, 206, and 215.

Reading and Writing Across the Curriculum

Graphic organizers have been shown to be highly effective in literacy development. In numerous studies, graphic organizers help improve the development of literacy skills—including oral, written, and comprehension. In one study, researchers concluded that graphic organizers helped at least 80 percent of students master key vocabulary skills (Brookbank et.al., 1999). Other studies found that elementary students’ writing skills improved when graphic organizers were part of the writing process (Gallick-Jackson, 1997; Meyer, 1995). Reading comprehension was found to have improved with young students when graphic organizers were used (Brookbank, et.al., 1999; Sinatra, et.al., 1984).

The National Reading Panel (2000) found that graphic and semantic organizers are one of the seven most effective categories of instruction to improve reading comprehension. Graphic organizers aid students in developing critical thinking and other higher-order thinking skills (Brookbank, et.al., 1999; DeWispelaere & Kossack, 1996) Other studies found that graphic organizers are a helpful tool for improving retention and recall of information for students at all ages and skill levels (Bos & Anders, 1992; Ritchie & Volkl, 2000; Griffin, et.al., 1995).

In Science

Graphic organizers have been shown to aid student comprehension and retention of science material (Guastello, et.al., 2000; Hawk, 1986; Ritchie & Volkl, 2000; Simmons, et.al., 1988; Willerman & MacHarg, 1991). In the science classroom, we try to help students organize their thoughts. Scientists classify, categorize, and organize things, so Foldables are a perfect fit—with Foldables, we put information in chunks that make sense.

In Social Studies

Graphic organizers have been found to help students organize information from expository social studies texts and comprehend content area reading. They also help students select, organize, and recall relevant information and help transfer thinking and learning skills to new situations and content areas (Alvermann & Boothby, 1983; Alverman & Boothby, 1986; Armbruster, et.al., 1991; Griffin, et.al., 1995). Casteel & Narkawicz (2006) compared lecture/worksheet style instruction with instruction focused around the use of Foldables in a social studies classroom and found that Foldables significantly improved students' attitudes toward the discipline.

In Mathematics

In mathematics, graphic organizers may help students develop stronger problem-solving skills as well as general mathematical skills and knowledge (Braselton & Decker, 1994; Monroe & Orme, 2002).

With Students with Special Needs

Graphic organizers may help English language learners improve higher-order thinking skills (DeWispelaere & Kossack, 1996).

Because of their visual organization, graphic organizers seem to be quite beneficial for use with learning disabled students. They appear to help students comprehend content area

material, to organize information, and to retain and recall content (Boyle & Weishaar, 1997; Doyle, 1999; Gardill & Jitendra, 1999; Griffin et al., 1991; Scanlon et al., 1992; Sinatra et al., 1984).

Conclusions

There is a common thread to the research cited here: graphic organizers may lead to improved student performance, whether measured by classroom-based observation, textbook assessments, or standardized assessments, when compared with more traditional forms of instruction.

Graphic organizers work at all grade levels. They seem to be just as effective with primary students as with high school or college students. Studies have been conducted with early elementary (Brookbank et al., 1999), upper elementary/intermediate grades, and middle school (Guastello et al., 2000), and with secondary grades/high school (Doyle, 1999), all showing similar results.

There are four keys or phases to effective learning, according to Kolb (1984). These phases are: getting involved through concrete experience, reflective listening and observation, creating an idea with an abstract conceptualization, and making decisions through active experimentation. Graphic organizers address all four of these phases at some level and, when combined with other classroom instruction, they can be a powerful tool for learning.


Marzano, Pickering, and Pollack (2001) contend that to foster higher-order thinking, instruction must require learners to restructure prior knowledge and to link it to new information. These researchers and others use graphic organizers to restructure existing knowledge and make new connections. In fact, Marzano, Pickering, and Pollack (2001) propose nine instructional strategies to improve student achievement, and Foldables can be utilized in each of them.

When students construct their own graphic organizers, as they do with Foldables, they are active participants in their learning (Moore and Readence, 1984). Student-constructed graphic organizers allow teachers to observe levels of understanding, to identify misconceptions, and to make appropriate instructional interventions (Naughton, 1993, 1994).

Our goal as educators is to help students glean important information and understand key concepts and to be able to relate these concepts or apply them to real-world situations. The Glencoe/McGraw-Hill *iScience* program includes instruction for study organizers, called Foldables. A Foldable is designed to fit each chapter's content and guides students in choosing the important concepts and recording them in an organized format. Since students make their own three-dimensional Foldable as well as enter the notes, they feel a sense of ownership. The Foldables also serve as an effective tool to use as notes or a study guide

before tests to help students achieve greater success (Carter & Van Matre, 1975; Van Meter et al., 1994).

Glencoe/McGraw-Hill **iScience** chose to embrace the use of Foldables because of the wide research support that demonstrates the effectiveness of graphic organizers. Students read science textbooks, magazines and newspaper articles, trade books, and web sites to gain information to answer science questions. Reading is intentional thinking during which the reader constructs meaning from the text. Graphic organizers help support and develop students' note-taking skills, summarizing skills, reading comprehension, and vocabulary development which leads to better understanding and application of science content.

 **iSCIENCE** Foldables are found in every chapter of every grade level of the iScience program. The Foldables Handbook on pages SR29-SR39 of the Student and Teacher Editions gives specific instructions for construction.

Dinah Zike is an award-winning author, educator, educational consultant, and inventor, known internationally for graphic organizers known as Foldables®. Based outside of San Antonio, Texas, Zike is a frequent keynote speaker and conducts seminars for over 50,000 teachers and parents annually.

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