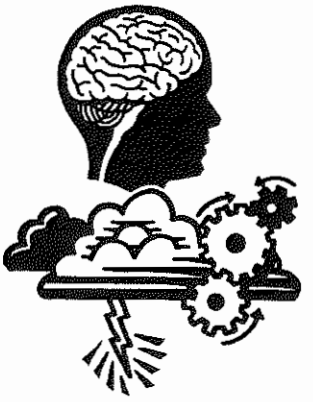
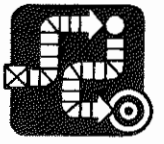
Strategy 1

Brainstorming and Discussion



WHAT: DEFINING THE STRATEGY



The brain is a highly social organism. If you don't believe that statement, just arrive early at a faculty meeting or any other type of social gathering, particularly one where people know one another. Watch what happens as people begin to arrive. Most of them take the opportunity to converse with one another. Very few, if any, sit in silence.

Then visit a traditional classroom where students spend most of their time engaged in individual activity without the benefit of conversation and, in fact, are expected to sit in silence for a greater period of the day. What is wrong with this picture? Perhaps teachers are expecting students to exhibit behavior that is unnatural to the brain. You see, discussion has many advantages, not the least of which is that simply opening the mouth to speak sends oxygen to the brain and facilitates dendratic growth.

When students are given the opportunity to brainstorm ideas without criticism, to discuss opinions, to debate controversial issues, and to answer questions at all levels of Bloom's taxonomy, wonderful things can happen that naturally improve comprehension and higher order thinking.

HOW: SAMPLE CLASSROOM ACTIVITIES

- Level/Subject Area: Elementary/Middle/High (Cross-curricular)

Standard/Objective:	Encourage divergent thinking.
Activity:	Students are given a question to which there is more than one appropriate answer. Students brainstorm as many ideas as

WHY: RESEARCH RATIONALE

Students learn 90% of what they say or discuss as they complete an activity. (Dale, 1969)

Learner performance scores improved when learners were asked questions of greater depth. (Redfield & Rousseau, 1981)

Better quality questions result in more challenge to the thought processes of the brain. (Berliner, 1984)

Learning increases when students have the opportunity to talk about it in their own words; to make it their own. (U.S. Department of Education, 1986)

Students who discuss how they and others think become better learners. (Astington, 1998)

Regardless of the topic or task, small-group discussion reinforces classroom learning, assists the brain in recalling the information, and allows students to solve problems collaboratively and explore topics in depth. (Alexopoulou & Driver, 1996)

The ability to ask questions allows individuals to be creative, to imagine beyond what is given, to search for missing information, physical rationales, and human purposes that will explain the given. (Harpaz & Lefstein, 2000)

It is unrealistic for teachers to formulate questions for students since, in real life, students are required to form their own questions. (Sternberg & Grigorenko, 2000)

When students generate their own questions, they become actively engaged in reading and motivated by their own queries rather than those of the teacher. (Report of the National Reading Panel, 2000)

The process of brainstorming can be used to activate prior knowledge since one student's idea causes other students to scan their neural networks for related ideas. (Gregory & Chapman, 2002)

possible in a designated time period using the DOVE guidelines:
Defer judgment, One idea at a time, Variety of ideas, and Energy on task.

- Level/Subject Area: Elementary/Middle/High (Cross-curricular)

Standard/Objective: Increase higher order thinking skills.

Activity: Students answer content-related questions at all levels of Bloom's taxonomy using the question stems provided below. Include all levels of questioning in discussion groups as well as on teacher-made tests.

- Level/Subject Area: Elementary/Middle/High (Language Arts/History)

  Standard/Objective: Increase higher order thinking skills.

  Activity: Students discuss how they would react if they found themselves in the same situation as a literary character or a historical figure. Example: What would you have done if you found yourself alone in the wilderness for an extended period of time, as Brian did in the story *Hatchet*, by Gary Paulsen?

- Level/Subject Area: Elementary/Middle/High (Mathematics)

  Standard/Objective: Solve a math problem.

  Activity: Students are given a math problem to solve. Ask each student in a group to describe how a solution was reached. When all have finished, students' varying paths to the answer are compared and discussed, allowing them to see that there may be more than one way to solve a problem.

- Level/Subject Area: Elementary (Science/Mathematics)

  Standard/Objective: Comprehend the term *ratio*.

  Activity: Show the class a can of frozen juice and ask students if they have ever mixed juice using a concentrate. Ask them to explain the procedure of blending three cans of water to one can of concentrate (a ratio of three parts water to one part concentrate). Students then brainstorm additional examples of ratios from their own experiences.

- Level/Subject Area: Elementary/Middle/High (Cross-curricular)

Standard/Objective:	Read a variety of texts.
Activity:	Students form interest groups and each group selects and reads a text or book of interest. Students then meet to discuss the text by asking questions of one another, making connections, and challenging one another's opinions.

- Level/Subject Area: Elementary/Middle/High (Cross-curricular)

Standard/Objective:	Read a variety of texts.
Activity:	Students peruse books, magazines, newspapers, or the Internet to find information that is of interest to them. Students focus on the pertinent points, ask questions, and provide their personal insights on the information. They then present a summary of the information to the class. Classmates ask original questions using the question stems provided below.

Model Questions and Key Words to Use in Developing Questions

I. **Knowledge** (eliciting factual answers, testing recall and recognition)

Who	Describe
What	Define
Why	Match
When	Select
Where	Which one
How	What is the one best
How much	Choose
What does it mean	Omit

II. **Comprehension** (translating, interpreting, and extrapolating)

State in your own words	Summarize
What does this mean	Select

Give an example
Condense this paragraph
State in one word
What part doesn't fit
What restrictions would you add
What exceptions are there
Which is more probable
What are they saying
What seems to be
What seems likely
Classify
Judge
Infer
Show
Indicate
Tell
Translate
Outline
Match
Explain
Represent
Demonstrate
Which are facts, opinions
Is this the same as
Select the best definition
What would happen if
Explain what is happening
Explain what is meant
Read the graph, table
This represents
Is it valid that
Which statements support the main idea
Sing this song
Show in a graph, table

III. **Application** (to situations that are new, unfamiliar, or have a new slant for students)

Predict what would happen if
Choose the best statements that apply
Select
Judge the effects
What would result
Explain
Identify the results of
Tell what would happen
Tell how, when, where, why
Tell how much change there would be

IV. **Analysis** (breaking down into parts, forms)

Distinguish
Identify
What assumptions
What motive is there
What conclusions
Make a distinction
What is the premise
What ideas apply, do not apply
Implicit in the statement is the idea of
What statement is relevant, extraneous to, related to, not applicable
What does the author believe, assume
State the point of view of
What ideas justify the conclusion that
The least essential statements are
What's the theme, main idea, subordinate idea

What is the function of
What's fact, opinion
What inconsistencies, fallacies are there
What literary form is used
What persuasive technique
What is the relationship between

V. Synthesis (combining elements into a pattern not clearly there before)

Write (according to the following limitations)
Create
Tell
Make
Do
Dance
Choose
How would you test
Propose an alternative
Solve the following
Plan
Design
Make up
Compose
Formulate a theory
How else would you
State a rule
Develop

VI. Evaluation (according to some set of criteria, and state reasons for your evaluations)

Appraise
Judge
Criticize
Defend
Compare
What fallacies, consistencies, inconsistencies appear
Which is more important, moral, better, logical, valid, appropriate, inappropriate
Find the errors

REFLECTION

How can I integrate Strategy 1: Brainstorming/Discussion into my lesson plans so that my students' brains are engaged?

Standard/Objective:____

____.

Activity:____

____.

Standard/Objective:____

____.

Activity:____

____.

Standard/Objective:____

____.

Activity:____

____.

Standard/Objective:____

____.

Activity:____

____.

Standard/Objective:____

____.

Activity:____

____.

Standard/Objective:____

____.

Activity:____

____.