The NAF Learning Handbook

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NATIONAL Academy FOUNDATION

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Introduction

The purpose of this *Learning Handbook* is to expand upon the concepts presented in the NAF curriculum so that teachers can be better equipped in the classroom. It includes best practices and explanations of the instructional design and learning strategies in the curriculum. The "Navigating the Courses Online" section of this handbook offers information about how to find your way through the NAF website in order to successfully teach your course. The Lesson Plans section introduces you to exactly what you will find in each of the lessons.

Key Points about the NAF Curriculum

Each of the semester-long NAF courses has been developed in collaboration with classroom teachers and integrates national academic and career standards, industry expertise, Project Based Learning, and literacy instruction. The materials are designed to be as comprehensive as possible so that you won't need to spend time looking for additional resources; you can spend your time teaching.

Each course covers 75 class periods, leaving time for testing, snow days, professional development days, etc. Each lesson is geared around clear and observable learning objectives. Assessment guidance is provided, but you may adopt assessment practices that meet your needs. Our goal is to provide you with a comprehensive and thoughtful curriculum with specific lesson plans, but we don't want to limit you to a "lesson in a box" formula. To that end, all of the lessons are presented as Word documents so that you can customize or add to them according to your situation.

Courses are written so that each lesson builds on the previous one, and they can be used exactly as they are written. An estimated time frame is given for each activity to help you plan. However, it is also possible to add or substitute other activities that you know work for you, to make changes that build on your students' specific interests or prior knowledge, and to capture those teachable moments that appear in any classroom. If you are required to use certain textbooks by your school district, this curriculum can be used as a hands-on addition, or it can stand alone.

In addition to teaching essential academic skills, the NAF curriculum also emphasizes important career skills, which are integrated into the curriculum, as are key ties to the NAF Internship Toolkit. Employers consistently stress the necessity for the mastery of important skills in the work place: analytic ability, critical thinking skills, problem-solving ability, flexibility, and so on. They indicate that while their professional development departments can teach job-related technical skills, they cannot teach these higher-order skills that are so critical to a modern work environment. . The curriculum covers issues from resume writing and interview skills to time management and collaboration. All of these skills need to be actively modeled, taught,

reinforced, and reflected upon, in the same way that academic learning is. The students will have an opportunity to apply their new career skills during their required NAF internship.

We recommend paying particular attention to the group work designed into the curriculum. Project Based Learning and cooperative learning are essential to the NAF curriculum. It is important to remember that not all group work is cooperative learning. Students must actively help one another and learn from one another. Johnson and Johnson's research (1975: "Learning together and alone") indicates that it is essential to train students in cooperative learning by first modeling the skills you want them to use and then having them practice while giving feedback and checking for understanding.

Likewise, "doing a project" is not necessarily the same as Project Based Learning. A true project-based curriculum involves in-depth inquiry, critical thinking, collaboration, presentation, and a lot more than simply getting students out of their seats, doing hands-on work, or completing an assignment in a longer-than-usual amount of time. Michael Smith and Jeff Wilhelm (*Reading Don't Fix No Chevys*) report that our male students especially are more actively engaged when learning is linked to practical, immediate benefits, rather than to abstract future goals. Learning linked to individual interests and shared with peers makes the subject matter relevant. Only when rigor or relevance is linked to the task at hand does meaningful long-term learning take place.

To that end, we suggest that you first design your classroom management plan. You will want to establish the minor and culminating project groups yourself to avoid students simply hanging out with their friends and to maximize the potential for success for every student. You will also want to assign group roles to assure that one person does not dominate the group, including roles such as Recorder, Researcher, Reporter, Encourager, Time Keeper, and Illustrator. The section in this handbook on Project Based Learning will give you further ideas for implementing this in your classroom.

As a final note, it is important to be aware that students use a notebook throughout the course. In Lesson 1, each student prepares a notebook, in the form of a three-ring binder, so that materials can be easily added and located. The notebook is used for many important purposes in addition to note taking, such as responding to thinking prompts, developing taxonomies, writing reflections, and planning project tasks. While it isn't often repeated in the lesson activity instructions, it is recommended that you have students write down all prompts before writing their notes, answers, or reflections. This way, your students' work will be in context whenever they go back to review what they've written.

Course Expectations

The National Academy Foundation serves and supports Small Learning Communities within existing high schools across the USA. Our courses are intended to prepare students for post-secondary education and professional careers within their Academy theme. Each NAF curriculum is designed to be supported through high-level mentoring by business professionals and real-world paid internships.

In order to fully implement the new NAF curriculum, the following assumptions have been made about your Academy:

- The Academy functions as a Small Learning Community and contains a subset of students and teachers who are together for a three- or four-year span.
- The Academy has partnerships with employers, communities, and higher education through an active Advisory Board.
- The curriculum is designed around an Advisory Board that plays an active role in students' experiences.
- The instructor cannot implement certain lessons and projects without the continued support and participation of an Advisory Board.

For further explanation of what is essential for operating a highly successful NAF Academy, please go to **www.naf.org**.

Navigating the Courses Online

All NAF courses are accessible through the Curriculum Online Library that is available to NAF Network Members. When you click on an Academy theme (Academy of Finance, for example), you will go to a web page that lists all of the courses for that Academy. You can click on links for the course overview, lesson descriptions, and course downloads beneath the introductory paragraph for each course.

Course Overview Page

The Course Overview page gives an overall description of the course, followed by brief descriptions and links for the course Scope and Sequence, the culminating project overview, links for downloading the course, and a section that takes you to SAS Curriculum Pathways.

Lesson Descriptions Page

This page lists the units and the lessons within each unit. You can click on any lesson to read a brief summary of what it covers and how many class periods it is expected to take.

From this page you can also print out a PDF that has all of the lesson descriptions on it.

Course Downloads Page

Go directly to this page to download overview documents, the entire course, or any section of the course. Of critical importance is the date listed by every file: it tells you when that file was last updated. Check this page frequently to make sure you are working with the most current files.

The Lesson Components

Each lesson consists of a Lesson Plan, Teacher Resources, and Student Resources.

Lesson Plans

Each Lesson Plan begins with a brief overview of what the students will be learning in the lesson. Any preparations that must be executed before the lesson begins are listed after this introductory paragraph, in a section called **Advance Preparation.** Examples of advance preparation include scheduling industry experts or Academy Board members to come to class during a specific period, or booking library or computer lab time. It may also involve contacting people well in advance of when they will be needed, such as in the last lesson of the course.

As you read each lesson plan document, you will find the following sections:

1. Learning Objectives

Learning objectives state three to six desired student learning outcomes. They are specific, relevant, and tied to the lesson's content and course goals. The lesson assessments address one or more objectives.

2. Academic Standards

Each lesson plan includes a list of related national academic or career standards that apply to the lesson. These standards may extend over a number of lessons or entire units. The standards promote rigor, relevance, integration, and preparation for post-secondary education.

3. Assessment

Each lesson plan includes a list of corresponding assessment tools and assessment criteria.

4. Prerequisites

Prerequisites are specific skills or specific knowledge that students must have in order to fully understand the lesson.

5. Teacher Resources

Related teacher resources are listed here, including rubrics, assessment criteria, quizzes, and other discretionary handouts for the teacher.

6. Student Resources

Related student resources are listed here, including readings and assignments.

7. Equipment and Supplies

For your convenience, each lesson plan provides a list of all the equipment and supplies that are needed to deliver the lesson.

8. Lesson Steps

This section represents the heart of the Lesson Plan. An estimated time frame is given for each step of the lesson, or activity. Admittedly, this estimate is based on a best-case scenario where the lesson is done efficiently, with no interruptions; your timing may be a bit different. Each activity begins with a statement of purpose to orient the teacher. Approximately two of the steps in each lesson also list the relevant career skills that students will be learning or practicing through the activity.

Lessons progress through stages, either explicitly or implicitly. The main stages of a lesson are:

- **Springboard**

  The Springboard hooks the students on the topic. It may set the students' expectations about what will be covered in the lesson and assess their current knowledge of the subject. It might also establish essential background knowledge. There is only one Springboard activity per lesson.

- **Scaffolding**

  Scaffolding is the stage in which students learn new content. It provides the necessary support for students to master the lesson's objectives. Cross-curriculum skills, such as

literacy, math, and social studies, might also be integrated. Formative assessments, or "checks for understanding," might be provided after each step.

- **Closure**

This stage summarizes the key learning points in each lesson ("What I Learned") and the process students went through ("How I Learned"). The end of the lesson provides various means for students to reflect on their learning and interact with their classmates. This part of the lesson might also celebrate student learning and set the stage for upcoming lessons. Closure often includes some form of summative evaluation or assessment.

9. Enrichment Extensions

Enrichment extensions supplement the lesson and are possible for all students to use. They enable students to go deeper into some aspects of the lesson. They might include a list of related activities (e.g., research, surveys, field trips, projects, guest speakers) or suggested additional readings.

10. Cross-Curricular Integration Extensions

These activities provide specific examples of how teachers can integrate other disciplines into the lesson, or how a core course teacher can tie academy material into their curriculum. These activities can also be used to integrate topics or themes across the school curriculum.

Teacher Resources

A Teacher Resources document accompanies each lesson. It provides the ancillary materials that you may need to teach the lesson, including background reading and recommended websites. The Teacher Resource file is presented in Word so that you may amend it to suit your personal circumstances and preferences. This document may also include:

- Assessment tools and scoring criteria for lesson assignments
- Answers to worksheets
- Quizzes and tests
- Customized instructional strategies
- Additional reading suggestions
- Key Vocabulary (use according to your preference. Note that handing it out to students too early in many lessons will unduly influence lesson activities that focus on vocabulary.)
- Bibliography (print and online resources used to prepare the lesson to which teachers can refer for more information)

Student Resources

The Student Resources document provides the ancillary materials that are needed by the students for each lesson. It is always in Word so that you may amend it to suit your personal circumstances and preferences. It may include:

- Reading assignments
- Tables and graphs
- PowerPoint presentations as readings
- Worksheets and frames
- Excel spreadsheets
- Project assignments

You may choose to duplicate the student materials in advance and make a complete student handbook for your course. Quizzes and tests or other materials you may not want students to see in advance are, therefore, not included here; they are in the Teacher Resource file.

Assessment

Every lesson has at least one assessment product. An assessment product is an activity that students complete to show that they have met one or more learning objectives. Some assessment products are designed to be completed by individual students, while others are completed in pairs or groups. Throughout the NAF curriculum, you will find four basic approaches to assessing student work: rubrics, criterion-based assessments, quizzes and tests. The assessment tool is designed to match the depth of the learning objective that is being addressed.

Rubrics are provided for assessing major assignments such as oral presentations, student PowerPoint presentations, written assignments (essays, letters, etc.), and interviews. A rubric is a holistic tool used to assess student performance. NAF rubrics clearly describe categories of proficiency, from "exemplary" to "needs attention," phrased in an actionable way. Rubrics state clear performance outcomes to let students know what it will take to do well. They are particularly effective with those assignments in which there is an opportunity for formative assessment of multiple drafts so that students can be clear on what they need to improve before the summative assessment of the final draft.

The most common assessment tool is the criterion-based assessment, which is a simple and straightforward way to check for evidence of student learning. Here, student achievement is measured against four to eight defined and objective criteria. Criterion-based assessment is typically used for assignments where students complete their work in one class period. The criteria focus on demonstration of skills and knowledge learned in the lesson.

At times, when a learning objective is focused on recall of subject matter knowledge, you are provided with a quiz or test on the material presented (the answers are also provided). These are short-answer assignments rather than fill-in-the-blank or matching, so students are required to show what they learned rather then make guesses.

One final option sometimes offered is to give students a simple credit/no credit mark for basic completion of a task, such as with worksheets or note taking. A credit/no credit assessment is left up to the teacher's discretion and is not included in the list of assessable products at the start of the lesson plan.

There is no specific point system or grading method specified by the NAF curriculum. In honoring the individual preferences and needs of the many different teachers who use the curriculum, we leave it to the teacher to determine her own grading system. We also recognize the grading restrictions dictated by some school administrations or online grading systems.

As you familiarize yourself with the course materials, you will need to identify your own method of assigning points. For example:

- You may decide that every rubric is worth a total of 100 points. If a rubric has five categories, each category would then be worth 20 points. If a student scores in the "Exemplary" category, he could earn all 20 points, with fewer points available for students in the "Solid," "Developing," or "Needs Attention" categories. You also might decide that certain rows in a rubric are more important to the assignment and weigh those more. So one row may be worth up to 20 points while another row is only worth 5 points.
- You may decide that every criterion on an Assessment Criteria resource is worth 5 points each. That would make the assignment's total value somewhere between 20 and 40 points. A student would earn 5 points if she "met" the criterion, 3 points if she "partially met" it, and 0 points if she "didn't meet" the criterion.
- You may decide to assign grades to "credit/no credit" assignments. You can assign points for each section of a worksheet that is completed or for each important concept for which a student has completed notes.

In all cases, assignments with rubrics should be weighed more heavily than assignments with assessment criteria, as rubrics indicate longer, more complex, or more significant assignments.

Project Based Learning

Overview

As a teacher, you might have seen the value of having students do "hands-on" activities, conduct their own research, work in teams to meet "real-world" challenges, create quality products, and make effective presentations. You've seen the positive results when students, instead of just being passive recipients of knowledge, become active, engaged learners. This is what happens in Project Based Learning (PBL), a longstanding tradition in American education that is more important now than ever.

In today's world, students need both knowledge and skills to succeed. This need is driven not only by 21st-century workforce demands for high-performance employees who can plan, collaborate, and communicate, but also by the need to help all young people learn civic responsibility. PBL provides young people with the opportunity to develop the skills they will need to master their new role as global citizens.

Definition of PBL

PBL has been defined in many different ways over the years, usually as one form of "inquiry based learning." The Buck Institute for Education (BIE) defines standards-focused PBL as "a

systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks." This definition encompasses a spectrum of projects, ranging from brief projects of one to two weeks based on a single subject in one classroom, to yearlong interdisciplinary projects that involve community participation and adults outside the school.

The BIE distinguishes carefully planned projects from other extended activities in the classroom. In PBL, a well-designed project:

- Supports and advances students' inherent drive to learn, capability to do important work, and need to be taken seriously. Projects do this by putting students at the center of the learning process.
- Engages students in the central concepts and principles of a discipline. The project work is central rather than peripheral to the curriculum.
- Highlights provocative issues or questions that lead students to in-depth exploration of authentic and important topics.
- Requires the use of essential tools and skills for learning, self-management, and project management, including technology.
- Specifies products that solve problems, explain dilemmas, or present information generated through investigation, research, or reasoning.
- Includes multiple products that permit frequent feedback and consistent opportunities for students to learn from experience.
- Uses performance-based assessments that communicate high expectations, present rigorous challenges, and require a range of skills and knowledge.
- Builds in collaboration in some form, either through small groups, student-led presentations, or whole-class evaluations of project results.

Why Use It

Research shows that PBL enhances the quality of learning and leads to higher-level cognitive development through students' engagement with complex, novel problems. PBL teaches students complex processes and procedures such as planning and communicating. Well-designed and well-implemented PBL has been shown to improve student achievement and lead to more long-lasting, in-depth understanding. At its best, PBL can help you establish a high-performing classroom in which you and your students form a powerful learning community focused on achievement, self-mastery, and contribution to the community.

Teachers report that PBL is an engaging instructional model that supports authentic inquiry and autonomous learning. Besides encouraging academic proficiency, reports indicate that PBL:

- Overcomes the dichotomy between knowledge and thinking, helping students to both "know" and "do."
- Supports students in learning and practicing 21st-century skills such as problem solving, communication, teamwork and self-management.
- Encourages the development of habits of mind associated with lifelong learning, civic responsibility, and personal or career success.
- Integrates curriculum areas, thematic instruction, and community issues.
- Assesses performance on content and skills using criteria similar to those in the work world, thus encouraging accountability, goal-setting and improved performance.
- Creates positive communication and collaborative relationships among diverse groups of students.
- Meets the needs of learners with varying skill levels and learning styles.
- Engages and motivates bored or indifferent students.

Project Based Learning can also work well in low-performing schools. PBL offers students the opportunity to investigate authentic topics of interest to them, thus engaging them in the learning process in ways that traditional instruction does not. For students struggling with basic skills, it may be necessary to include more direct instruction during a project, design shorter projects, or tie projects closely to fewer and more specific standards.

The Teacher's Role

When you apply PBL in the classroom, your role changes from the one you play in traditional teaching. You're still the content expert, but you're also a coach and facilitator as you guide students toward successful completion of project tasks.

As you work in this role, consider the following suggested guidelines:

- Before beginning a project, reflect on your teaching style and skills. How will you operate in a PBL environment? Are you comfortable with students moving around a classroom, or with the ambiguity that characterizes a more open-ended learning process?
- If you are hesitant to release control over your students, you may want to start small until you feel comfortable and skilled in project leadership.
- Do not start projects on the first day of the semester; wait until you've had time to assess students and prepare them for project work.
- If students have not had experience with projects, they will need training in such skills as collaboration, research, project management, and oral presentation.

- Monitor students closely until they have mastered self-management skills.

At the heart of successful Project Based Learning is your ability to support and direct students (or conversely, your ability to let them struggle with a problem or information as they search out answers and solutions). This requires interpersonal and communication skills, as well as the ability to define the agenda for the class and push through a project to a successful conclusion. It also includes being sensitive to the fact that students finish work at different rates and have different abilities, aptitudes, and learning styles.

Implementation Recommendations

The BIE makes the following recommendations for successful implementation of PBL:

- Spend an adequate amount of time planning and preparing for a project. Coming up with an idea on Sunday to implement in the classroom on Monday does not work for PBL.
- Plan projects using a comprehensive design model that includes clearly identified goals, a range of assessments for both individuals and groups, and a driving question to focus the project. Map out the project's timeline, resource needs, and instructional strategies.
- Whenever possible, plan projects that involve your community, local businesses, outside experts and mentors, parents, other staff members, and organizations linked to online.
- Have students work in ways that are authentic to the kind of work done by professional adults or in the "real world."
- Provide rubrics early in the project, to guide students in producing high-quality work.
- Have students present their work to an audience beyond their teacher and peers in the classroom, which will raise the stakes and their level of achievement.
- Begin a project with an engaging "grabber" to hook students' interest—don't make the project appear to students as just one more (and perhaps more difficult-sounding) assignment. An effective grabber could be a field trip, guest speaker, a simulation with a call to action, a video, or a lively discussion of an issue to investigate or problem to be solved.
- Do not hand students a "complete packet of materials" with step-by-step instructions on the first day of a project—this can take away their initiative. Let them play a role in planning how they might approach a task, identifying what resources they need, and deciding how they can demonstrate what they learn.
- Develop work processes so students spend class time effectively. Arrange resources, checkpoints, feedback loops, and clear short- and long-term "deliverables."
- Conclude projects with reflection on both process and content.
- Don't forget to celebrate what you and your students have accomplished!

BIE Project Planning Checklist

Design Principle	Evidence
Begin with the End in Mind *The project meets all initial criteria for an authentic, standards-focused project.*	• Content outcomes aligned with national, state, or district standards. • Requires students to develop, apply, and demonstrate literacy or mathematical skills. • Organized around an open-ended essential/driving question or challenge that inspires higher-order thinking, encourages focused problem-solving skills, and requires content knowledge to answer. • Requires students to construct knowledge. • Requires students to engage in disciplined inquiry, over a long enough period of time to gain in-depth understanding and create high-quality products. • Addresses issues, problems, or questions faced by people in the world outside of school. • Requires students to develop one or two key life skills or workplace competencies. • Encourages students to reflect on and develop personal strengths. • Incorporates activities and tasks that encourage student autonomy. • Encourages and honors student "voice and choice." • Students have contact with adults outside the classroom. • Student work reviewed by a "real" audience. • Students do extensive exploration and research, including field-based activities. • Involves students and teachers in a wide range of communication patterns, roles, and activities.
Craft the Driving Question *The project poses an authentic problem or significant question.*	• The driving question or problem to be solved has meaning and relevance to students and may be generated by them. • The driving question is neither too open-ended nor too concrete. • The driving question is appropriate to the content outcomes for the project. • The driving question serves as a guide to the direction of inquiry and products for the project.

Plan the Assessment *Products and criteria are aligned with standards and outcomes for the project.*	• Assessments are closely aligned to standards and are rich and varied enough to make credible judgments about learning. • Products and performances are varied and sufficient to provide the opportunity for students to be adequately assessed on all outcomes, including performance assessments for skills, and self-report or similar assessments for work habits and personal strengths. • The project includes a culminating exhibition, presentation, or product in which students demonstrate that they can apply their knowledge. • Artifacts or other assessments are included as ways to measure the "process" of the project. • Formative assessments are included. • Students are informed of all assessments at the beginning of the project. • Students will be given regular feedback on performance as the project progresses.
Map the Project *The project includes well-thought-out tasks and activities.*	• Appropriately scaffolded activities have been built into the project timeline. • Project includes an appropriate, engaging introduction or launch activity. • Students will use technology as a tool for learning. • Students will use a variety of time and task management tools during the project. • Students have opportunities to develop workplace competencies. • Appropriate timeline is established. • Project plans for differentiated instruction.
Manage the Process *The project incorporates pervasive management approaches.*	• Driving question is discussed and posted. • Solutions to the problem or approaches to the question are discussed at the beginning of the project. • Assessments and criteria for performance are clearly explained to students at beginning of project. • Project materials are organized and available to students. • Students receive timely feedback on their work in progress. • Students understand what is required of them and are given exemplars of work. • Reflection is built into the project plan. • Students are taught to self-assess and are required to use structured methods to review progress.

Instructional Strategies

Concept Attainment

What It Is

Concept attainment uses a structured inquiry process, usually used to introduce and define a new concept. Bruce Joyce and Marsha Weil developed this approach in their book, *Models of Teaching*. It involves having students deduce the attributes of a concept by contrasting examples and non-examples of the concept. The students make hypotheses about the concept being presented and test their hypotheses as more examples are presented. Students are also given a chance to identify their own examples to further test their hypothesis of the concept. For example, you might use it to introduce the idea of recyclable goods, contrasting items that are recyclable with those that are not. You can also use written examples, to teach the concept of figurative language; for example, by presenting examples of literal and figurative language. To reinforce the concept of ethical business practices, you could present positive and negative examples.

The basic steps of the activity are:

1. Select and define a concept and determine its attributes
2. Develop positive and negative examples of the concept
3. Introduce the process to the students
4. Present the examples and have students guess if they are examples of the concept
5. As a class, develop a hypothesis of the concept definition
6. Give additional examples and list the attributes of the concept
7. Develop a definition of the concept based on the attributes
8. Evaluate

Why Use It

Concept attainment makes it possible to teach students key subject matter, while at the same time reinforcing critical thinking skills including observing, comparing, contrasting, analyzing, hypothesizing, and metacognitive reflection.

Concept attainment helps students make connections between what they know and what they will be learning and encourages them to examine a concept from a number of perspectives. They learn to sort out relevant information and to go beyond merely associating a key term

with a definition. The student learns the concept more thoroughly, and with improved retention.

Using the Strategy

Planning

1. Use a concept that has clear attributes and is defined by features that distinguish it clearly from other concepts.
2. Write a definition for the concept that is most appropriate for the lesson and use it to help you select examples.
3. List the essential attributes of the concept.
4. List as many examples as possible.
    a. Positive examples must contain all of the essential attributes.
    b. Negative examples should have some but not all of the essential attributes and should be designed to help the students rule out possibilities for essential attributes.

Teaching

1. Explain the goal: Students must define the concept by determining which items fit and then identifying what is essential to the meaning of the concept in their own words.
2. Write two column headings on the chalkboard: "Positive Examples" and "Negative Examples."
3. Explain that you are going to provide examples of the concept to see if they can figure out what else would go in the each column.
4. Begin with a few positive examples. Start to collect student guesses and list them if they fit.
5. Continue to give both positive and negative examples. Ask the class to guess if it is positive or negative. It is often a good idea to ask students to give a simple "thumbs up" or "thumbs down" to indicate their guesses in order to avoid embarrassment and unnecessary disruption.
6. Use the negative examples to help the students to recognize nonessential features of the concept and cross them off from the list of positive attributes as they discover them.
7. Have the students create a definition of their own for the concept using all of the essential attributes that they have listed on the board.
8. Give the students a few more positive and negative examples to see if they can identify which are positive and negative.
9. Have the students give their own examples and then explain why they are positive.

Reflection

This step is used to ensure that the students know how they determined the definition and to help them think about their own thinking processes. Questions to ask the class include: "When did you realize that a particular characteristic was essential to the meaning of this concept?" "How did we eliminate a particular characteristic?"

Cooperative Learning

What It Is

Cooperative learning develops interpersonal skills, individual accountability, communication, conflict resolution, and group decision-making skills. Unlike collaborative learning, which usually refers to any form of group-based, open-ended learning, cooperative learning is usually a fairly structured, teacher-designed activity. Students are divided into small groups, from two to six members, who complete a project as a team. Group members share various roles and are interdependent in achieving the learning goal. Students learn the importance of maintaining group health and harmony and respecting individual views.

The Five Elements of Cooperative Learning

It is only under certain conditions that cooperative efforts may be expected to be more productive than competitive and individualistic efforts. Those conditions are:

1. Positive Interdependence (Sink or swim together)

- Each group member's efforts are required and indispensable for group success
- Each group member makes a unique contribution to the joint effort through his or her resources, role, and/or task responsibilities

2. Face-to-Face Interaction (Promote each other's success)

- Orally explaining how to solve problems
- Teaching one's knowledge to others
- Checking for understanding
- Discussing concepts being learned
- Connecting present with past learning

3. Individual & Group Accountability (No hitchhiking! No social loafing)

- The entire group is collectively accountable for meeting the goals and/or objectives of the assignment, and each student is individually accountable for their piece(s) in the project
- The teacher may want to use some of the following techniques to manage individual and group accountability:
  - Keep the size of the group small. The smaller the size of the group, the greater the individual accountability may be
  - Give an individual test to each student
  - Randomly examine students by calling on one student to orally present his or her group's work to the teacher, in the presence of the group
  - Observe each group and record the frequency with which each member contributes to the group's work
  - Assign one student in each group the role of checker. The checker asks other group members to explain the reasoning and rationale underlying group answers

- Have students teach what they learned to someone else

4. Interpersonal & Small-Group Skills (Being a Team Player)

- Students explicitly learn and practice:
  - Leadership
  - Decision-making
  - Trust-building
  - Communication
  - Conflict management

5. Group Processing (A Metacognitive 21st Century Skill)

- Group members:
  - Discuss how well they are achieving their goals and maintaining effective working relationships
  - Describe what member actions are helpful and not helpful
  - Make decisions about what behaviors to continue or change

Why Use It

Research has shown that cooperative learning techniques have the following benefits:

- Promote student learning and academic achievement
- Increase student retention
- Enhance student satisfaction with the learning experience
- Help students develop skills in oral communication
- Develop students' social skills
- Promote student self-esteem
- Help to promote positive race relations

Glasgow and Hicks in *What Successful Teachers Do* cite further research regarding classrooms in which there was an arena of small group work; peer learning and unofficial discourse and dialogue among students provided increased opportunity for learning that whole-class learning cannot.

Theodore Sizer's Coalition of Essential Schools presents a model that sees the student as the worker and the teacher merely as the facilitator. Theme-based, student-centered or discovery learning all ask students to take a far more active role in their own education. The teacher facilitates and orchestrates, becoming a "guide on the side" rather than a "sage on the stage."

Using the Strategy

To get the most benefit from cooperative learning activities, follow these guidelines:

- Involve students in determining group norms and behaviors. Post these in your classroom so that expectations are known and shared by all students.

- Establish assessment criteria for group projects before students begin their tasks. Assess group members in terms of their ability to work well together as well as in terms of their final products.
- Structure groups with a mix of genders, ages and cultures. Explain that group experiences will be varied and numerous. Depending upon the activity, it may be useful to allow students to select their own groups at times.
- Structure the group in such a way that the participation of each member is necessary to accomplish the task.
- Identify the roles to be assigned to each group member (e.g., Recorder, Encourager, Reporter, Researcher, and Questioner). Ideally, the group members should determine their roles and assign responsibilities through collaboration and consensus.
- Monitor and assess student participation and progress, and observe and discuss individual and group efforts. Emphasize ongoing reflection about the process itself.
- Determine a sequence of steps to take if one member of the group is counterproductive and undermines the efforts of the other group members.
- Give group members the opportunity to reflect upon and assess the group process as well as the extent of their individual learning or goal achievement.

K-W-L (Know, What I Need to Find Out, Learned)

What It Is

K-W-L is a reading strategy created by Donna Ogle (1986) that activates students' prior knowledge about a particular topic. Students are asked what they already know about the topic. Students then set goals specifying what they want to learn, and after reading the material, they discuss what they have learned.

Why Use It

The primary purpose of K-W-L is to develop a framework that students can use as they read. It allows students to access their prior knowledge, making it easier for them to make connections between the new material and something that is familiar to them. Next, as they generate questions for the "W" stage, they develop a purpose for their reading. The last "L" stage reinforces whether students have indeed reached their goals. It is important to return to the "K" after reading to see if their previous assumptions were correct.

Using the Strategy

Follow these steps when applying the K-W-L strategy:

1. Provide the following K-W-L chart to your students.

K **What I KNOW**	**W** **What I WANT to Know (or What I Need to Find Out)**	**L** **What I LEARNED**

2. Provide students with the opportunity to brainstorm and list the ideas and details that they already know about a topic. Have them list these topics under the "K" column of the K-W-L chart.

3. Have the students review the topic again and consider what they still want to know (or, if some students are apathetic or indifferent to the topic at this stage, what they think they need to find out). They should list these items in the "W" column of the chart. Items should be listed as questions. (For example, students might say, "How can India stay a democracy when it's so culturally diverse?")

4. As they read or after they read, have students add details that they have learned while reading. They should list these items in the "L" column of the chart. These can be unrelated to what the student wanted to know. In addition, the students can add more items to the "W" column at any time as they go.

5. After reading the text and learning the material, have students go back to the "K" column and see if any of their prior knowledge was inaccurate. Have them check any of the topics that are inaccurate according to the text. Have them rewrite any of their statements that were inaccurate so they are correct.

6. Then have the students go to the "W" column and check any of their questions that the text did not answer. They could bring these unanswered questions up in class, and share how they will find the answers.

Variations

Follow the same procedure, but have the whole class brainstorm together while the teacher writes responses on the board or overhead.

List, Group, Label

What It Is

List, group, label is a strategy for developing categories within a larger concept. It is effective both as a way to introduce new material and as a review before a test or essay. The teacher provides—or asks the class to develop—a list of key words about a topic (for example, terms introduced in a mythology unit). Students then work individually, in pairs, or in small groups to sort the terms into categories and label them.

Why Use It

Because list, group, label activates prior knowledge and builds vocabulary, this activity aids in learning and retention. Students learn from one another and develop critical thinking skills about creating categories and discovering attributes of these categories. Clustering the words or terms helps students make sense of what they learn.

Using the Strategy

- Identify key vocabulary for a given topic or concept, preferably no more than 25 words. Have the students list the words or write them individually on cards or note paper. (See the variation below.)
- Students can work in teams or individually to cluster the vocabulary words into logical categories. If the words are unfamiliar to the class, you should provide time for students to look them up or find them in context.
- Have the students label the categories.

Example:	HEROES	GODS	MONSTERS	PLACES
	Hercules	Zeus	Cyclops	Thebes
	Theseus	Hades	Minotaur	Olympus
	Perseus	Ares		
	Odysseus	Poseidon		

- Have the students or teams discuss the categories they created and the rationale for their decisions.
- Students can pose questions based on the categories (ex: “Does Odysseus really belong in the Hero category? Why or why not?) and use the categories to define or question terms (“What do we really mean by a monster in mythology?).

Variations

- With a bit of teacher preparation, words or terms can be put on slips of paper that can then be put in envelopes for student pairs to sort and label. If this strategy is used as a review for a test, students can be encouraged to make one category “Terms I do not know,” and the teacher can then gather and discuss or re-teach these.
- Sorted lists can be put on poster paper and hung around the room for students to refer to throughout the study of a unit.

Think, Pair, Share

What It Is

Think, pair, share is a cooperative learning strategy that uses these steps:

1. Students think silently about a question that you have posed. Provoke their thinking with a question or prompt or observation and have them write the prompt down. The students should take a few moments to think about the question.

2. Students pair up during the second step and exchange thoughts. Using designated or spontaneous partners, students pair up to talk about the answer each came up with. They compare their mental or written notes and identify the answers they think are best, most convincing, or most interesting.

3. The student pairs share their responses with other pairs, other teams, or the entire class. After students talk in pairs for a few moments, ask for pairs to share their thinking with the rest of the class. You can do this by going around in round-robin fashion, calling on each pair, or taking answers as they are called out "popcorn style" (or as hands are raised). Record these responses on the board or on the overhead.

Why Use It

Think, pair, share benefits students in the areas of peer acceptance, peer support, academic achievement, self-esteem, and increased interest in school and other students. Students spend more time on task and listen to each other more when engaged in think, pair, share activities. More students are willing to respond in large groups after they have been able to share their responses in pairs.

Other benefits include:

- Students become actively involved in thinking about the concepts presented in the lesson
- Students retain more of the critical information in a lesson
- Students' misunderstandings about the topic are often revealed (and resolved) during the discussion stage
- Students are more willing to participate since they don't feel the peer pressure involved in responding in front of the whole class
- It is easy to use spontaneously and easy to use in large classes
- Students practice articulating precisely what they mean

Using the Strategy

Follow these strategies when you apply think, pair, share:

- Ask open-ended questions to generate more discussion.

- Switch the discussion partners frequently. With students seated in teams, they can pair with the person beside them for one discussion and the person across from them for the next discussion.
- Be sure to provide adequate "think time." You might have students give a thumbs-up sign when they have something they are ready to share.
- Walk around and monitor the discussions. You might hear misunderstandings that you can address during the whole group discussion that follows.

Variations

- **Write, Pair, Share**: Gives students a chance to write down their answers before sharing with their partner. You may wish to collect written responses from each student or each pair before or after their discussions.

- **Think, Group, Share:** Instead of pairs, you might break the class into groups; make sure they're small groups (no more than four students each) so that each student has a chance to talk. After students share their answers with each other, have a representative from each group give a summary to the rest of the class of some of their most interesting or surprising reflections.

- **Stand, Pair, Share:** Once the class has become more comfortable—and disciplined—with this strategy, you will be able to use it with more flexibility and freedom. You can have students simply stand and find a partner with whom to discuss an idea or project. Sometimes giving students the opportunity to get out of their seats, move around and talk to a partner is a needed break in class routine, without losing the thread of the class discussion.

- **Four Corners**: Another variation is to present four alternative responses to an assignment or discussion topic and have students move to the four corners of the room you have designated for each response. Once there, they can discuss their reasons for their choice and then present their argument to the class as a whole.

- **Give One-Get One**: Ask students to write down two things they know about a topic and then mingle with the class to "give" one and "get" another from each student. You can provide a simple grid for the students to fill out with their newly acquired information.

Literacy Strategies

Active Listening

What It Is

Active listening is a structured way of listening to others with the intent to listen for meaning and mutual understanding. The listener takes the time to check in with the speaker, through paraphrasing and questioning, to verify that he or she has understood what is being said. It is a skill that is important both in an academic setting and in the workplace.

Note: This is an underlying strategy not often explicitly called out in the activity instructions, but is nonetheless one of the most important strategies.

Why Use It

Students with poor listening habits will demonstrate these traits:

- Continually interrupting you or fellow students
- Not making eye contact with you or a student who is speaking
- Appearing distracted
- Fidgeting and playing with objects

Active listening is not only something we ask of our students, it is also something we teach them. Active listening promotes greater respect and understanding among your students and between the class and yourself. Active listening can also improve students' study skills, especially when the student summarizes or paraphrases the speaker's message.

Using the Strategy

Teach these active listening skills to students, and model them yourself:

- Look at the speaker, and stop other things you are doing.
- Listen not merely to the words, but to the feeling content and to body language.
- Be sincerely interested in what the other person is talking about.
- Restate what the speaker has just said (respond with "mirroring" statements).
- Ask clarification questions once in a while.
- Be aware of your own feelings and strong opinions.
- If you have to state your views, say them only after you have listened.

To encourage better listening, there are several strategies you can use in your classroom. One simple one is to move across the room from the person who is speaking and ask another student to be ready to give feedback on what was said. Another is to have students work in pairs or triads to practice the strategies. You might arrange the classroom seats in a triangle

configuration, or “The Golden Triangle of Success.” Have the poor listeners sit in the front row seats where there is usually less distraction from noise in and outside the classroom.

Composing with Key Words

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What It Is

Composing with key words is the strategy of using selected words from taxonomies or text to compose key ideas in sentence or paragraph format. This strategy provides students with the practice they need before they can write effective essays or create writings in complex genres.

Why Use It

Composing with key words enables students to respond to new learning or review previous information. By selecting key words, students focus on main or related ideas or create their own ideas. This strategy also builds vocabulary, assists with making journal entries, and helps students create narratives or expositions. Research has shown that testing vocabulary provides for little retention of knowledge. By writing the words in their own sentences, students are actively interacting with the vocabulary and using it in a context that makes sense to them personally.

It promotes writing skills, encourages fluency and creativity, and helps students build an authentic "voice."

Composing with key words is built upon these underlying learning principles:

- A starting point for writing builds confidence.
- Words are concepts; sentences are the expanders of concepts.
- Writing initially without worry about supporting details or written conventions frees the writer to compose.
- Creativity is enhanced when sentences can be factual or fanciful.
- Confidence builds in the individual when everyone can start out equally as a writer or composer.
- Students of different abilities and styles can find their own voices.

Using the Strategy

Have students follow these steps:

1. Select three words from a taxonomy or text.
2. Compose one sentence using all three words.
3. Add needed endings and use the words in any order you wish.
4. Read your sentences to your partner or group this way:
5. "Here are my words: ____. This is my sentence: _____."

Defining Format

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What It Is

Defining format is a strategy for developing a more precise and deeper understanding of new terms. It moves the student away from such vague definitions as "A house is something that…" or "a pencil is something that…" It can be used to further define a term, e.g., "What is a cat?" where the category is simply "animal," and get the student to think of a cat as a vertebrate, mammal, or feline.

Defining format provides a template for students to use consisting of three parts:

1. **Term**: What term is to be defined?
2. **Category**: Responding by finding the category to which the term belongs (e.g., a river is in the category *body of water*; a pencil is in the category *writing tool*; addition is in the category *mathematical operation*)
3. **Characteristics:** Stating the essential characteristics that separate the term from other terms belonging to the same category (e.g., a river and a lake are both bodies of water, but with different characteristics)

Students should imagine that their target audience is completely unfamiliar with the term being defined and needs a clear, unambiguous definition.

Example:

Term	Category	Characteristics
A river is a	body of water that	1. flows into another body of water, such as a lake, a bay, a gulf or an ocean. 2. has a source and a mouth 3. begins with fresh water that may become brackish or salty 4. may have rapids or meander.

Why Use It

Defining format builds students' understanding of a new term and their ability to construct and communicate the meaning of a term. Looking up a word in a dictionary or glossary often fails to provide the student with more than a surface or cursory understanding which can be quickly forgotten. When students construct the meaning of a new term, they form a deeper understanding of the term, which is retained longer.

Defining format also has these benefits:

- Constructing meaning is more effective for comprehension than copying meaning
- Greater clarity of meaning comes when the students can distinguish the general from the specific
- Deeper learning occurs as students develops the ability to categorize results in distinguishing ideas; promotes comparing and contrasting
- Using templates and patterns enhances understanding
- Students have a permanent template for organizing information that can be used for reports, presentations, and explanatory writing

Using the Strategy

Have students follow these steps to set up a "defining format" template:

1. Set up a double-page spread; divide the left-hand page in half lengthwise
2. Label the three columns "TERM, CATEGORY, CHARACTERISTICS"
3. Identify the TERM (e.g. "river")
4. Under the TERM, begin the answer: "A river is a…")
5. Move to CATEGORY and write the category (e.g. body of water)
6. Move to CHARACTERISTICS. List the characteristics numerically.
7. Compose a paragraph using your information from this template.

When two or more terms in the same category are defined using this strategy, the student can use the defining information to compare the items. For instance, in comparing a river and a lake, a student might write:

We can compare a river with a lake in several ways. Both are bodies of water, but with different characteristics. A river begins at a source that is usually in high land and flows north or south towards its mouth. The mouth is where it empties into another body of water such as a lake, a bay, or the ocean. A lake is a body of water that is surrounded on all sides by land and may get its water from a river flowing into it. Rivers are thought of as long, and lakes are thought of as large. Both rivers and lakes may have fresh water, brackish water, or salt water.

Metacognitive Statements

What It Is

Metacognition is self-awareness of one's knowledge stated in terms such as "I know that I know" or "I know that I need to know." Writing metacognitive statements is a way to encourage students to clarify for themselves exactly what they know about a given topic, and what they want to learn. Using a set format, students write sentences starting with "I know something about ..." and add "First..." and "In addition..." and "Finally..."

The strategy can be used alone or in connection with taxonomies. For example, after having students create a complete alphabetized taxonomy of what they know and want to learn about the geography of Iraq, they create a page that might look like this:

METACOGNITION	Draft copy
I know something about the geography of Iraq. First, I know that it is largely desert land, especially in the southwest. In addition, I know that there are fertile areas, especially around the Tigris and Euphrates Rivers.	Finally, I know that there are mountains in the northeast that extend from Turkey into Iran. Now you know something that I know about the geography of Iraq.

After reading further, students can write another metacognitive statement about their new knowledge.

METACOGNITION	New Knowledge
After reading in my social studies book and looking at a map of Iraq, I now know... In addition,	Finally, I now know a lot of information about the geography of Iraq.

Before using this strategy, you should go over:

- Group and/or class discussion of topic or ideas
- Oral statements by students of what they personally know about a topic
- Taxonomy of words related to the topic
- Possible use of K-W-L
- Skimming and scanning practice of written text

Why Use It

Metacognition lies at the core of the development of both reading comprehension and increased enjoyment of reading. Writing metacognitive statements gives students an organizational template for adding further details about a subject. The strategy addresses these skills:

- Accessing prior knowledge through conscious awareness
- Searching for new knowledge
- Relating prior knowledge to new knowledge
- Stating what you know, want to know, and need to know in an organized format
- Linking knowledge to various subject areas

Using the Strategy

Have students follow these steps:

1. Set up double-spread notebook pages.
2. Write "METACOGNITION" on top of the pages.
3. Skip a line and write, "I know that I know something about…"
4. Skip a line and write "First,".
5. Move to the middle of the page and write, "In addition,"
6. Go to the facing page and write, "Finally,".
7. Go to the bottom of the page, about two lines from the bottom, and write, "Now,"
8. Following this format, have students write their three supporting statements (starting with "In addition,") and a conclusion ("Now you know something that I know about…").

Taxonomy

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What It Is

A taxonomy is a list of words related to a specific topic or subject matter area. Students can be asked to build taxonomies about almost anything they are studying, organizing the key words or terms alphabetically. The purpose of building these taxonomies is both to increase vocabulary—and especially vocabulary they may need to write about a given topic—and also to encourage students to work together to share knowledge. Taxonomies become each student's personal thesaurus.

Taxonomies are typically organized by alphabet, as shown below.

Example: ASTRONOMY

A	astrology, Andromeda galaxy, asteroids
B	black holes, Big Bang
C	constellation, Copernicus
D	dwarf star
E	
F	
G	Galileo, galaxy
H	Hubble telescope
I	
J	
K	Kepler
L	lunar eclipse
M	moon, Milky Way
N	nebulae
O	
P	planet, pulsars
Q	quasars
R	
S	sun, solar flares, solar eclipse, supernova
T	
U	
V	Van Allen radiation belts
W	
X	
Y	
Z	

Why Use It

Building a taxonomy addresses these skills:

- Organizing prior, ongoing, and new knowledge
- Focusing on a topic
- Taking notes
- Expanding vocabulary
- Developing cooperative learning experiences

- Listening to others

Using the Strategy

- Students work alone and think of as many words as they can that relate to the topic being studied.
- Students enter each word next to its initial letter.
- Students work for three or four minutes without talking to anyone in the class.
- Students then collaborate by forming small groups and share their words, adding new words to their personal taxonomies.
- Have the whole class form a group to cross-pollinate thinking and suggest other words, or the students do a gallery walk to get ideas from other students' taxonomies.
- Have all the students add these new words to their personal taxonomy.

Variations

As students build taxonomies across the curriculum, they begin to build personal thesauruses. In order to keep track of their taxonomies, students can create a Table of Contents for their notebooks.

Example:

Date	Topic	Page
Sept. 14	Types of Number: Math	8
Sept. 26	Rain Forest: Science	14
Oct. 8	Explorers: Social Studies	18

- Another variation is to have students build a personal taxonomy to prepare for both autobiographical and biographical writing. It contains the words that answer "Who Am I?" Students can include family relationships, geographical information, interests, and personality traits.

Example: WHO AM I?

A	American, athletic
B	bicyclist, baseball fan!
C	cousin, classmate, curious
D	daughter
E	energetic
F	friend ... etc.

- Finally, taxonomies can be used to build synonyms for vocabulary building.

Example: Synonyms for "said"

A	announce, add, argue, assert, allege
B	bark, bellow
C	cry, counter, contend
D	debate, drawl
E	exclaim, exhort, emphasize, explain
F	

Key Activities

Cornell Notes

What It Is

The Cornell Notes System was designed by a professor at Cornell University and has been in popular use since the 1950s. The idea is have students divide their paper in half, taking notes on the right-hand column only. Later, they are to go back and pull out main points, key ideas, terms, and dates and list them in the left-hand column (see examples below), or to write cue questions about the material. A space is often left at the bottom of the page for a summary of the key points. This note-taking system is best used when the information is given in a sequential, orderly fashion and allows for more detail.

Why Use It

Cornell Notes are really just one of many double-entry notebook systems. Most students need to learn to take effective notes on what they read, discuss, or hear in class. Teaching this approach helps students to differentiate between major and minor ideas. In addition, it teaches them an effective study strategy. Students are encouraged to review their notes often and to test themselves by covering the right-hand column. It is, of course, important to model the strategy first, discussing why you are making the decisions about what notes to take in the right-hand column, and then which points seem most important to list in the left-hand column.

Using the Strategy

These are the instructions you should give students:

1. First, students should divide their notebook paper into two columns, leaving room at the bottom for a brief summary.
2. **During a reading, lecture or presentation**, students should record in the right-hand column important words, phrases, and definitions. To avoid missing information, the class should develop a system of abbreviations they understand, and write in telegraphic sentences (where you only include enough words to carry the essential meaning) or similar shorthand that is often used in cell phone text messages. As students take notes, realize that the emphasis should be on the key ideas rather than the actual words used to convey those ideas.
3. **Immediately after a presentation or reading,** students should write key words, term and dates as well as "cue" questions in the left-hand column to help them remember the information and study later.

4. **After each class,** students should summarize, at the bottom of each page, the notes they took.
5. **While reviewing their notes,** students should cover the right-hand column and recite what they remember by looking at the important words, phrases, and definitions.
6. **Before tests and quizzes**, students should reflect on the notes and ask themselves questions such as "What is important about this concept?" or "How do these ideas fit with what I already know?"
7. **Every week,** students should review all of their notes for at least ten minutes.

Here is an example:

Main Ideas	Details
War of 1812 *Who was president and who did we fight?* *What were the causes?* *What were the important battles?*	• *James Madison went to war against the English* • *Causes included: Controversy over English taking sailors from American ships* • *Shawnee chief Tecumseh wanted an Indian confederacy, preventing westward expansion. This became an excuse for anti-British sentiment* *Battles: Old Ironsides - sea victory, American forces capture York (Toronto) and try to conquer Canada!, capture of ten Chesapeake ("Don't give up the ship"), Battle of Thames, siege of Baltimore (where FS Key was inspired to write The Star Spangled Banner)and the Battle of New Orleans* *Treaty of Ghent ends the war - most of the issues causing the war are unresolved.*
Summary: The War of 1812 was a war America was not ready to fight. England fought reluctantly and no one really won. It lasted three years.	

Variations

- Double-sided notebooks can be used in any number of ways to encourage metacognition and reflection. For example, students do the note taking in the right-hand

column and then respond in the left-hand column with examples from their own lives, questions that come to mind, or drawings.

Left-hand page	Right-hand page
Gene Sheppard is the same guy who wrote "A Christmas Story." I must have watched that silly movie a thousand times with my family.	"Lost at C" by Gene Sheppard is a humorous short story about a boy entering high school and. the way he manages to escape getting called on, especially in math class where he is completely lost.
I can relate to being scared on the first day of school. My science teacher was terrifying.	Sheppard compares school to being on death row, to going into battle and to being lost at sea. He uses many metaphors and similes, and humorous exaggerations.
I really liked the way he uses all the imagery of drowning: "a tidal wave of fear" and "I was swept up in a flood..."	There is a surprise ending that explains the title.

Sources:

http://www.bucks.edu/~specpop/Cornl-ex.htm

http://www.montgomerycollege.edu/Departments/enreadtp/Cornell.html

Panel Discussion

What It Is

The panel discussion is usually a group of three to six people who sit in front of the rest of the class and have a purposeful conversation on a selected topic. Panel members present opinions and points of view or debate issues.

The panel presents an opportunity for the rest of the class to hear arguments and discussions about pertinent topics as seen from a variety of viewpoints.

Why Use It

Panel discussions encourage active, participatory learning. Students analyze alternative ways of thinking and explore their own experiences so they can become better critical thinkers. Besides, it is undeniable that we learn best—and remember far more of—what we teach others.

Panel discussions give students the chance to hear different perspectives, as well as enhance cognitive learning and foster a sense of empowerment and equality in the classroom. They are well-suited for a wide variety of learning styles.

Discussions also develop skills with speaking coherently and listening effectively to the exchange of ideas and opinions.

Using the Strategy

- Panel discussions can be guided by a moderator who may be the teacher or an assigned student. The rest of the class should participate by asking questions.
- Students may conduct research and develop questions in preparation.

Variations

- Ask small groups of students to summarize the results of their group internet research on a single sheet of paper which is then duplicated for the class or on an overhead. The group is then responsible for presenting the material and addressing the class's questions.

- A Socratic seminar is another very effective strategy for meaningful conversation among a small group of students. If the students involved in the Socratic seminar are placed in a circle within a circle, those on the outside can take notes. You may choose to have those on the outside be able to "tap in" on the discussion, thus taking the place of someone in the inner circle.

Read, Draw, Talk, Write

What It Is

Read, draw, talk, write (RDTW) helps to promote reading comprehension and retention. A small section is read by students. Then the students talk in pairs about what was read, as well as draw, talk, and write summary information.

This strategy is effective for linguistic, auditory, visual, and interpersonal types of learners.

Why Use It

The benefits of this strategy are many. It engages students by allowing them focused personal interaction (and often shared laughter). It reinforces the habit of making mental pictures or sensory images as they read. Researchers on multiple intelligences tell us that drawing is a powerful tool because it helps develop the habit of visualization, an effective reading strategy. It also increases comprehension by breaking the material into smaller "chunks," and promotes retention of the material by developing personal, visual connections to what is being taught.

Using the Strategy

This is a recommended way to use RDTW in the classroom:

1. Students establish partners (or you may assign the pairs).
2. Each student reads text silently for 60 seconds.
3. Students close their books or look away from the text.
4. Students draw a representation of what they have read.
5. Partners show each other their drawings and talk about what they read.
6. Students write individually what they learned with their books still closed.

Variations

Read, Write, Talk: This is similar to RDTW, except without the drawing component. Here is a suggested procedure:

1. Students individually read a passage (or handout) silently. During reading, students note major topics, characters, and/ or events in the passage. Sticky notes may be used.
2. Partner students and allow time for discussion of the passage. Individual notes may be used as a point of reference.
3. Students individually write responses to the following:
    a. What is most important in this passage?
    b. What does the author want the reader to think is important?
    c. How did the discussion with your partner help increase your understanding of the passage?

Reading Jigsaw

What It Is

Reading jigsaw is a cooperative learning strategy where each student within a team has a piece of information to be learned by all students, and each student is responsible for teaching this piece of information to the other students on the team. When all the pieces are put together, the students should have all the information, or the completed jigsaw.

Reading jigsaw should follow these steps:

1. Each student receives a portion of the materials to be introduced.
2. Students leave their "home" groups and meet in "expert" groups.
3. Expert groups discuss the material and brainstorm ways in which to present their understandings to the other members of their "home" group.
4. The experts return to their "home" groups to teach their portion of the materials and to learn from the other members of their "home" group.

Why Use It

Jigsaw learning allows students to be introduced to material and maintain a high level of personal responsibility. Jigsaw learning fosters teamwork and cooperative learning skills, and helps students develop a depth of knowledge not possible if they were to try to learn all of the material on their own. Because students are required to present their findings to the home group, jigsaw learning will often disclose a student's own understanding of a concept as well as reveal any misunderstandings. Note that this strategy works best if each section of the reading covers the same basic concepts; it is not used when every section covers entirely different content that is critical for every student to learn.

Research has shown that reading jigsaws not only have social benefits, but also help students learn and apply academic content as well. The reading jigsaw also offers these instructional benefits:

- It is an efficient way to learn the material.
- It encourages listening, engagement, and empathy by giving each member of the group an essential part to play in the academic activity.
- Group members must work together as a team to accomplish a common goal; each person depends on all the others.
- No student can succeed completely unless everyone works well together as a team.
- It facilitates interaction among all students in the class, leading them to value each other as contributors to their common task.

Using the Strategy

To conduct a reading jigsaw in your classroom, follow these steps:

1. Assign students to "home" teams of four or five students (their regular cooperative learning teams). Have students number off within their teams.

2. Assign study topics to "home" team members by giving them an assignment sheet or by listing their numbers and corresponding roles on the board. For example, a science course exploring the theory and application of the laws of physics might have one member of the home team focus on the physics of light while another tackles energy conservation.

3. Have students move to "expert" groups where everyone in the group has the same topic as themselves. For example, all the students reading or researching energy conservation would then be in one group.

4. Students work with members of their "expert" group to read about and/or research their topic. They prepare a short presentation and decide how they will teach their topic to their "home" team. You may want students to prepare mini-posters while in their "expert" groups. These posters can contain important facts, information, and diagrams related to the study topic.

5. Students return to their "home" teams and take turns teaching their team members the material. You might have team members take notes or record the information on a worksheet or in their journals. You could also have them complete a graphic organizer or chart with the new information.

6. Involve the class in a whole-group review of all the content you expect them to master on the assessment. A written test is usually given to the entire class to arrive at individual grades.

Variations

The expert groups can prepare large posters with a graphic depiction and key points listed. They then present the material orally to the class as a whole. The teacher can type a summary of these presentations to assure that all the **pertinent** information is covered.

SQ3R

What It Is

Survey, Question, Read, Recite, and Review (SQ3R) is a reading strategy developed by Robinson in 1947 to help students set the purpose for reading and engage them in reading for answers to key questions. It teaches students to first skim the material, and then develop questions to which they respond while reading. It consists of these five steps:

1. Survey	Familiarizes the student with the material presented in a chapter.
2. Question	Formulating a question before reading encourages students to become more involved with the chapter.
3. Read	Reading with a specific purpose helps to promote concentration.
4. Recite	Allows the student to assess his/her understanding of the reading material by writing notes in their own words, speaking aloud, highlighting key points, or drawing what they feel is most important.
5. Review	Challenges the student to recall the chapter's main points and comprehend the relationships between them.

Why Use It

While this strategy is probably one of the most tried and true and commonly taught reading strategies, current research (Caverly, Orlando and Mullen) has shown it increases reading comprehension as much as rereading the material would.

Using the Strategy

It is important for the teacher to model each step. Students often need to be shown what "recite" means. In this context, recitation can be oral, written, or graphic, depending on each student's learning style.

Below are the guiding instructions for SQ3R. It can be used as a student handout:

Before you read, **Survey**	□ Chapter titles, headings, and subheadings □ Captions under pictures, charts, graphs, or maps □ Questions or study guides □ Introductory and concluding paragraphs □ Chapter summaries
Question while you are surveying	□ Turn the title, headings, and/or subheadings into questions □ Read questions at the end of the chapters or after each subheading □ Ask yourself: "What did my instructor say about this chapter or

	subject when it was assigned?” □ Ask yourself: “What do I already know about this subject?” **Note**: If it is helpful to you, write out these questions for consideration. This variation is called SQW3R.
When you begin to **Read**	□ Look for answers to the questions you first raised □ Answer questions at the beginning or end of the chapters or study guides □ Reread captions under pictures, graphs, etc. □ Note all the underlined, italicized, bold printed words or phrases □ Study any graphic aids □ Stop and reread parts which are not clear □ Read only a section at a time and recite after each section
Recite after you’ve read a section	□ Ask yourself questions about what you have just read or summarize, in your own words, what you read □ Take notes from the text but write the information in your own words □ Underline or highlight important points you’ve just read **Note**: Use whichever recitation method best suits your particular learning style. The more senses you use, the more likely you are to remember what you read.
Review	□ Review key points/text and summarize understandings. Once you’ve finished the entire chapter using the preceding steps, go back over all the questions from all the headings. See if you can still answer them. If not, look back and refresh your memory; then continue.

