9. What do I typically do to chunk content into digestible bites?

Based on student needs, the teacher breaks the content into small chunks (that is, digestible bites) of information that can be easily processed by students.

**Teacher Evidence**
- Teacher stops at strategic points in a verbal presentation.
- While playing a videotape, the teacher pauses the tape at key junctures.
- During a demonstration, the teacher stops at strategic points.
- While students are reading information or stories orally as a class, the teacher stops at strategic points.

**Student Evidence**
- When asked, students can explain why the teacher is stopping at various points.
- Students appear to know what is expected of them when the teacher stops at strategic points.

### How Am I Doing?

<table>
<thead>
<tr>
<th>4 Innovating</th>
<th>3 Applying</th>
<th>2 Developing</th>
<th>1 Beginning</th>
<th>0 Not Using</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chunking content into digestible bites</strong></td>
<td>I adapt and create new strategies for unique student needs and situations.</td>
<td>I break input experiences into small chunks based on student needs, and I monitor the extent to which chunks are appropriate.</td>
<td>I break input experiences into small chunks based on student needs, but I do so in a somewhat mechanical way.</td>
<td>I use the strategy incorrectly or with parts missing.</td>
</tr>
</tbody>
</table>
Element 9: What do I typically do to chunk content into digestible bites?

Strategies

Presenting content in small chunks

The teacher chunks content into small, digestible bites for students. If presenting new declarative knowledge, the chunks are comprised of concepts and details that logically go together. If presenting new procedural knowledge, the chunks are comprised of steps in a process that go together.

Using preassessment data to vary the size of each chunk

If students scored well in a specific area on a preassessment, the teacher presents that information as part of a larger chunk. When presenting information about which students displayed misconceptions or little prior knowledge on the preassessment, the teacher can use smaller chunks.

Chunk processing

The teacher has students work together to process chunks of information. In groups of three, students decide who will be member A, member B, and member C. The teacher presents the first chunk of information, and member A summarizes it. Members B and C add to what A has already said, and each group identifies elements of the chunk they are still confused about. The teacher takes questions from the whole class to clarify these confusions and then asks each group to predict what the next chunk will be about. The teacher presents the next chunk, and groups repeat the process, except that member B summarizes and members A and C add information. After the teacher presents the third chunk, groups repeat the process again, with member C summarizing, and members A and B adding information.

Technology Links

- Divide presentations into appropriate chunks by inserting slides between sections that prompt students to stop and process what they just learned.
- Use learner response systems or voting websites (such as www.polleverywhere.com) to monitor students’ levels of understanding. Use the data to determine if the class is ready for the next chunk.
Module 5

Using Cooperative Learning, Curriculum Chunking, and Descriptions, Discussions, and Predictions

In this module we continue to explore techniques for helping students interact with new knowledge. All three of the modules in this section address Design Question 2: What will I do to help students effectively interact with new knowledge? As we saw, this design question involves a number of components. In this module we address the need to present new information and skills in small chunks so that students have time to process it and explore with other students their evolving reactions and perspectives. We also consider the need to engage students in a variety of small-group tasks to help them interact during critical-input experiences.

Reflecting on Your Current Beliefs and Practices

Before examining the strategies in this module, take some time to examine your current beliefs and practices by answering the following questions:

1. To what extent do you use cooperative learning and related small-group activities to help students process new information, skills, and procedures?
2. To what extent do you chunk new knowledge in small increments?

3. How do you use students' descriptions, discussions, and predictions to reinforce their processing of new information, skills, and procedures?

Recommendations for Classroom Practice

This module addresses the following strategies for Design Question 2:

- Using grouping to enhance students' active processing of information
- Presenting new information in small chunks
- Using descriptions, discussions, and predictions to enhance students' understanding of new information
- Using formal techniques for critical-input experiences

Using Grouping to Enhance Students' Active Processing of Information

Cooperative learning and other small-group processes allow students to experience content from multiple perspectives. Group interaction not only facilitates knowledge development but also creates awareness that is difficult if not impossible to achieve without interaction. We believe pairs and triads are the most effective grouping configurations as students process new information and skills. However, larger groups may also be used effectively. These intimate settings provide students with multiple reference points, including opportunities to see how others view new content. Students can also benefit from seeing how others react to their own processing of new information.

Small-group activities can be used before a critical-input experience. They can also be used throughout a critical-input experience. In either case it is important to help students apply operating rules such as the following, which are essential to group success:
1. Be willing to add your perspective to any discussion.
2. Respect the opinions of other people.
3. Make sure you understand what others have added to the conversation.
4. Be willing to ask questions if you don’t understand something.
5. Be willing to answer questions other group members ask you about your ideas.

The following examples illustrate how cooperative grouping might be used in conjunction with critical-input experiences.

Examples

**World History Unit on Ancient World Civilizations.** At the beginning of the academic year, this high school history class is preparing to investigate a variety of early world civilizations, including Mesopotamia, Egypt, the Indus River Valley, Mali, Songhai, and Ghana. The teacher breaks students into small groups of four to five. They are asked to brainstorm the characteristics they associate with the term *civilization.* Next, they are responsible for developing a consensus-driven definition of *civilization,* which they will then present to the whole class. Their teacher then leads the class in creating an operational definition they will apply to each of the world civilizations they will explore in this unit. The next day the teacher has students read about a specific civilization. Each group discusses how their definition of a civilization matches what they have read. The class revisits their definition, refining and modifying it as they examine each civilization, its unique and universal characteristics, and its enduring legacy.

**World Language Unit on Teenage Customs.** This Level 1 Spanish class is beginning a unit on what it means to be an adolescent in Spanish-speaking countries throughout the world. The teacher knows that the unit will emphasize both this cultural dimension and some difficult verb conjugations as part of its content. To pique their curiosity, she asks students to form “travel teams” that will work together throughout the unit, including participating in an initial WebQuest investigation of adolescent customs in a country they are assigned. As a prelude to this critical-input experience, each travel group is asked to generate a “top 10 list” of the traits, behaviors, and attitudes they associate with being a teenager in the United States today. After sharing their initial list with the whole group, each travel team will compare their initial list with characteristics of adolescence in their assigned country. Throughout the unit, travel teams will meet to explore how the language elements—including verb conjugations—they are learning in the unit might contribute to their ability to communicate with Spanish-speaking adolescents in other countries.

**Elementary School Unit on the Parts of Speech.** A majority of students in this 3rd grade class continue to have difficulty understanding the distinctions among the eight parts of speech. Observing this, their teacher decides that students will benefit from processing key concepts and skills in cooperative-learning groups. She has students break into triads and assigns them two interactive tasks: (1) use your grammar books and group knowledge
to find a way to teach younger students the key elements of each of the parts of speech. For example, how can you help a 1st grader tell if something is a noun, a verb, an adjective, or an adverb? How would you teach the 1st grader the difference between a preposition and a conjunction? (2) As you conclude your first activity, we will draw out of a hat the particular part of speech your group will be responsible for presenting. In your two- to three-minute presentation, model for the class how you would teach a 1st grader your assigned part of speech. The day after students make their presentations, the teacher illustrates each part of speech. Each triad examines its presentation for accuracy in light of the teacher's presentation.

Middle School Physical Science Unit on Newton’s Laws. Students in this class are about to investigate Newton’s laws, a unit their teacher knows from experience to be challenging for early adolescents. This year he decides to use a series of small-group experiential-learning activities before presenting the abstractions of Newton’s principles. He first breaks students into pairs, with each team responsible for observing a series of demonstrations he conducts with simple machines, toy cars, and balloons. Each pair records its observations and is given time to reflect on what those observations reveal about motion, energy transfer, and how objects affect and are affected by them. At the conclusion of this observation cycle, pairs are asked to share their observations with another pair near them. During a final whole-class debriefing session, the entire group determines what they agree about concerning motion, energy transfer, and objects. As students read about the laws of motion in the textbook, each pair of students continually refines its initial understanding of these laws.

Activity Box

Which of the examples of the use of cooperative grouping presented in this section is most similar to the ways you have used grouping? Explain why. What are some ideas you have for ways you might use cooperative groups?

Presenting New Information in Small Chunks

Our working memory—where we process new information—is small and can handle only a few bits of information at one time. Too much information swamps our working memory. Therefore, students need to actively process new content in small chunks or increments based upon their readiness levels and background knowledge. In effect, the more students know about the new content they are to study, the larger the chunks can be. This is why effective teachers plan for how they will “chunk” new information for students.
Using curriculum chunking effectively requires teachers to distinguish between the declarative and procedural knowledge that may be new to students. It also requires informal but careful pre-assessment of what students know about the content. In general, the more students know, the larger the chunks can be; the less students know, the smaller the chunks should be.

Examples

**Demonstration of Ecological Interdependence (Declarative Knowledge Focus).** In this biology class, students are studying the concept of symbiosis and interdependence within ecosystems. The teacher begins his presentation by showing them a series of photographs and short DVD clips of a specific type of ecosystem found throughout the planet. He then stops his presentation and asks students to form groups of three to discuss the information presented. The focus of their discussion becomes identifying key concepts and structural components of each of the systems presented. As the teacher presents additional system descriptions, students in each triad select a letter: A, B, or C. Member A summarizes the information presented in that segment. Then students B and C add to or modify what student A has said. At the conclusion of this activity, groups share their conclusions and questions they would like answered for clarification. The entire class then brainstorms predictions about what they may encounter as they learn about the next ecosystem. They continue this process as they explore each of the major ecosystems they will investigate in the course.

**Introduction to Designing a PowerPoint Presentation (Procedural Knowledge Focus).** Students in this computer applications class are learning to create a basic PowerPoint presentation on a subject of their choice. The teacher carefully chunks her introduction of key skills and strategies students might use. The first chunk involves a demonstration with follow-up small-group debriefing and application of the range of slide formats that can be chosen and the purpose for each. The second chunk involves the creation of a slide involving a title and informative bulleted items. The final chunk models and allows students to practice their use of various visual techniques, such as the fade and fly-in strategy. Between each segment of teacher demonstration and modeling, students debrief on what they have learned, collaborate on trying out specific strategies, and discuss clarifying questions (e.g., What are the key skills and procedures you learned in this segment? How would you teach someone else to use these skills and procedures? Are there areas you would like revisited or modeled? How can you apply what you learned in this segment to the PowerPoint presentation you will be designing?). Students also make predictions about what they will learn in the next segment.

**Lesson on Editing for Subject-Verb Agreement (Declarative and Procedural Knowledge Focus).** This English teacher is committed to helping students apply what they learn in lessons on grammar and usage to their own writing and editing process. Therefore, she chunks the curriculum content so that students move incrementally from the least
complex to the most complex concepts, skills, and procedures in this mini-unit on subject-verb agreement. As students progress through the unit, she uses diagnostic and formative assessment data to differentiate instruction using flexible grouping. For students who quickly demonstrate proficiency in the declarative and procedural content of each segment, she creates independent activities, learning centers, and opportunities for students' direct application to their own compositions. For other students who require extra coaching or tutorials, she creates opportunities for them to receive the direct support. As students progress through the course, she uses peer-response group activities to help them revisit key ideas related to subject-verb agreement.

**Activity Box**

The examples in this section demonstrate two different types of chunking. The first example demonstrates how a teacher might chunk the content during a single lesson—a small piece (i.e., a chunk) of information is presented to students, which they then process in small groups. The next two examples illustrate a second approach to chunking. Here new information is organized into chunks across different lessons during a unit. It is important to note that during these lessons information would also be chunked into small digestible bites. Describe how you have used or could use each of these two approaches to chunking.

**Using Descriptions, Discussions, and Predictions to Enhance Students' Understanding of New Information**

After each small chunk of information is provided, students should work in their small groups to describe, discuss, and make predictions regarding new information. For example, assume that a physical education teacher has provided a small chunk of information regarding the proper technique for warming up before strenuous exercise. This is an example of procedural knowledge—something students will be expected to actually do. After presenting the first few steps of the technique (i.e., a small chunk), the teacher would stop and ask students to try those steps and discuss with their partners what they are clear about and what they are not clear about. After a short while the teacher would ask students to interact as an entire class. At that point the teacher would take questions from the groups to clear up confusion. The teacher would also ask students to speculate about the upcoming parts of the technique that have not yet been demonstrated or
about how the technique as understood thus far might affect performance. When students appear to have a good grasp of the content in a particular chunk, the teacher would move on to the next chunk.

An elementary language arts teacher might present students with new information about the genre of tall tales by having students watch a short videotape illustrating a few of the genre’s basic characteristics. This content is more declarative in nature. The teacher would organize students into pairs or triads. In their groups, students would be asked to review the information they had observed and identify key points. Groups would be invited to pose questions to the teacher. They would also be asked to make some predictions about other characteristics of tall tales that might be presented in upcoming chunks.

These illustrations for declarative and procedural knowledge have some common elements. One common element is that students must briefly summarize what they have heard, read, or observed. In their small groups, students simply restate the new information, making distinctions between more important versus less important information. Next, students identify and address confusing issues. They might work through these confusing elements in their groups, or they might ask the teacher questions. Finally, during this small-group discussion, the teacher might ask students to make predictions about what will be presented next. These three components—(1) summarizing, (2) clearing up confusion, and (3) predicting—are the elements that guide interactions among small groups.

Examples

*High School Swimming Lesson.* During this lesson on how to execute the butterfly stroke, the teacher first demonstrates the kicking motion that goes along with the stroke. Using float-boards for their upper body, students try the motion themselves and then meet with their pre-assigned swim partners to discuss what they understand and don’t understand. While standing in the water, pairs ask questions of the teacher. Additionally, the teacher asks questions of the students regarding the kicking technique. Next the teacher demonstrates the arm movements of the butterfly stroke. Students try the arm motion in conjunction with the kicking motion. Again they meet with their partners to discuss the stroke and then ask questions of and answer questions from the teacher. Interacting about each chunk provides students with a firm foundational understanding of the stroke.

*Elementary Social Studies.* While presenting information about families, the teacher periodically stops and asks the triads of students she has formed to interact. One student summarizes what was presented. Then each triad identifies what they are confused about and tries to clear up their confusions. Many of the triads ask the teacher questions directly. Finally, the groups speculate as to what will come next in the presentation.
Using Formal Techniques for Critical-Input Experiences

The previous illustrations depicted how summarizing, clearing up confusion, and predicting within small groups can help students process information. These three techniques can be applied in a variety of ways by teachers. Additionally, there are three formal techniques teachers might use that employ these same basic elements. The techniques are (1) reciprocal teaching, (2) jigsaw cooperative learning tasks, and (3) concept attainment.

Reciprocal Teaching

Reciprocal teaching involves having small groups of students be responsible for discussing and analyzing key sections of a text. They take turns serving as the discussion leader who raises and facilitates responses to questions such as these: What are the main ideas here? What questions do we have? Are there areas we need to clarify? What predictions can we make? Someone from the group summarizes content read during each segment of the reciprocal teaching process before transitioning to a new leader. In addition to helping students deepen their understanding of key unit knowledge, this process is an ideal strategy for enhancing students' reading comprehension and analytical reasoning skills.

Jigsaw Cooperative Learning Tasks

In this cooperative learning structure, students are assigned (or self-assigned) to a four-person group responsible for becoming experts on significant curriculum content. To achieve this goal, each person becomes an expert on a particular aspect of the assigned topic or topics. Students investigating the same aspect meet in groups to discuss their findings, conclusions, and questions. When they have finished, they return to their base groups and teach key content to their group members. We recommend that jigsaw activities include opportunities for groups to ask the teacher clarifying questions. They can also make predictions about what they will discover or learn when information from expert groups is shared with the base group.
Concept Attainment

This strategy asks students to induce an awareness and understanding of a new concept by responding to examples and nonexamples of that concept. All examples should clearly reflect the essential characteristics or attributes associated with the concept. The nonexamples should clearly demonstrate the absence of those attributes. Students should be reminded to look for patterns and connections common to all of the examples but missing in the nonexamples. When students think they have discovered the concept and its attributes, they should then provide an additional example and nonexample to confirm their understanding.

Examples

Reciprocal Teaching in an Elementary Language Arts Class. In this 4th grade classroom, the teacher is exploring ways to engage student interest in folk literature, particularly the African tradition of Anansi tales depicting a trickster spider. She begins the unit by reading students a sample Anansi tale, modeling the kinds of questions students will use when they break into reciprocal teaching teams. Her questions include these: Who is the main character? How would you describe him? What does he appear to stand for or symbolize in human nature? What do you predict will happen next? What moral or lesson does this tale seem to be teaching us? After modeling the use of this process with another Anansi tale, the teacher prepares students to replicate this questioning process in small groups. She asks them to take turns serving as group leader and facilitator as well as official summarizer. At the conclusion of the lesson, students have read and analyzed at least three new Anansi tales. The lesson concludes with students being asked to summarize what the class learned about trickster tales in the Anansi tradition.

Cooperative Learning Jigsaw in a Middle School Consumer Science Class. Students in this middle school class are learning about the quilting process, including its history, its cultural roots, and techniques for sewing and stitching a quilt. Their teacher uses cooperative learning groups and jigsaw structures to enhance student engagement and understanding. Students form groups of four by drawing numbers from a bag. Their initial configuration is their base group. Throughout the unit, students leave their base group and move toward expert groups responsible for learning about and then teaching base group members key content. During one segment, expert groups become knowledgeable about a particular quilting tradition and its historical origins. Another expert group segment allows different groups to develop expertise in a particular sewing technique. At the conclusion of every expert group investigation, members return to their base groups and teach the other members what they have learned.

Concept Attainment in a High School World Geography Class. As students in this classroom explore different world regions, their teacher makes a concerted effort to help them understand cultural traditions and nuances. When introducing students to a major world
religion, for example, she uses concept attainment strategies, asking students to discover patterns in examples reflecting the specific religion (e.g., icons, spiritual concepts, architecture, and statements of belief) and contrasting nonexamples. When a particular unit requires students to understand and apply a key concept or idea from physical geography, the teacher uses visual examples and nonexamples related to the concept (e.g., isthmus, biome, and peninsula). Through this process, students reinforce their understanding and insight into the main ideas of the course. At key juncture points, the students are encouraged to create concept attainment activities to share with the rest of the class. This strategy proves especially useful when students are reviewing material and preparing for summative assessments such as end-of-unit tests.

Activity Box

Which of the three formal strategies described in this section—reciprocal teaching, jigsaw, and concept attainment—have you used in the past? Describe how you have used it. Also, describe how you might employ one or more of the strategies you haven't used before.

Checking for Understanding

Use the following rating scale to assess your current understanding and comfort level regarding key strategies and processes presented in this module:

4 = I understand and already fully implement this strategy in my classroom.
3 = I understand this strategy, but I need to practice using it in my classroom.
2 = I can explain this strategy, but I am not fully confident that I can use it.
1 = I do not understand this strategy, and I do not currently use it in my classroom.

1. Using grouping to enhance students' active processing of information

   Based on my rating, I may need to revisit the following:
2. Presenting new information in small chunks
   Based on my rating, I may need to revisit the following:

3. Using descriptions, discussions, and predictions to enhance students’ understanding of new information
   Based on my rating, I may need to revisit the following:

4. Using the formal techniques of reciprocal teaching, jigsaw, and concept attainment
   Based on my rating, I may need to revisit the following: