This chapter introduces the Structure of Process—the complement to the Structure of Knowledge. The Structure of Process shows the relationship of Processes, Strategies, and Skills to Concepts, Generalizations, and Principles in process-driven disciplines like English language arts, the visual and performing arts, and world languages. These subject areas apply their conceptual understandings, strategies, and skills to content offered by the Structure of Knowledge, but the disciplinary work is grounded in the Structure of Process.

THE STRUCTURE OF PROCESS

The United States Common Core State Standards, as well as the imperative to teach for deep understanding, make turning a spotlight on the Structure of Process very timely (see Figure 4.1). Much like Erickson’s visual that depicts how knowledge is structured, the Structure of Process illustrates the inherent relationship among components of processes, concepts, generalizations, and principles.

As described in the book Designing a Concept-Based Curriculum in English Language Arts: Meeting the Common Core with Intellectual Integrity K–12 (Lanning, 2013), at the level of concepts in the Structure of Process, we move from “doing” to “understanding” why we do what we do. Concepts are not the act of “doing”—for example, utilizing a process, strategy, or skill—although concepts need to be drawn out of each of these operations to support understanding. For purposes of explaining the Structure of Process, consider...
processes, strategies, and skills as the tools to help students engage with and explore the content under study.

Each component of the Structure of Process is defined below and followed by an example:

1. The bottom of the structure—the lowest level in the Structure of Process—includes process, strategies, and skills. All three are included in this component, with process being the broadest and most complex, then strategies, and finally skills. Because concepts in process-driven disciplines can be drawn from each, these actions are clustered together in the illustration.

Consider processes, strategies, and skills as the tools to help students engage with and explore the content under study.
• **Skills.** Skills are the smaller operations or actions that are embedded in strategies and, when appropriately applied, “allow” the strategies to work. Skills underpin a more complex strategy (Lanning, 2009). Further explanation follows.

• **Strategies.** A strategy may be thought of as a systematic plan learners consciously [metacognitively] adapt and monitor to improve their learning performance (Harris & Hodges, 1995). Strategies are complex because many skills are situated within a strategy. In order to effectively employ a strategy, one must have control over a variety of the skills that support the strategy for a particular text, be fluent and flexible in the utilization of these skills, and appropriately integrate other relevant skills and strategies. For example, using background knowledge, making predictions, and drawing conclusions are some skills situated within the strategy *Inferring*. In order to effectively employ the strategy *Inferring*, a learner must be fluent and flexible in the utilization of the relevant supporting skills (Lanning, 2009).

• **Process.** Processes are actions that produce results. A process is continuous and moves through stages during which inputs (materials, information, people’s advice, time, etc.) may transform or change the way a process flows. A process defines what is to be done—for example, the writing process, the reading process, the digestive process, the respiratory process, and so on. These processes are continuous and stop only when an intervention takes place. The quality of the result may be dependent on inputs (as mentioned above). During various stages of a process, inputs may transform the way the process is unfolding, and the result may emerge with different characteristics than originally perceived (Lanning, 2009). A process then is complex and abstract, and the quality of the end result depends on the utilization of the appropriate strategies and skills nested within the process.

2. Moving up to the next level in the Structure of Process are **concepts**, represented in one or two words (nouns) or a short phrase. They characterize the mental constructs or ideas drawn from the content (topics), and from the complex processes, strategies, and skills that are under study. Concepts are used to write statements of understanding (generalizations) that we want students to realize by the end of the unit. Consistent with how concepts were previously defined in the Structure of Knowledge, concepts are timeless; they provide lessons through the ages that grow in sophistication. Because they are universal, the representative examples may be derived from any culture.
3. Finally, we reach the triangle:

- **Principle.** A principle is defined as a fundamental rule or truth. In a process-driven subject like English language arts, some consider the prescriptive rules of language grammar or usage as principles. There are also principles of design in art, principles of composition in music, and so forth.

- **Generalization.** Chapter 3 defined generalizations as statements that are summaries of thought. They answer the relevancy question, "What will I understand as a result of my study?" Again, generalizations are defined formally as two or more concepts stated in a relationship. The distinction between a principle and a generalization is that, occasionally, generalizations may need a qualifier added to the statement if the idea is important to the subject of study, but is not verifiable across all situations. To avoid confusion, only the term *generalization* will be used in a concept-based curriculum; there is no need to worry about whether or not a statement of understanding represents a principle or a generalization because that is not the point. The point is to identify the important, transferable understandings we want students to reach by the end of the unit of study.

- **Theory.** There are theories, as defined in Chapter 3, related to language, art and music, so theory has been added to the Structure of Process. Again, the emphasis in concept-based curriculum and instruction is on teaching to *understanding*; in other words, concepts and generalizations. Doing so significantly raises the bar for student learning!

You can see that the terms *concepts, generalizations/principles* and *theory* are included in both the Structure of Knowledge and in the Structure of Process. These three terms are defined the same way in both structures and represent the same relationships.

Now, let's look at some examples of how a generalization would be crafted in various process-driven disciplines using the Structure of Process. In Figure 4.2, a sample curriculum unit title is listed for various process disciplines. Examples of the processes, strategies, or skills students would be expected to be able to do by the end of the unit are listed in the second column. Notice that for English language arts, these expectations (standards) come directly from the Common Core State Standards. In the next column, as represented on the Structure of Process (Figure 4.1), concepts are drawn from the processes or pulled from the important ideas within the
## Figure 4.2 Process Discipline Generalizations

<table>
<thead>
<tr>
<th>Subject Area/Unit Title</th>
<th>Processes (Strategies/Skills)</th>
<th>Concepts</th>
<th>Generalization</th>
</tr>
</thead>
</table>
| **English Language Arts:** Stories Told Again and Again | - CCSS.ELA-Literacy.RL.K.9: With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories.  
- CCSS.ELA-Literacy.RL.K.2: With prompting and support, retell familiar stories, including key details. | Familiar stories, narrative elements, characters, key ideas, sequence | People retell familiar stories through the characters’ adventures, setting, problems encountered, and the solution. |
| **World Language/Level 1 Spanish:** Traditions of Mealtime | - Use food vocabulary  
- Express opinion and comment on foods  
- Use Affirmative informal commands to make requests  
- Use affirmative inf. commands with DOP  
- Use Stem verbs: Pedir/probar/preferir/poder | Taste/flavors, traditions, instructions | The foods people eat reflect traditions and heritage. |
| **Music:** Folksongs | - Hear and extract (identify) musical concepts from musical material  
- Hear and write rhythms in patterns or folksongs | Beat, rhythmic note values, mood, interpretation, organization of musical elements, composition, improvisation | Hearing rhythmic or melodic patterns establishes a model for composition. |
| **Art:** Visual Literacy | - Use different media, techniques, and processes to communicate ideas, experiences, and stories  
- Describe how different materials, techniques, and processes cause different responses | Warm, cool, tint, shade, complementary, primary, secondary, tertiary, communication, technology | Distinctive colors and combinations attract attention, communicate emotions, and make a visual more memorable. |
content under study in the unit (see Figure 4.2). The last column shows a sample generalization crafted from the identified concepts.

Generalizations represent the important understandings students will realize by the end of the unit of study. A typical curriculum unit will have five to eight generalizations depending on the grade level and length of the unit. In a process-based discipline unit (art, music, world language, English), most of the generalizations will represent important understandings about processes, though there may also be a few generalizations addressing the content under study.

HOW THE STRUCTURE OF PROCESS GUIDES CURRICULUM AND INSTRUCTION

The Structure of Knowledge and the Structure of Process show the conceptual system that organizes disciplines dominated by content (knowledge) or processes or the intersection of both. What has been omitted from past curriculum landscapes, especially in disciplines that are process-based, has been awareness that important, transferable concepts are embedded within complex processes. Students have been expected to apply reading and writing strategies to content (summarize text, write a strong lead, etc.) without an understanding of why the strategies are important and how instrumental they are to the reading and writing process. As a result, learning is situational, skill-based, and more difficult for students to remember and transfer. The Structure of Process illustrates that ideas are as essential to understanding processes as they are to understanding knowledge.

Rather than assume the important transferable understandings (generalizations) of a curriculum unit will be figured out by individual teachers, a concept-based curriculum identifies for teachers those generalizations that will become the focus of district or school-wide, grade-level instruction. Because our goal is to develop students’ thinking that leads to deep, transferable understanding, instruction is designed with an inquiry approach; by using examples and asking both specific and open-ended questions, the teacher guides the students to the realization of the unit generalizations. This will be discussed in more depth in Chapter 5.

Finally, no matter what the discipline is, we need to consider both knowledge and processes when designing concept-based curricula, but
the learning task often places a greater emphasis on one. Consider teaching a child how to ride a bike. Yes, there are rules of the road, the names of bike parts, and signals that need to be learned (knowledge), but initially the strategies and skills of riding are at the heart of becoming a bike rider. Children develop the basic skills of bike riding (balancing, starting, stopping, cornering) with practice, but in order to go on to become more skillful riders, they must develop an understanding of the concepts from both the process of riding and knowledge of the bike and riding environment (distance, endurance, speed, wind velocity, rules of the road vs. mountain biking, etc.). Expert riders or competitors go beyond an understanding of the individual concepts to an understanding of the relationships among the concepts (generalizations), which can transfer to other forms of riding (motorcycles, unicycles, skateboards). Do you see the horizontal and vertical synthesis of critical concepts drawn from Knowledge and Processes occurring as expertise grows?

Now let’s consider teaching a child about his or her government. The content knowledge to include in the curriculum unit will be defined and will become the focus of instruction. Yes, there will be some processes and skills included in the study (reading, writing, presenting, etc.), however, the skills will be used to leverage the learning of the content and do not determine what the content will be. Once the child develops a conceptual understanding of the important ideas within the content, she will be able to transfer this learning to governments in other places of the world and draw parallels and contrasts. Again, skills will be learned along the way, but may not rise to the level of deep understanding, because in this case, content knowledge is driving the instruction.

Knowledge is distinct from process, but, as previously discussed, there is interplay between the two. The challenge is to find the right balance in instruction and in the assessment of students’ learning. If instruction and assessment become overly skewed to knowledge versus process (or the inverse), understanding often remains at a surface level. There are critical junctures in the development of expertise where understanding concepts in content and understanding concepts of process come together. We need to reconsider only teaching for deep understanding of concepts in content (e.g., in math, literature, social studies) and just “doing” skills. We cannot just assume that students will develop an understanding of the “what” and an understanding of the “how.” In other words, teachers need to make deliberate decisions about when conceptual understanding of a process needs to be realized to fully understand the content. Purposefully designing instruction so the two are periodically brought together and assessed as a synthesis of the important conceptual understandings of both (knowledge and process) will develop learners who are prepared for the complexities of the 21st century.
DISCUSSION QUESTIONS

1. How does an understanding of the relationships among the components of the Structure of Process deepen your understanding of how people learn a complex process?

2. How does a concept-based curriculum design support what we know about how people learn?

3. What are the distinctions among Processes, Strategies, and Skills? When is it important to know the distinctions?

4. What are the potential consequences of using only the Structure of Knowledge as a model for designing curriculum in a process-driven discipline?

SUMMARY

The Structure of Process depicts the hierarchical relationships of processes building to generalizations (transferable understandings). When we apply our understanding of this structure to process-driven curriculum and instruction, we move students’ learning of complex processes beyond routine competencies to transferable understandings of the critical concepts embedded in the process. Using concepts and generalizations to guide instruction results in better retention of learning, and gives relevance to those important processes, strategies, and skills of the discipline being studied.

The Structure of Process served as the architecture for the curriculum units in Resources C, D, and E. See if you can explain the relationship between the Structure of Process and the curriculum as you review the unit webs and generalizations. Models of elementary, middle school, and high school units for another process-based discipline, English language arts, may be found in the book *Designing a Concept-Based Curriculum for English Language Arts: Meeting the Common Core With Intellectual Integrity, K–12* (Lanning, 2013).

Next, Chapter 5 explores how one develops as a concept-based teacher. The journey is multifaceted and requires patience and persistence; however, time and again teachers tell us it is one of the most professionally rewarding learning experiences they have ever had.