

How LEARNING WORKS

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HOW LEARNING WORKS

a playbook

CORWIN
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Visit the companion website at
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for resources.



Note From the Publisher: The authors have provided video and web content throughout the book that is available to you through QR (quick response) codes. To read a QR code, you must have a smartphone or tablet with a camera. We recommend that you download a QR code reader app that is made specifically for your phone or tablet brand.

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Introduction

This playbook is about how learning works—not by chance, but by design. How do students learn and how can we leverage this knowledge into great learning, through the design of our classrooms, learning experiences, and tasks? We want our students to effectively learn the content, skills, and understandings associated with the specific subject area of focus. From inferences in English language arts, deforestation in environmental science, perspective in art, or spatial awareness in physical education, the range of topics and ideas is as diverse as the students in our classrooms. In addition, the content, skills, and understandings associated with each content area are not isolated from social, emotional, affective, and language learning. The characterization of learning as “reading, writing, and arithmetic” does not even come close to conceptualizing the highly complex, multidimensional, highly coveted outcome we strive for in our classrooms: flexible, durable, and usable learning.

Consider the dynamic first-grade classroom of Rebecca Anderson, where her students are learning about equivalence. Here is how she has clarified and articulated the day’s learning.

LEARNING INTENTION

Today I am learning about things that are equal.

For example, $17 - 5 = 16 - 4$

Today I am also learning the importance of explaining my mathematics thinking to my classmates.

SUCCESS CRITERIA

I will know I have learned it when

- I can describe what it means to be “equal” in mathematics.
- I can determine if two number sentences are equal.
- I can explain my thinking using different models.

In addition to what is *explicitly* shared through her learning intentions and success criteria, use the space on the next page to develop a list of what additional learning Ms. Anderson’s students are expected to know, understand, and be able to do. We will get you started with an example.

1. Different models for showing equivalence
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Ms. Anderson clearly articulates what her students are expected to know, understand, and be able to do in the learning intentions and success criteria. But her students are learning more than that. There are aspects of this learning experience not explicitly stated by Ms. Anderson. For example, students must learn what language is involved in a mathematical explanation, how to structure a mathematical explanation, the different models for explaining their thinking, as well as the social, emotional, and affective aspects of persisting in problem solving and interacting with their peers. In other words, the learning expectations of Ms. Anderson are far more complex and have greater depth and breadth than merely determining whether $17 - 5$ is or is not equal to $16 - 4$. And this is as it should be. The underlying point of this example is that learning is complex and multidimensional, and therefore the learning experiences should be designed as such and not left to chance. Let's look at another example.

Betty Dixon is using *The Giver* by Lois Lowry as the anchor text for the following standards (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010):

1. **CCSS.ELA-Literacy.RL.8.2.** Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.
2. **CCSS.ELA-Literacy.RL.8.3.** Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.
3. **CCSS.ELA-Literacy.RL.8.4.** Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

4. **CCSS.ELA.W.8.3b.** Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. (© Copyright 2010 National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.)

In this particular example, our focus is not necessarily on the explicit or implied learning intentions and success criteria, but on the transfer of learning. Ms. Dixon wants her students to learn about theme as well as the ways in which dialogue and character actions propel the plot forward, figurative and connotative meanings of words and phrases, and narrative techniques used by the author. She wants her learners to transfer this learning to other texts and incorporate these literacy skills into their own independent reading. Again, this is complex, multidimensional, and requires the careful design of learning experiences that result in both the learning of these ideas and the transfer of this learning to new contexts.

These two scenarios capture exactly what we set out to do in this playbook. Knowing how learning works can help us design experiences that amplify our students' learning outcomes. In other words, how do students learn, and how does the answer to this question impact the decisions Ms. Anderson and Ms. Dixon make in designing the learning experiences for their students? Furthermore, how can an understanding of their own learning benefit our students as they progress toward independent learners?

THE PURPOSE OF THIS LEARNING PLAYBOOK

The purpose of this playbook is to take a closer look at how our students learn so that we can better design learning experiences that align with how learning works. This playbook will engage us in unpacking *the science of how we learn* and design learning experiences that *translate* the science of how we learn into *promising principles and practices*. This includes *implementing* instructional approaches and strategies that promote learning and, at the same time, *monitoring* our impact on student learning through generating and gathering evidence of that learning. Richard Mayer asserts that “if you want to help people learn, it would be useful for you to know something about how learning works” (2011, p. vii). The modules of this playbook will focus on expanding your understanding of how students learn and how to better utilize these ideas in the classroom through a process that places the teacher at the center of this work (see Figure 1.1).

However, you likely noticed that the final component of great learning by design is strategy instruction. In this playbook, we will also explore how to better engage students in understanding how they learn and the tools that foster, nurture, and sustain their own learning. We want students to take an active role in their learning, selecting the most effective tools to move their own learning forward.



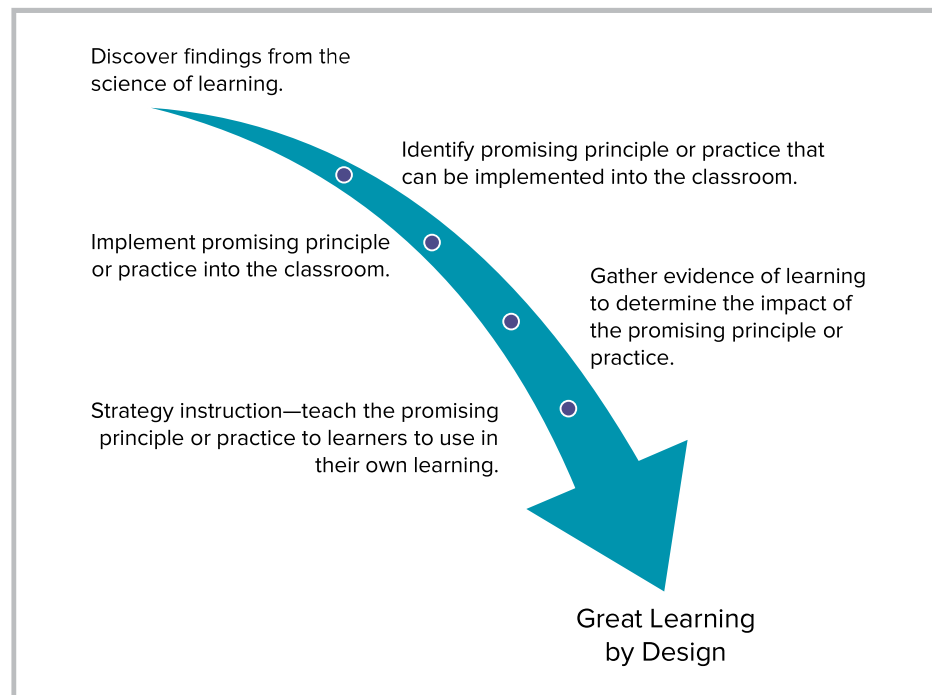
For a video introducing the purpose of the playbook, visit the companion website at resources.corwin.com/howlearningworks.

To read a QR code, you must have a smartphone or tablet with a camera. We recommend that you download a QR code reader app that is made specifically for your phone or tablet brand.

THE LEARNING PLAN WITH THE MODULES

This is a playbook and, by definition, contains a collection of tactics and methods used by a team to accomplish a common goal and get things done (Merriam-Webster, 2021d).

I.1 GREAT LEARNING BY DESIGN



In the case of this playbook, the common goal is the translation of findings from the science of how we learn into promising principles or practices that can be implemented in classrooms and that students can utilize in their own learning journey. Therefore, each of the subsequent modules is designed to support your learning about this process. Just like the previous playbooks, the modules that follow this introduction are not necessarily intended to be completed in sequential order or all at once. When coaches and their teams go to their playbooks to get things done, they select the plays that best fit the current context or situation. For example, whether a football club (i.e., soccer team) uses an overlap, wall pass, spreads the ball wide, or has the winger whip in the cross depends on the current situation unfolding on the soccer field. The situation on a soccer field is fluid, as well as complex and multidimensional. Those last two descriptors should sound familiar—that is how we described the learning in Ms. Anderson’s, Ms. Dixon’s, and your classroom. The modules in this playbook should be utilized by your team when the current context or situation calls for the module. So, what’s the plan?

This playbook is divided into four parts (see Figure I.2). The first part will unpack the science of learning by first developing a description of what is meant by learning in your classroom, the different ways of thinking about learning, barriers to learning, and discovering the major findings from the science of learning. What does it mean to learn something in your classroom? The science of learning offers promising principles or practices that *may* work in our classrooms. However, we must make *adaptations* to these principles or practices that reflect the *local context of the classroom* and then *generate evidence* that allows both us and our learners to determine if learning has occurred. Therefore, we must devote time to discover and develop a definition of what learning looks like in our individual classrooms, within the context of their content area

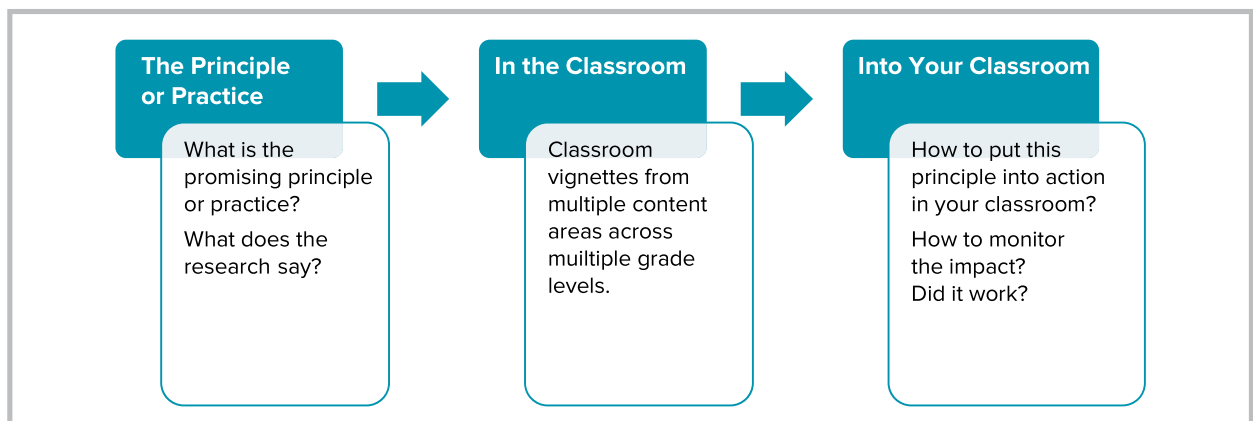
I.2 HOW LEARNING WORKS PLAYBOOK OVERVIEW

Section	Focus
Part I	
Module 1	What does learning look like in your classroom?
Module 2	What are different ways to think about learning?
Module 3	What are the barriers to learning?
Module 4	How do students learn?
Part II	
Modules 5–11	What are promising principles and practices?
Part III	
Modules 12–18	How do we translate promising principles and practices into learning strategies?
Part IV	
Module 19	How do we generate and gather evidence of impact?

and grade level. From there we will engage in a process for evaluating whether a specific finding from the science of learning is a promising principle or practice.

The second part of this playbook takes an up-close look at specific promising principles and practices from the science of learning. However, these modules will offer more than just an overview of the principle and examples. Instead, the emphasis in these modules will be on how to adapt the promising principles or practices/interventions based on the local context of individual classrooms (see Figure I.3).

I.3 IMPLEMENTING PROMISING PRINCIPLES AND PRACTICES



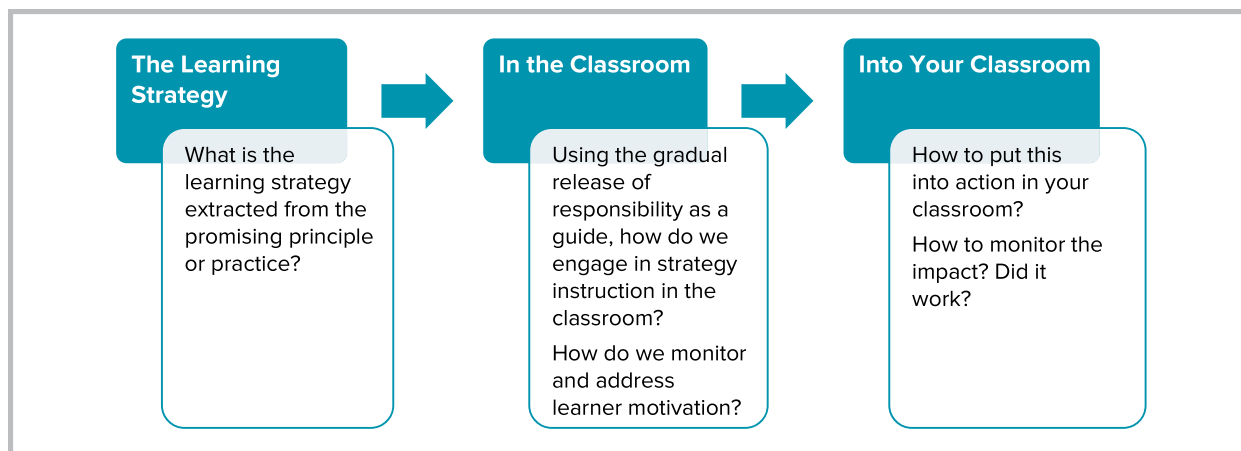
Then, we turn our attention to building the capacity in our students to take ownership of their own learning. Student learning strategies have the potential to considerably accelerate learning (Visible Learning Meta^x, 2021). This is the focus of Part III of this playbook. Summarizing, spaced practice, interleaved practice, elaborate interrogation, and transfer strategies are examples of tools that, when implemented effectively by students, move their learning forward.



For more resources related to learning strategies, visit the companion website at resources.corwin.com/howlearningworks.

Each module in this section will use the gradual release of responsibility to engage in strategy instruction with the learners in your classroom. As with the previous modules, there will be an emphasis on adapting the specific implementation of the learning strategy based on the local context of your individual classroom—using the learning strategies to overcome the barriers to learning (see Figure I.4).

I.4 LEARNING STRATEGY INSTRUCTION FROM PROMISING PRINCIPLES AND PRACTICES



For a video on the significance of explicitly teaching students learning strategies, visit the companion website at resources.corwin.com/howlearningworks.

Learning strategy instruction will build the capacity and efficacy of students as they move beyond the specific learning experiences and outside of our classrooms. We want our students to take ownership of their learning and know what to do to move their learning forward when we are no longer their teacher. These modules support learners in

- ➔ Selecting the best learning tools to move their learning forward
- ➔ Seeking feedback about their learning
- ➔ Monitoring their own learning progress
- ➔ Making adjustments to their learning when necessary (Frey et al., 2018)

The final part of this playbook focuses on generating and gathering evidence of impact. Did the promising principles and practices result in student learning? The first aspect of evaluation is engaging in evaluative thinking and focusing on the need to generate evidence of learning. These final modules emphasize that we should see ourselves

as evidence-generators that verify learning and challenge learners, not hold judgment over learning. The tasks within this module will lead to the development checks for understanding and provide opportunities for learners to respond, thus generating evidence of learning. This requires that we bring the learner directly into the conversation about their own learning. Using the evidence generated, how do we reframe the conversation away from grades (i.e., holding judgment over them and their learning) toward self-reflecting, self-monitoring, and self-evaluating their learning (e.g., one-on-one conferencing, error analysis, student-led conferences, goal setting, progress monitoring). The role of the teacher, then, is engaging in reciprocal and effective feedback that focuses on both the giving and receiving of information about learning.



For a video on the importance of evaluating the impact of this work, visit the companion website at resources.corwin.com/howlearningworks.

LEARNING WITHIN THE MODULES



Each of the modules has a specific focus, an explanation of the ideas within the module to establish purpose (a learning intention). The module then continues by linking the purpose of the module with specific findings from the science of learning. QR codes and the companion website provide resources that support the process of translating findings from the science of learning into classroom practice. In many instances, these are seminal works in the science of how we learn or the translation of the science into classroom practice. Don't be alarmed if you see a citation from the 1970s. That just means that particular study is either the first study to report a particular finding or is the "gold standard" for all subsequent work in this area. Examples of translation will cover primary, elementary, middle school, and high school content, skills, practices, dispositions, and understandings. From learning place value to writing an argumentative essay, we seek to provide a wide range of examples to show how the principles and practices potentially translate into our classrooms.

COLLABORATING FOR GREAT LEARNING



Each module offers you an opportunity for practice and application with a variety of grade levels and content areas. The practice section encourages you to write your answers and discuss them with your colleagues, if possible. Although using this book as part of your personal learning is possible, the translation and implementation of promising principles and practices are best done collectively with colleagues. We offer three suggestions for collaboratively using this playbook: an accountability partner, an instructional coach, or during your common planning or PLC+ meeting (see Fisher et al., 2020).

Let's start with accountability partners. The use of this playbook during common planning or your PLC+ meeting may not be feasible. You may be more comfortable partnering with a colleague across the hall, in another part of the building, or in another school.

You and this colleague can move through the modules, engage in the tasks, adapt the promising principles or practices/interventions based on the local context of each of your individual classrooms, and evaluate your impact. You and this colleague will serve as accountability partners in increasing your understanding of how learning works and leveraging your new learning in the design of your classrooms, learning experiences, and tasks.

A second way to collaboratively work with this playbook is alongside an instructional coach. Instructional coaches provide all of us with an outside perspective on the teaching and learning in our classrooms. They can provide us with the right feedback at the right time. Sitting down with an instructional coach, engaging in critical dialogue about how learning works, designing experiences and tasks, and then working together to evaluate the impact on student learning is an invaluable asset to our own professional growth.

Finally, this playbook can drive conversations during your PLC+ meeting (Fisher et al., 2020). We believe that the work of this playbook is another tool for the work you do in your PLC+. The use of these five guiding questions of PLC+ will keep the focus relentlessly on the learning of our students:



For a video on collaborating with the playbook, visit the companion website at resources.corwin.com/howlearningworks.

- ➔ Where are we going?
- ➔ Where are we now?
- ➔ How do we move learning forward?
- ➔ What did we learn today?
- ➔ Who benefited and who did not benefit? (Fisher et al., 2020, p. 8)

In PLC+, teachers identify learning intentions and discuss ideas for instruction. They meet to review student work and figure out if their efforts have been fruitful. They also talk about students who need additional instruction or support for success (Figure I.5). To revisit the earlier quote from Richard Mayer, “If you want to help people learn, it would be useful for you to know something about how learning works” (Mayer, 2011, p. vii). This is best done together, during our work as a community of learners.

Whether you have an accountability partner, access to an instructional coach, or a high-functioning, high-impact PLC+, the benefit of a collaborative approach is the opportunity to engage in critical dialogue around what learning looks like for you and your learners.

So, without any further delay, let’s unpack how students learn!

1.5 HOW HOW LEARNING WORKS SUPPORTS THE WORK OF PLC+

PLC Question	<i>How Learning Works</i> Module
Where are we going?	Module 1. What Does Learning Look Like in Your Classroom? Module 2. What Are Different Ways to Think About Learning?
Where are we now?	Module 3. What Are the Barriers to Learning? Module 4. How Do Students Learn?
How do we move learning forward?	Module 5. Promising Principle 1: Motivation Module 6. Promising Principle 2: Attention Module 7. Promising Principle 3: Elaborate Encoding Module 8. Promising Principle 4: Retrieval and Practice Module 9. Promising Principle 5: Cognitive Load Module 10. Promising Principle 6: Productive Struggle Module 11. Promising Principle 7: Feedback
What did we learn today?	Module 12. Explicit Strategy Instruction Module 13. Learning Strategy 1: Goal Setting Module 14. Learning Strategy 2: Integrating Prior Knowledge Module 15. Learning Strategy 3: Summarizing Module 16. Learning Strategy 4: Mapping Module 17. Learning Strategy 5: Self-Testing Module 18. Learning Strategy 6: Elaborative Interrogation
Who benefited and who did not benefit?	Module 19. Generating and Gathering Evidence



In this section:

- Module 1. What Does Learning Look Like in Your Classroom?
- Module 2. What Are Different Ways to Think About Learning?
- Module 3. What Are the Barriers to Learning?
- Module 4. How Do Students Learn?

1

WHAT DOES LEARNING LOOK LIKE IN YOUR CLASSROOM?

LEARNING INTENTION

We are learning about the characteristics of learning in my classroom.

SUCCESS CRITERIA

I will know we have successfully completed this module when

- I can describe the different aspects of learning in my classroom.
- I can describe what learning is in my classroom.

The first sentence of this playbook used two very important words that need further exploring before we move forward in answering the essential question of this module. Write those two words below in the blanks provided.

not by _____, but by _____

We enjoy etymology, the study of words. While that may not be a particularly enjoyable pastime for you, looking into the words *chance* and *design* can provide valuable insight and a sense of purpose for our work in this playbook. For example, the word *chance* has five different definitions in Merriam-Webster's Dictionary (2021a):

1. Something that happens unpredictably without discernible human intention or observable cause
2. A situation favoring some purpose (e.g., needed a chance to relax)
3. A fielding opportunity in baseball
4. The possibility of a particular outcome in an uncertain situation
5. Risk or a raffle ticket

Notice that each of these definitions is associated with a lack of control or predictability in the outcome. Even in the baseball example, the only example that seems not to fit into our conversation depends solely on whether the batter hits the ball in your direction. Hold on to these five definitions as we contrast them with the definitions of the word *design* (Merriam-Webster, 2021b).

1. To create, fashion, execute, or construct according to plan
2. To conceive and plan out in the mind, to have as a purpose, to devise for a specific function
3. *Archaic*: To indicate with a distinctive mark, sign, or name
4. To make a drawing, pattern, or sketch of, to draw the plans

For the word *design*, each of the four definitions implies a significant level of purpose, intentionality, and deliberation. This contrast in perspectives on learning cannot be overstated, especially when we are talking about the young learners in our schools and classrooms. Whether we are talking about equivalence in Ms. Anderson's first-grade classroom or transferable literacy skills in Ms. Dixon's English Language Arts block, the learning in both of these situations cannot be left to chance.

Using the space provided below, take a moment and reflect on the learning in your classroom. What aspect of your students' learning is left to chance? What aspects of your students' learning are by design? Yes, this task can be very challenging and put us in a vulnerable position. Do not feel compelled to share your thinking with your colleagues, but please take time to reflect on these questions. This reflection is an important part of our work in this playbook.

**What Learning in Your Classroom
Is Left to Chance?**

**What Learning in Your Classroom
Occurs by Design?**

Please mark the previous page, as we will return to this reflection as we move into subsequent modules.



For more resources related to learning by chance, visit the companion website at resources.corwin.com/howlearningworks.

Throughout the next several modules, we aim to move those examples of learning by chance and transition them to learning by design. The first step in this transition is to discover and develop a definition of what learning looks like in your classroom. This definition will serve as the plan, drawing, or sketch (Merriam-Webster, 2021b) necessary to design.

A DEFINITION OF LEARNING

If you surveyed 100 individuals and asked them what is meant by learning, you would likely get 100 different answers. However, those 100 answers are likely variations of beliefs about learning that could be organized into broader categories: behaviorism, cognitive learning theory, and constructivism (Schunk, 2019). For example, some believe that individuals learn through behavioral modification (see Figure 1.1).

1.1 SUMMARY OF THREE MAJOR LEARNING THEORIES

	Learning is . . .	The learner . . .
Behaviorism	. . . changing the probability that a specific behavioral outcome will occur by reinforcing or shaping behavior with a stimulus and response.	. . . is passive and the learning comes solely from the teacher as the source. In other words, they are an empty vessel that must be filled.
Cognitive	. . . knowledge stored in the cognitive architecture of the learner—memory—through processing, organizing, and synthesizing learning.	. . . is actively processing, organizing, and synthesizing learning, but the learning is considered independent of the learner.
Constructivism	. . . based on experiences and the construction of a personal interpretation of the world based on these experiences and interactions.	. . . is an active participant, constructing their own knowledge through collaboration, problem solving, and scaffolding.

Source: Adapted from Schunk (2019).

Those who approach learning from a **behavioral perspective** might describe learning as linking some stimulus, a specific type of mathematics problem, to a specific response, the algorithm for solving that problem. Likewise, a specific request to line up for lunch results in specific behaviors that have been reinforced over time.

If you take a **cognitive perspective**, you might respond that learning is the encoding and storing of information in memory. Through problem solving, deep processing, exploring, organizing, and synthesizing information, learners engage in active reading and use text features to make meaning of their reading. And if you are a **constructivist**, you might describe learning as the result of your students building their own personal interpretation of the world based on their experiences and interaction. In other words, learners construct their understanding of polygons in geometry, horizon lines and perspective in art, and spatial awareness in physical education through their active experiences.

Take a moment and develop your own definition of learning. What is meant by learning? Jot down your ideas and/or the ideas of your colleagues in the space below.

If the previous task was challenging for you and your colleagues, you are not alone. You and your colleagues likely found it difficult to articulate learning as solely behavioral, cognitive, or constructive. Thinking through our school day, there are clear examples where stimulus-response learning was utilized and effective. We all have examples when cognitive processing was the focus and your students successfully organized and synthesized knowledge. Finally, you can think of times where your students were provided opportunities to construct personal meaning from these opportunities.

As teachers, devoting large amounts of time to unpacking and applying theories of learning is not only unhelpful but also does not reflect the complex and multidimensional nature of the learning in our classrooms. Learning is not behavioral, cognitive, or constructive. It's all three of these things, and more. Return to the introduction of this playbook and review the list you generated around the learning in Ms. Anderson's classroom. Learning is highly contextualized, meaning that the "where" of the learning and "who" is involved in that learning matters. Developing a universal view of learning is not going to result in great learning by design. Instead, we should develop a definition of what learning looks like in our own classrooms, for our learners. Using the template on the next page, gather evidence of how your own students feel about learning and themselves as a learner. This will be additional information that will allow us to see "who" is learning in our classroom and contextualize our definition of learning in the classroom. By the way, you can give this survey multiple times throughout the semester or year to see if your students change how they feel and what they think about learning.



For a Learning Survey Template, visit the companion website at resources.corwin.com/howlearningworks.

CONCEPTIONS OF LEARNING SURVEY

Directions: This survey is to gather information about how you see yourself as a learner and what you think about learning. Use the scales to mark what best represents your response to each statement.

I think . . .

<p>1. Learning is when I am taught something I did not know before.</p>	
<p>2. Learning is taking in as many facts as possible.</p>	
<p>3. When someone gives me new information, I feel like I am learning.</p>	
<p>4. Learning helps me understand and apply ideas.</p>	
<p>5. Learning means I can talk about something in different ways.</p>	
<p>6. When something stays in my head, I know I have really learned it.</p>	
<p>7. If I have learned something, it means that I can remember that information whenever I want to or need it.</p>	
<p>8. I should be able to remember what I have learned at a later date.</p>	
<p>9. I have really learned something when I can remember it at a later date.</p>	
<p>10. When I have learned something, I know how to use it in other situations.</p>	
<p>11. If I know something well, I can use the information if the need arises.</p>	
<p>12. Learning is making sense out of new information and ways of doing things.</p>	
<p>13. I know I have learned something when I can explain it to someone else.</p>	
<p>14. Learning is finding out what things really mean.</p>	
<p>15. Learning is difficult but important.</p>	

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(Continued)

<p>16. Even when something I am learning is difficult, I must concentrate and keep trying.</p>	
<p>17. Learning and studying must be done whether I like it or not.</p>	
<p>18. Learning has helped me widen my views about life.</p>	
<p>19. Learning changes my way of thinking.</p>	
<p>20. By learning, I look at life in new ways.</p>	
<p>21. Learning means I have found new ways to look at things.</p>	
<p>22. Increased knowledge helps me become a better person.</p>	
<p>23. I use learning to develop myself as a person.</p>	
<p>24. When I learn, I think I can change as a person.</p>	
<p>25. Learning is necessary to help me improve as a person.</p>	
<p>26. I don't think I will ever stop learning.</p>	
<p>27. I learn a lot from talking to other people.</p>	
<p>28. Learning is gaining knowledge through daily experiences.</p>	
<p>29. Learning is knowing how to get along with different kinds of people.</p>	
<p>30. Learning is not only studying at school but also knowing how to be considerate of others.</p>	
<p>31. Learning is the development of common sense in order to become a better member of society.</p>	
<p>32. Learning is developing good relationships.</p>	

So, let's try this again. Rather than developing an answer to the question *What is meant by learning?* develop a more contextualized description of learning in your classroom. Using the learning survey completed by your students as additional evidence, what does learning look like in your classroom? Be specific. If necessary, select an upcoming unit or topic and use that specific context to describe what learning looks like in your classroom.

As we wrap up our first module, our time devoted to discovering and developing a definition of what learning looks like in the context of our classrooms will help us better focus on the durable, flexible, and usable learning we strive for in our students. While there are many theories about learning, the contextualized nature of our classrooms requires that we devote time to articulating what learning is in Room 30, the gymnasium, the science laboratory, or the writing center. Then, and only then, can we create, fashion, and execute great learning according to plan—by design. In the next module, we will revisit your answer to the question *What is meant by learning?* and look at the different types of learning encompassed by your answer.

Oh, one last request. Using the blank pie chart on the next page, color in the percentage that reflects your belief about the responsibility for learning that falls to the teacher and the percentage of responsibility for learning that falls to the student. If possible, use two different colors. For example, you may believe that 90% of the responsibility falls to the teacher and 10% falls to the learner, so your chart might look like the following.



For more resources related to assessment-capable visible learners, visit the companion website at resources.corwin.com/howlearningworks.