
Chapter 4: Determine the State’s Role and Approach to Implementation

Questions from Diagnostic Tool

- Is there a designated strategic leadership team responsible for selecting the strategies — a coordinated set of activities designed to achieve our goals in science — and for ensuring delivery?
- Is there clear ownership of each of the policy elements related to the NGSS?
- Is there a clear understanding of the political landscape and levers of influence as they relate to *adoption*?
- Have we identified what districts need for *adoption*, what their highest priorities are and what assistance they most need from the state?
- Have we identified what the state’s role in NGSS *implementation* will be and how it may need to be different from the current state role?
- Have we specified strategies for the state’s role in NGSS *implementation* that are based on evidence?
- Are we confident that the strategies for the state’s role in NGSS *implementation* will facilitate the shifts required by the standards in every classroom?
- To what extent are the strategies for the state’s role in NGSS *implementation* coherent with CCSS implementation, teacher/leader effectiveness work and other significant initiatives?
- Have we defined *feedback loops* — evidence that identifies whether implementation is on track — that we can use to monitor the likelihood that this plan will deliver its promised results?

As we have noted in previous chapters, the NGSS present an opportunity to improve student achievement and strengthen the relationship between education and economic development. The NGSS are intended to reflect a new vision for American science education, and as such, they demand significant changes in practice from your classrooms to school districts to state agencies.

In the United States, nearly every state practices **local control** — defined broadly for the purposes of this workbook as the strong authority that individual local education agencies have to set and shape what happens in their classrooms. However, the practice of local control does not preclude a state from playing a strong leadership role in implementation efforts. In fact, as the driver of adoption, the state education agency must take responsibility for ensuring that the NGSS deliver on the aspirations they have set for students. At the same time, a “strong” state role does not dictate implementation by mandatory top-down actions. Rather, the challenge for states is to drive real changes in classroom practice in a way that is consistent and compatible with local control.

The magnitude of this shift means that state agencies will need to play a meaningful role in the implementation of the NGSS. The traditional state role — often limited to authority over adoption of standards — will likely be insufficient for two reasons. First, adoption of the standards will not change classroom practice by itself; for that, educators will need a range of supports, including access to NGSS-aligned curricular and instructional materials, support from educator preparation programs, and aligned in-service professional learning.

How this unfolds will inevitably look different across states with different authority, capacity and tradition. For example, when it comes to curricular and instructional materials, in some cases, the state will directly provide materials or processes for required district use. In other cases, the state may provide a list of approved options or highlight exemplars for districts to choose from, and in still other cases, the state may develop materials or processes for voluntary use by districts. Importantly, in each



of these scenarios, local districts and schools would have access to high-quality and aligned curricular and instructional materials. Likewise, when it comes to building educator capacity, the state education agency can take direct responsibility — from professional development around creating and accessing aligned materials to managing the instructional changes required in the classroom — or the state can work with others, including districts, regional service centers, higher education institutions and more traditional vendors, to ensure that the right kinds of supports are in place.

Second, adoption and implementation are complementary conversations. To make the case for adoption, states will need to show that they have a credible plan for implementation — one in which they hold themselves accountable for improved student achievement. This also signals more broadly that the state is thinking comprehensively and long term about implementation. Specific exercises to plan for adoption (including individual state processes, rules, etc.) were explored in Chapter 1.

Whatever your particular situation, the action steps in this chapter will help you define your state’s role and the core elements of a preliminary implementation plan. Where possible, the steps lay out principles rather than specific prescriptions, with options for states to choose from based on local context.

Action Steps

Step 1: Define your state’s role.

Step 2: Identify core implementation strategies.

Step 3: Draw the delivery chain and identify feedback loops.

Step 1: Define Your State’s Role

To identify the ideal role for your state, begin by understanding what kind of role the state has historically played vis-à-vis local education agencies. What has local control looked like in your state? What does your state constitution or statutes actually allow the state education agency to do? In what areas has your state played the strongest or most proactive role?

To analyze this question, consider the typical “levers” that a state uses — and under what circumstances — to influence what happens in schools and classrooms:

Policy/guidance: Creating requirements or imposing mandates. Strategies to apply this lever could include mandating adopting textbooks statewide, revising course-taking or graduation requirements, creating criteria for the kinds of professional development/materials that schools and districts must use, and/or generating lists of approved materials and/or vendors.

Funding: Aligning existing funding streams, incentives and grant programs (e.g., Title II, Part B funds for Math and Science Partnerships) to the desired change in behavior. This could also include the way professional development vendors are funded/managed.⁶

Capacity-building: Providing “optional” or “recommended” resources and/or support of any kind. This could include directing and/or contracting the development and dissemination of aligned curricular materials and professional development, providing guidance on local planning (similar to what is in this workbook), and creating communities of practice for cross-district and cross-school learning. The state

⁶ For more information on how state and districts might think about setting budgets and an overview of major federal education programs, see page 3.16 of the Achieve-U.S. Education Delivery Institute CCSS implementation workbook: www.achieve.org/files/Organize_The_Basics.pdf.



has a particularly important role to play in identifying and publicly elevating examples of local practices and/or innovations for NGSS implementation.

Monitoring: Incorporating any of the expectations for what is happening in the classroom into the existing accountability system (e.g., statewide performance goals, determinations, public reporting and incentives), school improvement planning or other monitoring mechanisms. This could be as accessible and transparent as building key indicators into the state and school report cards, or it could simply inform how the state creates and shares data from feedback loops with districts and schools.

Coordination: Eliminating silos and tying the NGSS work to other major initiatives. This might include leveraging existing delivery systems within the state to get the right message and strive toward policy and implementation coherence.

Which of these levers has your state relied on historically? Which has it avoided? In particular, which levers have been relevant in prior adoption and implementation of new standards, such as the CCSS? What additional levers might you access for implementation of the NGSS, and what kinds of changes will this require? These questions are at the core of defining your state's role, and they are covered in more detail in Exercise 9.

The state should always serve as a catalyst for action by providing data and influencing and incentivizing other actors in the system, both in the public sphere and the private sector. However, the state is not necessarily responsible for directly providing resources, professional development, etc. to districts and schools but rather for ensuring that districts and schools have access to resources to meet their local needs.

You may, for example, see that in previous standards implementation efforts, your state generated lists of aligned materials and/or vendors that schools and districts might use (using the capacity-building lever). However, districts and schools were in the middle of materials adoption cycles, so they were not able to put these resources to use given their timelines. Moving forward, you might decide that the state's role needs to include an analysis of what districts and schools need and to what extent — and where — they would welcome state help. This analysis would improve the chances of successful implementation and help build local advocates. Articulating this new role is important for the development of strategies in the next step, but it is also an important part of your case for adoption of the NGSS.

Explaining the role that the state will play — and why — is an important part of building credibility to implement and preparing stakeholders for the changes ahead.

EXERCISE 9: Define Your State’s Role

Objective(s) for participants:

- Identify what districts need for adoption, what their highest priorities are and what assistance they most need from the state.
- Understand the role that the state has historically played in standards implementation in the past.
- Articulate the role for the state to play in supporting districts in NGSS implementation.
- Identify the real and perceived barriers or challenges within the state education agency to supporting standards implementation.

Instructions:

- Using the template, answer questions for each of the five levers under “Current Use” columns for the CCSS and past science standards implementation efforts:
 - How has this lever been relied on historically for standards implementation? If it has been avoided, why?
 - What has it looked like when this lever has been used successfully? What made it successful?
 - What has it looked like when this lever has been used unsuccessfully?
- Using the template, answer questions for each of the five levers under “Future Use: NGSS Implementation”:
 - How important will this lever be to our implementation of the NGSS?
 - What will we do that will be similar to our current use of this lever?
 - What will be different, and what will that require?

Materials needed:

- Template
- Markers

Template for Exercise 9

Lever	Current Use: CCSS Implementation	Current Use: State-Specific Science Standards	Future Use: NGSS Implementation
Policy/guidance			
Funding			
Capacity-building			
Monitoring			
Coordination			



Step 2: Identify Core Implementation Strategies

The state role you have defined in Step 1 is effectively your theory of action; it specifies how you expect to make a difference in students' science education experience and improve science education and performance. If your state has an overall strategic plan, this should also be reflected. It also sets you up to define the **strategies** that your state will undertake as part of its NGSS preliminary implementation plan.

What is a strategy? For these purposes, a strategy is a coordinated set of activities that are designed to help you achieve one or more of your goals in science education. A strategy should have a beginning and an end, and it should be designed to change something about the way your state does business in science education. Some strategies involve creating something new, while others involve changing or scaling up an existing practice. For example, you may have a higher education strategy that involves working with education school faculty to integrate the NGSS into educator preparation preservice training; this is designed to change current practice, and it will “end” when NGSS-aligned instruction is a standard part of every educator preparation program in your state.

The strategies you select should not be created in isolation from other concurrent initiatives, such as CCSS implementation and teacher/leader effectiveness work — nor should they ignore structures that the state may have already created for these efforts, such as school-district leadership teams or regional centers that serve as a state's primary professional development provider. Rather, in developing your NGSS strategies, your state should make every effort to learn from this work, build on its successes and avoid previous missteps.

Finally, different strategies make different use of the levers defined previously. Some strategies inherently rely on certain levers more than others, but there is often a great deal of flexibility. You may mandate a curriculum, for example (policy/guidance); you may create it and recommend it (capacity-building); or you may give schools and districts monetary incentives to adopt it (funding).

Figure 7 gives some typical examples of strategies for a state to employ in standards implementation. *It is by no means an exhaustive list*; additional areas (e.g., assessment, the role of technology in supporting science instruction) are worth considering in the longer term.



FIGURE 7: Potential State Strategies and Specific Activities⁷

Strategy	Potential State Activities for Each Strategy, by Lever				
	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
Curricular and instructional materials	<p>Develop lists of “must-haves” that districts and regional education centers can look at when determining NGSS alignment with their materials.</p> <p>Evaluate existing textbook adoption cycles for all content areas and related policies to ensure alignment with the state’s NGSS adoption and implementation timelines.</p>	<p>Encourage appropriate repurposing of state and federal funding streams for aligned curricular and instructional materials where possible, providing samples for districts and schools.</p>	<p>Provide model materials or books that the state has determined are aligned.</p> <p>Elevate and highlight the work of leading districts or schools (e.g., around reuse and refurbishment of science lab materials).</p> <p>Engage educators directly or provide tools and/or resources for districts to engage educators in development, identification and/or piloting of aligned materials.</p> <p>Develop and make widely available tools (e.g., criteria or rubrics) that administrators and educators can use to</p>	<p>Have a system in place to track administrator and teacher access to and use of high-quality, aligned materials and to address problems based on feedback.</p>	<p>Collaborate with other states that are implementing the NGSS.</p> <p>Coordinate with membership associations and third-party organizations’ curation and creation of materials aligned to the NGSS.</p> <p>Coordinate districts’ and regional education centers’ sharing of materials aligned to the NGSS.</p> <p>Coordinate the reuse and refurbishment of science lab materials among districts.</p> <p>Identify informal learning environments that include a wide range of contexts and settings, such as museums, zoos, nature</p>

⁷ Education First Consulting and Achieve have partnered on the development of the “Common Core State Standards Implementation Rubric and Self-Assessment Tool”: www.achieve.org/common-core-state-standards-implementation-rubric-and-self-assessment-tool.

Potential State Activities for Each Strategy, by Lever					
Strategy	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
			evaluate the alignment of classroom materials.		and environmental programs, and other science-rich cultural institutions.
Professional development	<p>Require, provide or certify aligned teacher professional development.</p> <p>Develop lists of “must-haves” that districts can look at when formally vetting professional development providers.</p> <p>Identify a clear set of expectations for providers, including evaluating the effectiveness of professional development offerings and assessing their impact.</p> <p>Certify vendors that complete a state professional development training.</p> <p>Create new professional development offerings.</p>	<p>Require that all providers participate in an orientation session.</p> <p>Develop a plan for sustaining a consistent focus on professional development for teachers around the NGSS.</p> <p>Provide resources — funding (reallocating existing funding; providing new, targeted funding; or a combination of the two) and time — to support state/regional/local provision of aligned professional development only.</p> <p>Issue guidance on the repurposing of federal and state dollars to best support implementation</p>	<p>Provide a list of approved professional development providers that the state has determined are of high quality.</p> <p>Require or provide opportunities for teachers and teacher teams to practice applying the NGSS to instructional tasks (e.g., selection of instructional materials, lesson planning, grading student work).</p> <p>Elevate and highlight the work of leading districts or schools.</p>	<p>Develop and collect a standardized evaluation form from all professional development providers.</p> <p>Create a report card for professional development providers.</p> <p>Have a system in place to target support, track progress of professional development efforts, and hold the state and others accountable for continuous improvement based on feedback.</p>	<p>Intentionally coordinate professional development activities across divisions/ departments within the state education agency.</p> <p>Intentionally coordinate professional development activities across regional education centers.</p>

Potential State Activities for Each Strategy, by Lever					
Strategy	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
		of the NGSS.			
Educator preparation and licensure	Align individual teacher licensure/certification/endorsement standards to the NGSS.			Publicly report on the effectiveness of teacher preparation programs, including measures that link student growth on NGSS-aligned assessments to program graduates as one factor in determining program effectiveness.	<p>Embed the NGSS in teacher preparation programs.</p> <p>Create a plan to align accreditation standards for institutions/programs/alternative providers to the NGSS.</p> <p>Create partnerships with or requirements for teacher preparation institutions/programs/alternative providers to align coursework and other requirements to NGSS expectations for student learning.</p>
Educator evaluation and effectiveness	Align teacher observation rubrics and model teaching standards that clearly articulate the knowledge and skills with which teachers must become proficient to deliver instruction aligned to the NGSS.		Provide training on the use of teacher observation rubrics and other aligned classroom materials to principals/assistant principals that is focused on the instructional shifts in the NGSS, not just the procedures required to	<p>Create a mechanism to address gaps between teacher evaluation results and access to NGSS-aligned professional development.</p> <p>Create a system to target support, track</p>	

Potential State Activities for Each Strategy, by Lever					
Strategy	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
	<p>Use guidelines, processes and materials to reinforce alignment to the NGSS through evaluation.</p> <p>Ensure that reports that teachers receive on their performance clearly indicate how well the teachers' students are performing against the NGSS.</p>		implement revamped evaluation systems.	progress of principal professional development efforts focused on instructional leadership for the NGSS, and hold the state and others accountable for continuous improvement based on feedback.	
Graduation requirements	<p>Align minimum high school science graduation course requirements so that they cover all of the NGSS high school standards indicated for all students.</p> <p>Provide guidance to districts and schools to review the courses students are required to take to make sure they are covering all of the NGSS.</p> <p>Develop processes, protocols, guidance and/or exemplars</p>				Ensure NGSS-aligned minimum high school science graduation course requirements seamlessly connect to the course admissions requirements at state colleges and universities.

Potential State Activities for Each Strategy, by Lever					
Strategy	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
	showing strong alignment among the NGSS and career and technical education expectations and pathways.				
Accountability and data reporting	<p>Set statewide performance goals tied to the NGSS and other college- and career-ready expectations.</p> <p>Create a plan that includes a process for identifying statutory or regulatory changes to be considered or made in light of the transitions under way.</p> <p>Clearly differentiate schools and districts based on status and growth metrics aligned to the NGSS and other college- and career-ready indicators.</p> <p>Align supports and interventions to the intensity and type suggested by school or</p>		<p>Elevate and highlight the work of leading districts or schools that have closed achievement gaps.</p> <p>Facilitate conversations among districts about the types of leading indicators they are monitoring and the best ways to do so.</p> <p>Ensure that educators can access and use data indicators that predict student performance and diagnose specific needs on the NGSS.</p>	<p>Ensure that the state report card for districts and schools clearly shows progress on NGSS-aligned assessments and other college and career readiness indicators.</p>	

Potential State Activities for Each Strategy, by Lever					
Strategy	Policy/Guidance	Funding	Capacity-Building	Monitoring	Coordination
	district capacity to implement the NGSS.				
Alignment to higher education	Create a strategy for raising awareness among faculty to build support for NGSS adoption.				<p>Create a collaborative working team to align the higher education system and university or college first-year courses with the NGSS.</p> <p>Create a strategy to train postsecondary faculty in the scope, sequence and content of the standards.</p>
STEM agenda	<p>Establish a course approval process to foster innovation in STEM high school course design.</p> <p>Incentivize districts to increase the number and percentage of high school graduates who enroll in college with the intent of majoring in a STEM discipline or who begin careers in fields that require STEM knowledge and skills.</p>	Identify funding streams focused on advancing STEM strategy at the state, regional or district levels.			<p>Define how the NGSS fit into broader state STEM strategies.</p> <p>Encourage local and regional partnerships between K–12, higher education, business leaders and informal science education providers, including museums, zoos, nature and environmental programs, and other science-rich cultural institutions.</p>

With so many options to choose from, how should state leaders go about prioritizing the strategies that are most important to them? There are two main criteria to consider:

Impact: What is the potential for the strategy to improve student achievement (as measured by one or more of your student outcome goals determined in Chapter 2)? In particular, how does it help you to build on the strengths and address the challenges that you defined in Chapter 3?

Difficulty: Given your state’s current capacity, how challenging will implementing this strategy be? Can the strategy be designed to rely on the levers that you have defined in your state’s role?

Answering these questions will require that you take a moment to define and shape the strategies you are considering. Exercise 10 uses a series of questions to help you to brainstorm and define potential strategies. Exercise 11 will then help you to prioritize them according to the above criteria.

EXERCISE 10: Brainstorm and Define Potential Strategies

Objective(s) for participants:

- Develop a list of potential strategies for NGSS implementation.
- Agree on a brief description of what each strategy would entail.

Instructions:

- Using the potential strategies and specific activities list in Figure 7 as a starting point, brainstorm a list of potential strategies and fill them in on the template.
- For each strategy, fill in the template:
 - Rationale: How does this strategy contribute to one or more of the state’s student outcome goals? (See state aspiration from Chapter 2.)
 - Definition of success: If this strategy were successful, what would success look like in three years’ time?
 - Scale: What is the intended scale of implementation? How many teachers/students will be affected?
 - Levers: Which levers does this strategy make the most use of and how?

Materials needed:

- Flipchart template
- Markers
- Copies of Figure 7 for each participant

Exercise notes:

- You may need to narrow down the initial list of strategies before filling in the template.

Template for Exercise 10

Strategy	Rationale	Indicators of Success	Scale	Levers



EXERCISE 11: Prioritize Potential Strategies According to Impact and Difficulty

Objective(s) for participants:

- Identify priority strategies based on their potential impact and degree of difficulty.

Instructions:

- Using the list of strategies identified in Exercise 10, place each strategy on the 2 x 2 matrix template on the flipchart, according to its individual impact and degree of difficulty.
- Once you have placed each key strategy on the matrix, reflect on the overall picture. Specifically, consider the following questions:
 - Are strategies accurately placed in relation to one another?
 - Should certain strategies be priorities based on their potential for impact and their degree of difficulty?
 - Can certain strategies be deprioritized based on their potential for impact and their degree of difficulty?

Materials needed:

- List of strategies from Exercise 10
- Flipchart
- Markers

Exercise notes:

- Encourage participants to really reflect on impact and difficulty and avoid classifying all strategies as high impact and high difficulty.
- Use the full spectrum provided by the matrix to indicate which strategies are higher or lower than others.
- Urge participants to avoid placing strategies “on the line” and to make a judgment as to whether those strategies are slightly more on the high or low side.

Template for Exercise 11

High		
Potential impact		
Low		
	Low	High
	Degree of challenge	



Step 3: Draw the Delivery Chain and Identify Feedback Loops

A prioritized set of strategies is an important first step toward a good preliminary NGSS implementation plan. Drawing your **delivery chain** will take these strategies to the next level.

A delivery chain answers the question: “How, and through whom, will our NGSS strategies reach the field at scale?” Starting with your leadership at the state level and ending with a change in science instruction for thousands or millions of students, how will it happen? To do this, a delivery chain defines four things:

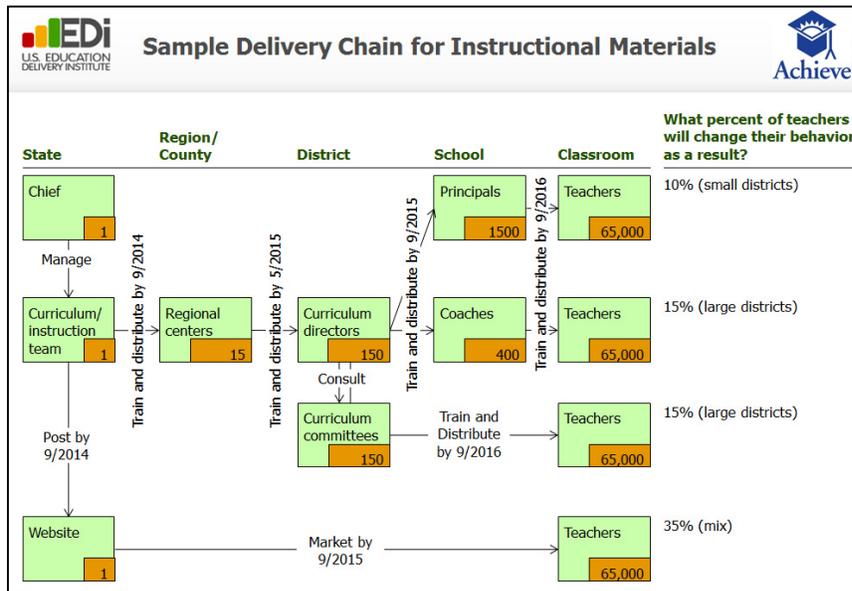
- The **actors** — people or organizations — who have a role in implementing strategy at every level, (e.g., state, district, school, classroom) and the number of personnel affected at each (e.g., 10,000 teachers, 1,000 principals, 100 superintendents);
- The **role** that each actor plays in implementing the strategy;
- The **relationships** that this implies between each of the actors; and
- The **most direct line** of influence between the beginning and the end of the chain.

You may choose to create a delivery chain for each of the strategies you have prioritized, or you may choose a subset of them. In many cases, several strategies will “share” the same delivery chain. Bear in mind that you may already have such a structure in place for other initiatives you are undertaking, such as CCSS implementation and teacher/leader effectiveness work. Where it makes sense, you should try to integrate the different delivery chains across these strategies.

An example of a delivery chain for a single strategy — aligned curriculum and instructional materials — is given in Figure 8. The beginning of the chain is the state chief and the curriculum and instruction team for science, and the end of the chain is the state’s 65,000 teachers (split out by their presence in small and large districts). The dissemination of instructional materials mainly takes place through “traditional” channels at the regional, district and school levels: The curriculum and instruction team trains and distributes materials to 15 regional centers, which in turn work with the curriculum directors at 150 districts. Then, depending on the size of the district, the curriculum directors pass the materials on to principals, school-based coaches or district-based curriculum committees, who then work with teachers. In a completely separate channel, the materials are posted on the state’s website, which is accessed by a certain number of teachers.



FIGURE 8: Sample Delivery Chain for Instructional Materials



A delivery chain serves three primary purposes:

- Details a given strategy, including those involved and their relationships;
- Allows you to test for potential weaknesses and adjust your strategy to address them; and
- Creates feedback loops that allow you to monitor the quality and fidelity of the strategy’s implementation.

The first purpose can be seen from Figure 8: It allows you to flesh out the development of a given strategy. A delivery chain is, in effect, a more detailed plan about what you expect to happen. Beyond the vague label of “curriculum and instructional materials,” you now know a lot more about the assumptions underlying this strategy: A set of materials will be created. It will be disseminated on an optional/recommended basis to teachers through five key role groups. You also have assumptions that are critical to test: Is it plausible for 35 percent of all teachers to access the website? Does our curriculum and instruction team have the capacity to train the staff at 15 regional centers? Can each regional center take on an average of 10 districts apiece? If we are successful, will we reach the field at sufficient scale to make a difference? In a very real sense, drawing your delivery chain puts real meat on the bones of a strategy.

EXERCISE 12: Draw a Delivery Chain for One or More Strategies

Objective(s) for participants:

- Identify the key actors in the delivery chain.
- Map the relationships between each key actor to create the delivery chain.

Instructions:

- For an identified strategy, identify where it begins and ends as well as the levels in between.
- At each level, identify the other key people or organizations that could be involved in implementing the strategy.
- For each identified actor, record how many there are.
- Draw the most important line of direct influence from the beginning to the end of the chain and describe the relationships between each actor.
- Draw any secondary lines or relationships involved and describe those relationships.
- Repeat as needed with additional strategies.

Materials needed:

- Flipchart
- Markers

Exercise notes:

- Typically the delivery chain will loosely follow from the state to region to district to school to classroom.
- Encourage participants to get specific about the actors that fall under those key categories, articulating organization names or specific names or titles of individuals.
- Encourage participants not just to map the actors but also to consider how many of each actor there are and what the relationships are between each.
- Delivery chains will be messy, but the discussion is part of the benefit.



The second purpose of a delivery chain is related to the first: It allows you to test for potential weaknesses and adjust your strategy to address them, whether by changing the delivery chain itself or strengthening the links within it. There are at least four types of weaknesses to look out for in a delivery chain:

Individual relationships: What is the quality of personal relationships among the key actors in the delivery chain? Where are the areas of strongest and weakest leverage?

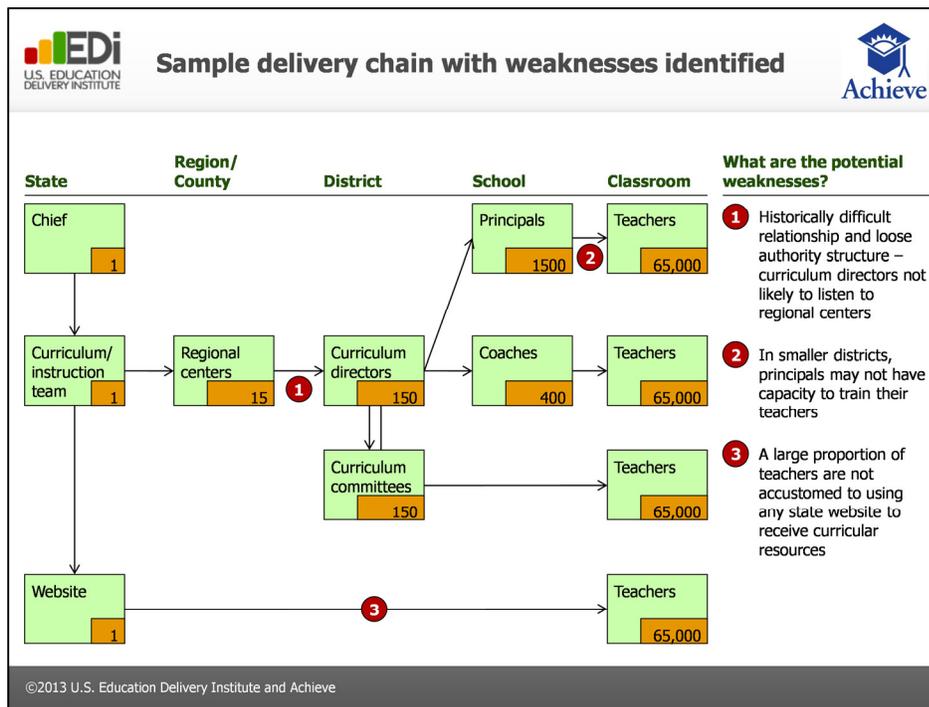
Complexity: How many actors are involved in the delivery chain? How easy or difficult is it to coordinate those actors to get something done? Is the chain unnecessarily complex?

Funding flows: What are the major sources of funding and resources? Who controls these flows, and in which direction(s) do they go? Are they aligned to the flows of influence envisioned in the delivery chain or not?

Choke points: Are there particular actors that you disproportionately depend on to get something done?

Figure 9 gives an example of how you can examine a delivery chain and pinpoint the weaknesses on it.

FIGURE 9: Sample Delivery Chain with Weaknesses Identified



EXERCISE 13: Identify and Address Potential Weaknesses in Your Delivery Chain

Objective(s) for participants:

- Identify weaknesses in the delivery chain.
- Identify potential solutions to the identified weaknesses.

Instructions:

- Using the delivery chain created in Exercise 12, consider potential weaknesses.
- Particularly identify potentially challenging relationships, overly complex parts of the chain, areas where there may be a mismatch between funding flows and the delivery chain, and potential choke points in the delivery chain.
- Record these weaknesses on the flipchart template.
- For each of the weaknesses, identify potential solutions and record those on the flipchart template.
- Repeat as needed with additional strategies and their associated delivery chains.

Materials needed:

- Delivery chain from Exercise 12
- Flipchart
- Markers

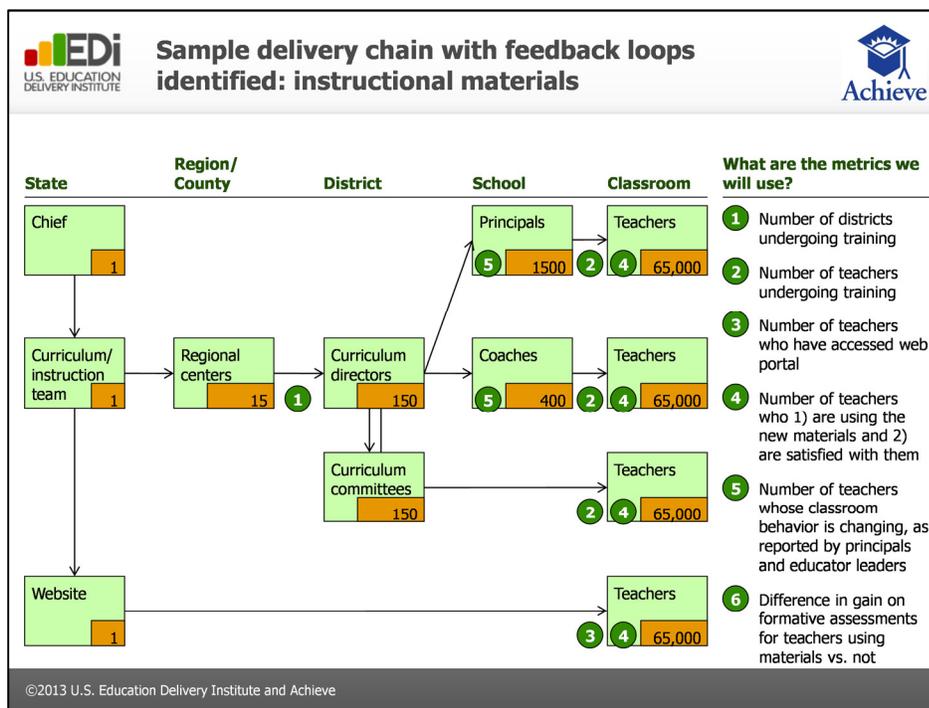
Template for Exercise 13

	Potential Weaknesses	Potential Solutions
Individual relationships		
Complexity		
Funding flows		
Choke points		
Other		

The final purpose of a delivery chain is to create **feedback loops** that allow you to monitor the quality and fidelity of a strategy’s implementation. A feedback loop is a type of evidence that you commit to collecting to know whether your strategy is on track to deliver its promised results or whether challenges exist that require more attention. Evidence from feedback loops is particularly important for mid-course corrections in implementation, as the data on student outcome goals are normally not available more than once a year. Examples of feedback loops include surveys of educators/school leaders, focus groups or interviews with educators/school leaders, participation in events, evaluations of resources or materials, informal observations, formal audits, or website hits.

A delivery chain is helpful for creating feedback loops because it allows you to “read” particular areas where you will want to know more about the quality of implementation. For example, you may choose to develop feedback loops to assess the quality of implementation in the areas that are most critical or most at risk. Figure 10 gives an example of how feedback loops can be read from a delivery chain.

FIGURE 10: Sample Delivery Chain with Feedback Loops Identified



How do you prioritize which feedback loops to develop? Start by looking at the delivery chain and prioritizing the particular actors (state education agency staff, regional center staff, district coaches, principals, teachers, etc.) that you will want to focus on. Which ones are the most critical and/or the most challenging? Then, for each role group, consider what questions you want to answer about how implementation is playing out for them. In the context of your NGSS strategies, you can ask at least six types of questions:

Inputs: What did they experience? For example, did training take place as planned? Did they receive the messages we intended them to receive?

Reaction: Was the training a productive use of time? For example, how well were the trainings and/or materials received?

Learning: Did they learn what they were expected to do? For example, do teachers now understand the conceptual shifts required of them by the NGSS? Do regional center staff understand what kind of training they are responsible for delivering?

Support: Were they set up for success? For example, have the support and evaluation systems for teachers shifted to align with NGSS expectations?

Fidelity of implementation: Are they changing their practices to meet the new expectations? For example, is NGSS-aligned instruction happening in classrooms? Are principals holding teachers accountable for that instruction?

Outcomes: Is student achievement increasing, and are achievement gaps closing?

Once you have prioritized your questions, you can develop specific sources of evidence to answer each of them. You can consider several different types of sources, including:

- Surveys of people in role groups across the delivery chain. This includes pre- and post-training surveys and more general surveys.
- Interviews and focus groups of representative people in role groups across the delivery chain. You may have a standing group of people in each role group that you return to regularly for feedback from the front lines.
- Site visits to schools and/or districts to see how implementation is playing out on the ground. The number of visits you can make is limited, but they can serve as a useful “spot check” on implementation.
- Analysis of educator and/or student artifacts, such as lesson plans, teacher evaluation summaries, student work, materials from trainings, etc. Again, these can be examined on a “spot check” basis to get a sense for what is happening.
- Formative and summative assessment data, sometimes as a source in and of themselves and sometimes to crosstab with other types of evidence.

In prioritizing your sources of evidence, it will be important to start with information that you already have and add new data collection only if absolutely necessary. Many states have in place some form of each of the above sources of evidence; the goal may be to adjust these rather than creating additional work.

EXERCISE 14: Define Feedback Loops for Your Strategies

Objective(s) for participants:

- Identify key questions to be answered for your strategies.
- Identify sources of evidence to use to answer those questions.

Instructions:

- Using the full set of delivery chains you created, consider how you will know the strategies are successful.
- For each of the six types of feedback loops, identify key questions to answer about the strategies, keeping the important role groups from your delivery chain in mind. Record those on the flipchart template.
- For each of those questions, identify the evidence and sources to answer them and record those on the flipchart template.

Exercise notes:

- This exercise needs only be done once — not for every delivery chain.
- The exercise can also be done by keeping the priority strategies in mind, even if you have not drawn delivery chains.
- Identifying key questions for each of the six feedback loop types is not necessary, but you should encourage participants to think through how to gather the evidence for each key question they have identified.

Template for Exercise 14

Type of Feedback Loops	Key Questions	Sources of Evidence To Answer Them
Inputs		
Reaction		
Learning		
Support		
Fidelity of implementation		
Student outcomes		
Other		



Conclusion

In these first four chapters, you have explored the most critical elements of adoption and preliminary implementation planning, which include a preliminary implementation plan with well-defined core strategies that are based on a shared aspiration and an honest look at current performance against that aspiration. The next chapter, on setting targets and trajectories, establishes the mechanism for connecting all of these things together into a coherent plan for NGSS adoption and implementation.

