Analyze data

Tools for this chapter include:

Understanding what it means to be data literate

TOOL

3.1

Purpose	Promote a conversation on the importance of data literacy among team members.	
Recommended time	45 minutes	
Materials	Tool 3.1 • "Looking for the woozle: The story," pages 3–8 • What Do You Think?, page 9	
Process	1. Individually read "Looking for the woozle: The story."	10 minutes
	2. As a team engage in a conversation responding to the questions in What Do You Think?	20 minutes
	3. Discuss implications for the team and this stage of the learning cycle.	15 minutes

Understanding what it means to be data literate, continued

Looking for the woozle

THE *Story*

Karl Kline was a school improvement field consultant for a regional educational service center. He had spent 10 years in this capacity after two decades as a successful principal and administrator in mid- to larger-sized districts in his state. He was respected for his ability to help schools make significant gains in student achievement. His background as a statistics major and math teacher led him to a practical approach that had served many schools well in their efforts to pinpoint areas for improvement.

Each year after the state released the results of its annual standardized tests, the service center experienced a flurry of new calls. This year was no exception as more districts found their scores falling within a state warning band, the result of a state board of education decision to raise the cutoff scores. The field consultants would be busy for quite some time.

Kline was pleased to get the call to work with Merryville Schools, a district he had not yet visited but whose small size he thought would be an opportunity for a systemwide turnaround. As Kline drove the winding back roads to his first appointment with the district's administrators, he anticipated a rigorous

Understanding what it means to be data literate, continued

meeting to prepare to get the two-school district back on course. After a 45-minute drive, he pulled into the high school parking lot; the superintendent's office was located in the high school. Superintendent Rose Joslyn had seen him arrive and greeted him at the door, leading him to a small room where she introduced the district's elementary school principal and secondary school principal. Joslyn, the principals, and the Title 1 coordinator/federal programs director were the district's administrators.

Joslyn outlined the reason she had invited Kline: They were to write a plan to address falling student achievement scores. The administrators took turns giving brief descriptions of their work

About the district

Merryville is a small, rural village situated beside a natural, unspoiled river in a quiet area of the state. The town's population of 675 is supported by a business district that includes the post office and a dry goods store housing a small grocery store. Several small enterprises support and cater to vacationers who come to the attractive area for water sports and holiday excursions. Three dozen or so large (and pricey) summer homes line the river, and their owners' families have begun to remain in Merryville year-round, adding a new dimension to the school district's divergent population.

The school district's four administrators and 18 professional staff had grown up in the area. All attended college within a 40-mile radius of Merryville and live with their families within the 10 square miles of the district's service area. Most have taken professional trips to other states and have vacationed in more distant locations. But, always, they return to their roots to live and work among friends and several generations of their families. The staff reflect the philosophy and perspectives of the citizens of Merryville. They are conservative — and very satisfied with their school system.

Understanding what it means to be data literate, continued

and insights on the district. Kline thanked them for the invitation to work with them and told them he was ready to dig into the project. The group agreed that the best place to begin an improvement initiative would be at the elementary school. Kline asked that the group begin by looking at the districtwide data from the statewide competency tests and data for the classroom levels for the elementary and secondary schools.

The administrators glanced at each other. The superintendent paused and then admitted that the administrators had not taken time to examine the data. The superintendent provided Kline with a set of data, and the group agreed he would return in two weeks to work with the elementary staff.

Beginning the work

For the next two weeks, Kline studied Merryville's data. He looked at subscores by item and reviewed how various student groups had performed. He noticed gender differences in a couple of areas and a significant achievement gap for students receiving free and reduced-price lunch. He looked at the data by classroom and noticed where students had missed a concept that seemed to affect later grade-level strands as well. He was satisfied that he had a good overview of student learning in the district and closed his binder.

Two weeks after the initial meeting with Merryville's administrators, Kline arrived in the elementary school media center to meet with the kindergarten to 6th-grade teachers. He spread the pages of the state reports on a large table. As teachers sat quietly, he introduced himself and explained his mission, then invited the teachers to review the data and to respond to the data's messages. He wanted the teachers' perspectives, rather than to share his views of what he had seen.

They dutifully filed over to the table and gathered around the sheets, staring at the columns of figures. Their faces looked bored or blank, and Kline thought they were tired after a long workday. He asked them what they perceived from the data. After a lengthy time with no responses, he gently and with

Understanding what it means to be data literate, continued

genuine concern adjourned the meeting, scheduling a subsequent meeting two weeks later when, he said, he hoped the staff wouldn't be so tired.

Kline reflected on his approach and decision to solicit teachers' reactions and input about the data. He was committed to not just telling them what *he* saw, but involving them in the process of identifying areas of need so they would understand and make decisions for their own learning. He decided that some social activity might be in order to begin their next meeting and might allow the teachers a few minutes to rejuvenate before they tackled the mental challenges of examining the data.

He put the refreshments out on a table and spread out the data again on an adjacent table. The cookies and lemonade were a success. The data were not.

When he returned to the elementary school two weeks later, Kline brought macadamia nut cookies and lemonade. He put the refreshments out on a table and spread out the data again on an adjacent table. The cookies and lemonade were a success. The data were not.

The teachers were excited about the refreshments but had no discernible reaction afterward when they were invited over to the data table. When Kline asked them for insights, the silence again was unbroken. He asked for anyone to volunteer one fact from the data, but was met with silence. Kline adjourned the meeting without having made any progress. He was frustrated as the teachers hurried out of the room with their eyes downcast, and he packed up pondering what had happened.

Learning to read data

As he drove home, Kline thought about the two meetings with the teachers. Why couldn't he get a response from them? He knew the teachers cared deeply about their students and wanted them to improve. Suddenly, he had an epiphany: Maybe the teachers did not know *how* to read and interpret the display of figures from the state. How could they respond if they didn't understand the reports? Kline was so used to looking at state

Understanding what it means to be data literate, continued

reports that he didn't think twice about it, as were most of his colleagues at the educational service center. And, with his math background, numbers were almost second nature to him. He felt at that moment like Winnie the Pooh, tracking around the spinney of larch trees, searching the ground fruitlessly for the woozle that was sitting just above his head in the tree.

He pulled off the road and pulled out his mobile phone, dialing the number for the elementary principal. The principal confirmed his hunch — the school staff had had no professional development about their school's state achievement test scores. The principal admitted that the staff hadn't spent time trying to figure out what the information actually meant.

Kline's next call was to a well-respected state department of education staff member who agreed to travel to Merryville to work with the district staff on how to gain access to the meaning of their data. Kline's third call was to Joslyn to report his experiences with the teachers, his conversation with the principal, and his request to the state department of education facilitator. Joslyn expressed her appreciation and asked that the district's entire staff be included in the professional learning. She noted that everyone on the district staff needed to develop skills in using data to make instructional decisions.

Everyone on the district staff needed to develop skills in using data to make instructional decisions.

On the day of the professional development, the state department of education facilitator arrived early with a binder of information for each staff member, organized by grade level. The binders included the information as teachers received it from the state, blank sheets formatted for teachers to extrapolate data sets, and protocols the group would use to dig into the data.

All the teachers arrived on time, along with the two principals and the superintendent. The Title 1 coordinator also was present. The facilitator had staff work in various small groups as they followed her points on the slides she had brought. The educators were engaged. The study kept their attention as they

Understanding what it means to be data literate, continued

began to understand the state department's format for reporting school and classroom data, and they soon moved to item analysis in academic subject areas.

A moment later and a trifle abashed, he reported, "I'm going to have to learn to teach that differently next year!"

The groups had worked through midafternoon on the item analysis, when suddenly the secondary school science teacher jumped to his feet. "They didn't get it!" he exclaimed. He realized from the student data that his teaching had not resulted in desired learning outcomes for students. A moment later and a trifle abashed, he reported, "I'm going to have to learn to teach that differently next year!"

The science teacher got it. He understood now that he needed new skills to help his students learn successfully. He would need to design learning materials and activities that matched students' needs in order to reach the goal.

Kline's next meeting with teachers went more smoothly as they began to process the information and determine their next steps.

Joslyn was pleased with the meeting's progress and called a meeting with the administrative team to write the district plan. Kline, on the other hand, was concerned that the staff had additional needs regarding their use of data. He hoped the district plan would address using data.

Understanding what it means to be data literate, continued

What do you think?

The superintendent of this small district was compelled to seek external help when the district was unable to reverse declining test scores. Instead of settling for quick fixes, all district staff learned the power of analyzing data to use to guide continuous improvement. As staff developed skills in interpreting data, they uncovered additional learning needs. Questions remain about whether the district will commit to continuing to learn how to use data beyond analyzing student tests.

- What other sources of data will support staff decision making regarding professional learning?

  _____

  _____

- What sources of data do you use to inform your professional learning?

  _____

  _____

- What ideas might the staff include in the district improvement plan?

  _____

  _____

- How do you suggest the external consultant introduce the other two purposes for data?

  _____

  _____

- What actions might the principals and teacher leaders take to ensure that staff use data in accordance with Learning Forward's Standards for Professional Learning?

  _____

  _____

- What additional knowledge and skills do you need to develop related to the Data standard?

  _____

  _____

Source: Looking for the woozle: The story from *A Playbook for Professional Learning,* by Stephanie Hirsh and Shirley Hord. Copyright 2012 Learning Forward. Reprinted with permission.

Assessing our data literacy

TOOL
3.2

Purpose	Determine current strengths and potential areas for growth in order to use data to drive planning and decision making.	
Recommended time	65 minutes	
Materials	Tool 3.2 • Data standard, page 10 • Teacher/Data IC Map, pages 11–19	
Process	1. Read the Data standard below and discuss how it applies to this stage of the learning cycle.	10 minutes
	2. Use the following discussion protocol: • Review the Teacher/Data IC map. • Independently circle the level (1–6) on the Teacher/Data IC map that best represents your individual expertise in the various components. • With other members of the team discuss your ratings. Identify areas where there is strength within the team and areas for potential growth.	40 minutes
	3. External to team meetings, work with the principal or a coach to plan how to develop data literacy in those areas for growth that the team has chosen.	15 minutes

Spotlight standard: Data

Professional learning that increases educator effectiveness and results for all students uses a variety of sources and types of student, educator, and system data to plan, assess, and evaluate professional learning.

Assessing our data literacy, continued

Teacher/Data

4.1 Analyze student, educator, and system data					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.1.1: Develops capacity to analyze and interpret data.					
• Develops, with colleagues, knowledge and skills to access, organize, and display data. • Develops, with colleagues, knowledge and skills to analyze and interpret data from multiple sources (e.g., norm-referenced tests, student work samples, student portfolios, and school system-designed tests) to make team, grade-level, department, and individual decisions about professional learning.	• Develops knowledge and skills to access, organize, and display data. • Develops knowledge and skills to analyze and interpret data from multiple sources (e.g., norm-referenced tests, student work samples, student portfolios, and school system-designed tests) to make team, grade-level, department, and individual decisions about professional learning.	• Develops knowledge and skills to access, organize, and display data. • Develops knowledge and skills to analyze and interpret data from multiple sources (e.g., norm-referenced tests, student work samples, student portfolios, and school system-designed tests) to make individual decisions about professional learning.	• Develops knowledge and skills to access, organize, and display data to make individual decisions about professional learning.	• Fails to develop knowledge and skills to analyze and interpret data.	

Assessing our data literacy, continued

Teacher/Data

4.1 Analyze student, educator, and system data					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.1.2: Analyzes and interprets multiple sources of student data to determine professional learning needs.					
• Analyzes, with colleagues, qualitative and quantitative student data from four or more sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative student data from four or more sources to decipher trends, patterns, outliers, and root causes within the data. • Supports colleagues to independently identify findings, trends, patterns, outliers, and root causes from four or more sources of student data.	• Analyzes, with staff and SLT, qualitative and quantitative student data from 3 sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative student data from three sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes, with staff and SLT, qualitative and quantitative student data from two sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative student data from two sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes one source of educator data.	• Accepts results of educator data analysis from principal, coach, SLT, or others.	• Fails to engage in analyzing educator data.

Assessing our data literacy, continued

Teacher/Data

4.1 Analyze student, educator, and system data					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.1.3: Analyzes and interprets educator data to determine professional learning needs.					
• Analyzes, with colleagues, qualitative and quantitative educator data from four or more sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative educator data from four or more sources to decipher trends, patterns, outliers, and root causes within the data. • Supports colleagues to independently identify findings, trends, patterns, outliers, and root causes from four or more sources of educator data.	• Analyzes, with staff and SLT, qualitative and quantitative educator data from three sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative educator data from three sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes, with staff and SLT, qualitative and quantitative educator data from two sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative educator data from two sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes one source of educator data.	• Accepts results of educator data analysis from principal, coach, SLT, or others.	• Fails to engage in analyzing educator data.

Assessing our data literacy, continued

Teacher/Data

4.1 Analyze student, educator, and system data					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.1.4: Analyzes and interprets school data to determine professional learning needs.					
• Analyzes, with colleagues, qualtative and quantitative school data from four or more sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative school data from four or more sources to decipher trends, patterns, outliers, and root causes within the data. • Supports colleagues to independently identify findings, trends, patterns, outliers, and root causes from four or more sources of school data.	• Analyzes, with staff and SLT, qualitative and quantitative school data from three sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative school data from three sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes, with staff and SLT, qualitative and quantitative school data from two sources to make predictions, observations, and inferences about the data. • Interprets, with staff and SLT, qualitative and quantitative school data from two sources to decipher trends, patterns, outliers, and root causes within the data.	• Analyzes one source of school data.	• Accepts results of school data analysis from principal, coach, SLT, or others.	• Fails to engage in analyzing school data.
Desired outcome 4.1.5: Uses analyzed data to determine professional learning needs.					
• Uses, with colleagues, analyzed data to identify needs for individual and team professional learning.	• Uses, with colleagues, analyzed data to identify needs for individual or team professional learning.	• Uses analyzed data to identify needs for individual or team professional learning.	• Identifies needs for individual and team professional learning.	• Fails to use student, educator, or school data to identify needs for individual and team professional learning.	

Assessing our data literacy, continued

Teacher/Data

4.2 Assess progress					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.2.1: Determines formative data to assess progress toward professional learning benchmarks and goals.					
• Establishes, with principal and colleagues, benchmarks to assess progress toward individual, team, and schoolwide professional learning goals. • Establishes monthly, with principal and colleagues, qualitative and quantitative formative data to assess progress toward individual, team, and schoolwide professional learning benchmarks and goals.	• Establishes, with principal and colleagues, benchmarks to assess progress toward individual and team professional learning goals. • Establishes quarterly, with principal and colleagues, qualitative and quantitative formative data to assess progress toward individual and team professional learning benchmarks and goals.	• Establishes, with principal and colleagues, benchmarks to assess progress toward individual and team professional learning goals. • Establishes semiannually, with principal and colleagues, qualitative and quantitative formative data to assess progress toward individual and team professional learning benchmarks and goals.	• Identifies annually either qualitative or quantitative data to assess progress toward individual professional learning benchmarks and goals.	• Fails to identify data to assess progress toward individual or team professional learning benchmarks and goals.	

Assessing our data literacy, continued

Teacher/Data

4.2 Assess progress					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.2.2: Collects, analyzes, and uses data to continuously assess progress toward professional learning benchmarks and goals.					
• Uses, with colleagues, analyzed data to identify enhancers of and barriers to progress. • Engages with colleagues in problem solving to address identified barriers to achieving professional learning benchmarks and goals. • Makes, with colleagues, data-based, in-process adjustments in individual and team professional learning (i.e., learning designs, coaching activities, and timeframes). • Celebrates with colleagues progress toward professional learning benchmarks and goals.	• Uses, with colleagues, analyzed data to identify enhancers of and barriers to progress. • Engages with colleagues in problem solving to address identified barriers to achieving professional learning benchmarks and goals. • Makes, with colleagues, data-based, in-process adjustments in individual and team professional learning (i.e., learning designs, coaching activities, and timeframes).	• Uses analyzed data to identify enhancers of and barriers to progress. • Solves problems that create barriers to achieving professional learning benchmarks and goals. • Makes data-based, in-process adjustments in individual professional learning (i.e., learning designs, coaching activities, and timeframes).	• Uses analyzed data to identify enhancers of and barriers to progress.	• Fails to use data to assess progress toward professional learning benchmarks and goals.	

Assessing our data literacy, continued

Teacher/Data

4.2 Assess progress					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.2.3: Uses analysis of progress to make adjustments in professional learning.					
• Uses analyzed data related to student learning and changes in classroom practice to adjust and refine school-wide, team, and individual professional learning.	• Uses analyzed data related to student learning and changes in classroom practice to adjust and refine school-wide and team professional learning.	• Uses analyzed data related to student learning and changes in classroom practice to adjust and refine school-wide professional learning.	• Uses analyzed data related to student learning and changes in classroom practice to adjust and refine schoolwide professional learning.	• Disregards any data to adjust or refine professional learning.	• Fails to use analysis of progress to adjust and refine professional learning.

4.3 Evaluate professional learning					
Desired outcome 4.3.1: Contributes to the development of an evaluation plan for professional learning.					
• Contributes to the development of a theory of change, logic model, and evaluation framework to evaluate schoolwide and team professional learning.	• Contributes to the development of a theory of change and evaluation framework to evaluate team professional learning.	• Contributes to the development of an evaluation framework to evaluate team professional learning.	• Contributes to the identification of data sources and data collection methods to evaluate individual professional learning.	• Identifies data collection methods to evaluate individual and team professional learning.	• Fails to contribute to the evaluation of professional learning.

Assessing our data literacy, continued

Teacher/Data

4.3 Evaluate professional learning					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.3.2: Uses a variety of formative and summative data to evaluate the effectiveness and results of professional learning.					
• Collects, with colleagues, student data (e.g., test scores, benchmark results, student surveys, interviews, etc.) and classroom observations to measure changes in student learning and behaviors associated with professional learning. • Collects, with colleagues, data about changes in teacher knowledge, skills, and dispositions associated with professional learning. • Collects, with colleagues, educator data (e.g., staff surveys, interviews, selfreports, and observations) to assess changes in classroom practices associated with professional learning. • Collects, with colleagues, data to assess changes in school culture and organizational structures, policies, and processes associated with professional learning.	• Collects, with colleagues, student data (e.g., test scores, benchmark results, student surveys, interviews, etc.) and classroom observations to determine changes in student learning associated with professional learning. • Collects, with colleagues, data about changes in teacher knowledge, skills, and dispositions associated with professional learning. • Collects with colleagues educator data (e.g., staff surveys, interviews, selfreports, and observations) to identify changes in classroom practices associate with professional learning.	• Collects, with colleagues, student data (e.g., test scores, benchmark results, student surveys, interviews, etc.) and classroom observations to determine changes in student learning associated with professional learning. • Collects, with colleagues, data about changes in teacher knowledge, skills, and dispositions associated with professional learning.	• Collects, with colleagues, student data (e.g., test scores, benchmark results, student surveys, interviews, etc.) and classroom observations to determine changes in student learning associated with professional learning.	• Fails to contribute to the evaluation of the effectiveness and results of professional learning.	

Assessing our data literacy, continued

Teacher/Data

4.3 Evaluate professional learning					
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
Desired outcome 4.3.3: Uses data to evaluate the effectiveness of professional learning designs, content, and duration.					
• Identifies, with colleagues, data to evaluate the effectiveness of learning designs to develop knowledge, skills, dispositions, and practices. • Engages in individual and team reflection about attainment of professional learning goals. • Analyzes and interprets, with colleagues, data about collaboration, learning, and results. • Forms conclusions, with colleagues, about the design, content, and duration of professional learning.	• Identifies, with colleagues, data to evaluate the effectiveness of learning designs to develop knowledge, skills, dispositions, and practices. • Analyzes and interprets, with colleagues, data about collaboration, learning, and results. • Forms conclusions, with colleagues, about the design, content, and duration of professional learning.	• Identifies, wit colleagues, data to evaluate the effectiveness of learning designs to develop knowledge, skills, and practices. • Analyzes and interprets data about collaboration, learning, and results. • Forms conclusionsabout the design, content, and duration of professional learning.	• Identifies data to evaluate the effectiveness of individual professional learning designs, content, and duration.	• Fails to evaluate the effectiveness of individual and team professional learning designs, content, and duration.	

Source: IC Maps for teachers, Data Standard, pp. 61–68. *Standards into practice: School-based roles. Innovation Configuration maps for Standards for Professional Learning*. Copyright 2012 Learning Forward. Reprinted with permission.

Finding data sources and developing a data plan

TOOL
3.3

Purpose	Use this organizer to inform your process for identifying and organizing data sources; then, develop a plan to analyze and summarize data, identify causes, and prioritize goals.	
Recommended time	60–120 minutes	
Materials	Tool 3.3 • "The Numbers Game," page 21 • A Data Plan, pages 22–24 • Student Data Checklist, page 25 • Data Sources Worksheet, page 26 • Chart paper and markers, white board, or other display devices (optional)	
Process	1. Read individually "The Numbers Game" and discuss implications for this work.	10 minutes
	2. Examine the Student Data Checklist and determine which of the data are accessible and whether you need to consider other accessible data sources.	10 minutes
	3. Use the Data Sources Worksheet to record school improvement goals, team goals, and individual goals.	10 minutes
	4. Make a plan for identifying, creating, and collecting the data you need most.	30 minutes
	5. Implement the plan.	as required

Finding data sources and developing a data plan, continued

The Numbers Game: Measure progress by analyzing data

By Joan Richardson

If a district or a single school has a vision of what it wants to be, the use of data can be a powerful tool to measure its progress along the way.

Sylvie Hale has seen the power of using data in that way. "Schools have to collect data to make sure they're on target. Data do not lie," she said.

Ask Hale, senior research associate at WestEd, for an example of how using data guided a school to fulfill its vision and she's ready with a handful of stories. This is one of her favorites:

A rural California school district had a goal of ensuring that all children would read at grade level by 3rd grade. Teachers in one school were quite discouraged because many 1st and 2nd graders were reading below grade level. How could they meet the district goal if children were falling behind so early?

Teachers quickly decided that the school needed a new reading program.

Hale and other consultants from a regional assistance center urged the school to look over its data very closely. Perhaps the school would discover that the curriculum wasn't the only reason students were struggling with reading.

After receiving some preliminary school data, teachers discovered that a majority of kindergartners had been absent for more than half the year. That must mean that parents don't care enough about education to get them to school, teachers concluded.

The consultants pushed them to look at other possible explanations for missing school.

The teachers talked with parents of students with high absenteeism and learned that these children rode a bus to school but that the district provided no bus transportation to take them home at the end of their half-day in school. The buses were needed to transport high school students and the district did not want to mix high schoolers with kindergartners. Working parents or parents who relied on others for after-school transportation frequently kept children home rather than deal with the transportation hassle.

Clearly, the reading curriculum was not at fault. When providing transportation for these kindergartners turned out to be financially unfeasible, the teachers explored other options. By the next school year, the school created a remedial reading program was diverted to pay for extra teacher hours. At last report, the reading of these students was improving.

What's the lesson? "Check your assumptions at the door," said Hale.

"I don't think that's an uncommon story. We all make quick assumptions. Instead, we need to look at data, generate questions and find answers. Data keep you honest," she said.

Finding data sources and developing a data plan, continued

A data plan

Let's assume that the district's vision includes a statement that all children will read at grade level by 3rd grade and remain at grade level every year thereafter. How could you use data to measure your progress towards achieving that vision?

Step 1	**Collect basic information**
	Every school should maintain basic data on student demographics and achievement. See the Student Data Checklist on page 25 for a guide to collecting information that will give you a snapshot of students in your school.
	Break down this information by grade. Keep the original data available so you can crossreference it with other data in later steps.
Step 2	**Identify additional data**
	To check on students' reading ability in your school, what data will you need to collect?
	To measure academic performance, a school would probably collect, at a minimum, standardized test scores, grades, and classroom assessments. You should always collect at least three types of data for any study.
	Identify who will be responsible for collecting this data and set a date for finishing this task.
Step 3	**Disaggregate the data**
	Assemble the academic performance data and disaggregate it according to the characteristics collected under Step One. At a minimum, you should break down each type of data by gender, race, socioeconomic factors, attendance, mobility, discipline issues, and English language ability.
	Use the Data Sources Worksheet on page 26 for this process. Prepare one sheet for each type of data you collect.
Step 4	**Analyze the data**
	After you've filled out the Data Summary Sheets, begin to ask questions about that data.
	What is the lowest performing group? What is the highest performing group? Are boys and girls performing equally well in reading? Are there dips in reading achievement between different grades?
	If so, which grades? What are the reading levels of various language groups? Do different socioeconomic groups have different reading levels? Are reading levels similar between various racial and ethnic groups?

Finding data sources and developing a data plan, continued

Step 5	**Summarize the data**
	Describe in a statement what the data tell you. These statements can be called either data summary statements or needs statements. See a sample statement on page 32.
	In this step, the school team is trying to identify the problem, not solve it. This forces individuals to spell out what they see and not fall back on assumptions, Hale said. Write one statement or write a dozen summary statements, depending on your observations.
	At this stage, avoid the urge to brainstorm solutions. That step will come later. For now, concentrate on simply describing your observations.
Step 6	**Brainstorm causes**
	Once a school team has objectively evaluated the data, the next step is to suggest possible explanations.
	What's going on instructionally? What's going on with the curriculum? Where are the gaps? Why do these gaps exist?
	"If you're not getting the results you want, there's dissonance someplace. Where is the dissonance?"
	For example, a staff may suggest that the curriculum is not aligned with the assessment or that teachers lack sufficient training to implement the curriculum appropriately.
Step 7	**Collect more data**
	After the team has suggested explanations for blips in the data, the next step is to collect more data to determine which explanations are most accurate.
	For example, if the team hypothesizes that the curriculum has not been implemented completely, the team might survey teachers about their practices as well as observe relevant classes.
Step 8	**Analyze and summarize data**
	As it did with the student data, the team now analyzes the data it has collected regarding instruction and curriculum.
	The team repeats the process of writing objective statements about the data it has collected.
Step 9	**Identify a goal**
	After analyzing and summarizing the data, the team now needs to identify its goals. See page 27 for a tool to help with this.
	Write a specific, measurable and attainable goal. What would you consider success? How will you measure that? When will you measure that?

Finding data sources and developing a data plan, continued

Step 10	Repeat the process
	Once the goal has been identified, the process has not ended. The team needs to establish a time table for repeating the process of collecting and analyzing the data. This forces the team to stay focused on measuring its progress.

But Hale cautions teams against focusing too narrowly on certain areas because of the potential to ignore other areas. "You have to collect data to make sure you're on target but you also have to look at data to make sure other things aren't falling through the cracks," Hale said.

"Data collection and analysis is a continuing process. It never ends. Once you begin asking questions and looking for answers, you find that you have more answers and more questions," Hale said.

Finding data sources and developing a data plan, continued

Student data checklist

Student Data Checklist	Grade Level				
Enrollment					
Total number of registered students.					
Number of students in special programs (e.g. Title 1, IEP, gifted and talented) broken down by category.					
Number of students broken down by ethnicity, language group or other meaningful categories.					
Daily Attendance					
Average daily attendance of students by grade, grade span, whole school, or other enrollment category.					
Percent of students tardy for classes.					
Number of students who have been absent from school 21 days or more.					
Mobility/Stability					
Mobility rate: percent of children who move in and out of a school during a year.					
Stability rate: the percent of students who remain in the same building for the entire year.					
Socioeconomic Status (SES)					
Percent of students receiving free or reduced-price lunch.					
Average level of parents' education and/or household income.					
Unemployment rates in the attendance area.					
Student Behavior					
Number or percentage of discipline referrals or incidents.					
Number or percentage of student suspensions and expulsions.					
Frequency of gang-related, substance abuse, or other at-risk behavior.					
Limited English Proficiency					
Percent of students with limited English proficiency.					
Percent of families who speak English as a second language.					

Source: *Comprehensive School Reform: Research-Based Strategies to Achieve High Standards,* by Sylvie Hale, 2000, San Francisco: WestEd. Copyright 2000 by WestEd.

Finding data sources and developing a data plan, continued

Data sources worksheet

Learning goals	Data that inform these goals
Schoolwide improvement goals:	
Team learning goals:	
Individual learning goals:	

Crafting data summary statements

Purpose	Use your data to support the development of a data summary statement	
Recommended time	120 minutes or more	
Materials	Tool 3.4 • Various data sources • Data Summary Sheet, page 28 • Data Summary Worksheet, page 29 • Data Analysis Protocol (Informal and Formal), pages 30–31 • Data Summary Statement Example, page 32 • Data Summary Statement Worksheet, page 33 • Chart paper and markers, white board, or other display devices	
Process	1. Team members post desired vision and other relevant priorities on display device.	5 minutes
	2. Complete as many items as possible on the Data Summary Sheet for each data source. Be as detailed as possible.	20 minutes
	3. Use the Data Analysis Protocols to guide analysis of the data.	30 minutes
	4. Review the Data Summary Statement Example. Then, using the Data Summary Statement Worksheet, write a first draft of the summary statement.	15 minutes
	5. Consider which data will be most helpful in determining needs for future team cycles.	10 minutes
	6. Make a plan for collecting the chosen data.	10 minutes
	7. After collecting and analyzing the data, write the first data summary statements to guide planning for a future team cycle.	30 minutes or more

Crafting data summary statements, continued

Data summary sheet

Data type: _____
(e.g. enrollment, student achievement, total, attendance, student achievement reading)

Data source/measure: _____
(e.g. SAT9, school records, staff survey)

What the numbers represent: _____
(e.g. percentage of students below grade-level; number of students higher than 4 on district math assessment; percentage of students who say they like to read)

Student Characteristic	Grade Level													Total
Ethnicity														
African-American														
Asian/Pacific Islander														
Caucasian														
Hispanic														
Native American														
Other														
Gender														
Male														
Female														
Income														
Low income														
Not low income														
Language Ability														
Fully proficient														
Limited proficient														
Non-proficient														
English only														
Special Populations														
Migrant														
Title 1 Target Assist														
Special education														
Preschool														
After-school														
Other														

Source: *Comprehensive School Reform: Research-Based Strategies to Achieve High Standards,* by Sylvie Hale. Copyright 2000 by WestEd.

Crafting data summary statements, continued

Worksheet

Data type: _____

(e.g. enrollment, student achievement, total, attendance, student achievement reading)

Data source/measure: _____

(e.g. SAT9, school records, staff survey)

What the numbers represent: _____

(e.g. percentage of students below grade-level; number of students higher than 4
on district math assessment; percentage of students who say they like to read)

Student/Demographic/ Economic Characteristic	Grade Level													Total

Crafting data summary statements, continued

Data analysis protocol (informal)

• What is being measured in these data?

_____

_____

_____

• Who is represented in the data pool?

_____

_____

_____

• What jumps out in the data on first glance?

_____

_____

Surprises _____

Expected _____

• What conclusions can we draw at this point?

_____

_____

_____

• What other data have we looked at recently that have suggested similar findings?

_____

_____

_____

• What other data might we consider to confirm or disprove these conclusions?

_____

_____

Source: *Becoming a Learning School* (Tool 10.4 on supplemental CD), by Joellen Killion and Pat Roy, 2009, Oxford, OH: NSDC. Copyright 2009 by National Staff Development Council. Adapted with permission.

Crafting data summary statements, continued

Data analysis protocol (formal)

• What are we looking at here?

    _____

    _____

• What is being measured in each assessment?

    _____

    _____

• Which students are assessed?

    _____

    _____

• What areas of student performance are meeting or exceeding expectations?

    _____

    _____

• What areas of student performance are below expectations?

    _____

    _____

• Do patterns exist in the data?

    _____

    _____

• How did various populations of students perform? (Consider factors such as gender, race, and socioeconomic status.)

    _____

    _____

• What are other data telling us about student performance?

    _____

    _____

• How are the data smiliar or different in various grade levels, content areas, and individual classes?

    _____

    _____

• What surprises us?

    _____

• What confirms what we already know?

    _____

Source: *Becoming a Learning School* (Tool 10.5 on supplemental CD), by Joellen Killion and Pat Roy, 2009, Oxford, OH: NSDC. Copyright 2009 by National Staff Development Council. Adapted with permission.

Crafting data summary statements, continued

Data summary statement example

Data summary statement:

Fourth-grade Vietnamese immigrant boys are underachieving in science.

Evidence:

Achievement scores, teacher observation, and chapter (textbook) tests.

Why questions:

Q: Why do 4th-grade Vietnamese immigrant boys underachieve in science?

A: They have difficulty with English language. (Supporting data or facts: language assessment.)

Q: Why does the fact that Vietnamese boys have difficulty with English contribute to low performance in science?

A: They have difficulty understanding the concepts and applying them in practice. (Supporting data or facts: observation and student input.)

Q: Why do 4th-grade Vietnamese immigrant boys underachieve in science?

A: Curriculum does not match assessment. (Supporting data or facts: Curriculum is based on 1985 framework, assessment is based on 1995 framework.)

Q: Why does the mismatch between curriculum and assessment contribute to the low performance in boys?

A: There is misalignment between what is taught and what is being assessed. (Supporting data or facts: comparison of 1985 and 1995 frameworks.) Upon further examination, all students are having some difficulty in science.

Source: *Comprehensive School Reform: Research-Based Strategies to Achieve High Standards,* by Sylvie Hale, 2000, San Francisco: WestEd. Copyright 2000 by WestEd.

Crafting data summary statements, continued

Data summary statement worksheet

Write a statement below summarizing the data. A data summary statement does not offer a solution nor does it describe a cause or lay blame.

1. Review your Data Summary Sheet for each of your data sources. Be as complete as possible. Think about other possible summary tables that might also be created. For example, after completing the sample data summary sheet, you may notice that girls in 4th through 6th grades are underachieving in mathematics. You could create another data summary table in which you break out the girls by ethnicity to see if a pattern emerges.

2. Summarize the data by writing a statement based on the data. As you review the data, consider:

   • Which student subgroups appear to need priority assistance, as determined by test scores, grades, or other assessments? Consider subgroups by grade level, ethnicity, gender, language background (proficiency and/or home language), categorical programs (e.g., migrant, special education), economic status, classroom assignment, years at our school, attendance.

   • In which subject areas do students appear to need the most improvement? Also, consider English language development.

   • In which subject areas do the "below proficient" student subgroups need the most assistance?

   • What evidence supports your findings?

3. For each data summary statement, brainstorm all the possible reasons why the data show what they do. For each reason, identify data or facts that support that assertion. If no data exist, determine how to locate data that would support the assertion. Continue asking "Why?" until the root cause of the problem or need has been identified. The information will be valuable in the next two stages.

_____

_____

_____

_____

_____

_____

Source: *Professional Learning Plans: A Workbook for States, Districts, and Schools,* by Joellen Killion, p. 59. Copyright 2013, Learning Forward.

Understanding root causes

Purpose	Use the resources in this tool (i.e. brainstorming for causes and fishbone diagram) to identify, narrow, and better understand causes	
Recommended time	90 minutes	
Materials	Tool 3.5 • Brainstorming for Causes, page 35 • Fishing for Root Causes, page 36 • Fishbone Diagram, page 37 • Chart paper, sticky notepaper, large marking pen, laptop or other devices for display	
Process	1. Review brainstorming for causes protocol.	2–3 minutes
	2. Follow the brainstorming protocol on page 35 to identify causes of gaps in student performance or other problems.	27–28 minutes
	3. After the brainstorming is complete, take the identified causes and examine them in more detail using the fishbone diagram to come to consensus about root causes.	60 minutes

TOOL 3.5

Understanding root causes, continued

## Brainstorming for causes protocol

1. Team members identify the problem and write it on chart paper or a chalkboard at the front of the room.

2. Members individually write as many causes for that problem as they can, using a separate sticky note for each cause.

3. In sequence, each team member shares one idea aloud with the group. Write each cause on the chart paper.

4. If an idea is unclear, allow team members to ask for clarification. The team member who suggested the cause should re-write the idea on another sticky note, using language that is more clear to everyone.

5. When the group runs out of causes, use prompts to elicit more ideas. If more are suggested, ask a recorder to write down those ideas on sticky notes.

6. To analyze the causes, lead the group through a discussion that answers five questions for each idea.
   • What are the feelings about this cause?
   • What are the positive aspects of this cause?
   • What is wrong with this cause?
   • What other ideas could be added to strengthen this cause?
   • What additional information do we need about this cause?

7. Turn to page 37 and use the fishbone diagram to continue working with causes identified through brainstorming.

Understanding root causes, continued

Fishing for root causes protocol

1. Team members write the problem statement — the effect of the process — in the rectangular box at the head of the "fish."

2. Team members randomly stick their ideas onto the fish.

3. Silently, members should group the sticky notes into categories. (Since these these ideas have been expressed already, this process should take only a few minutes.)

4. Discuss the groupings until the group reaches a consensus on how to label each category.

5. After agreeing on the groupings, label each group. Write those labels into the rectangular boxes at the outer edges of the fish skeleton.

An example of a diagram is shown below.
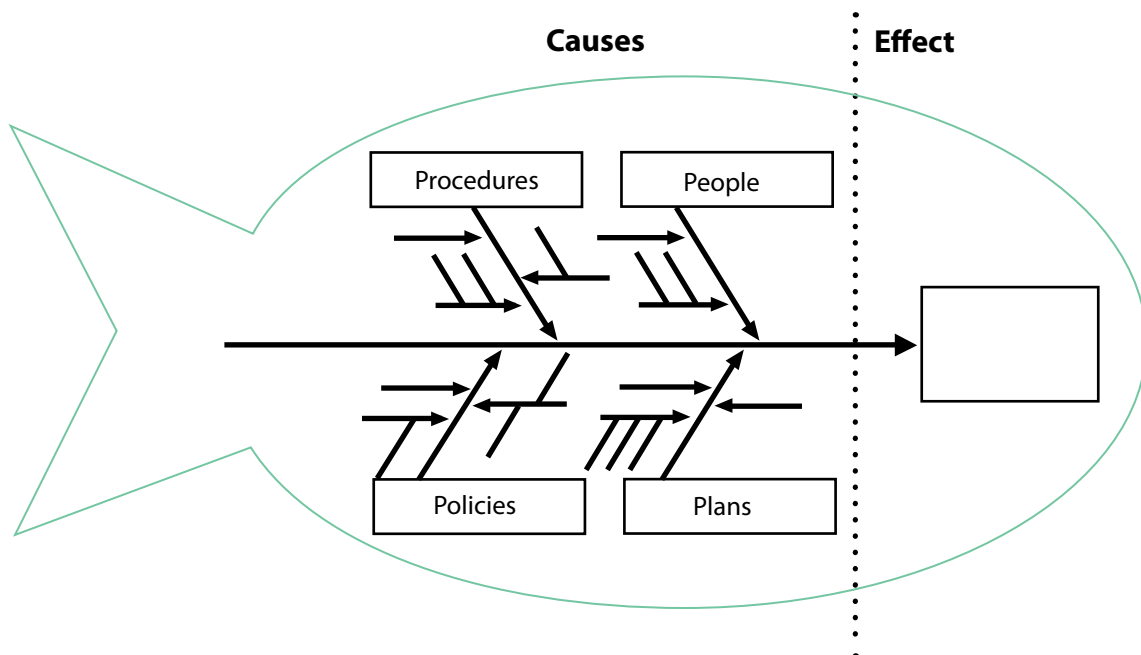
Understanding root causes, continued

Fishbone diagram
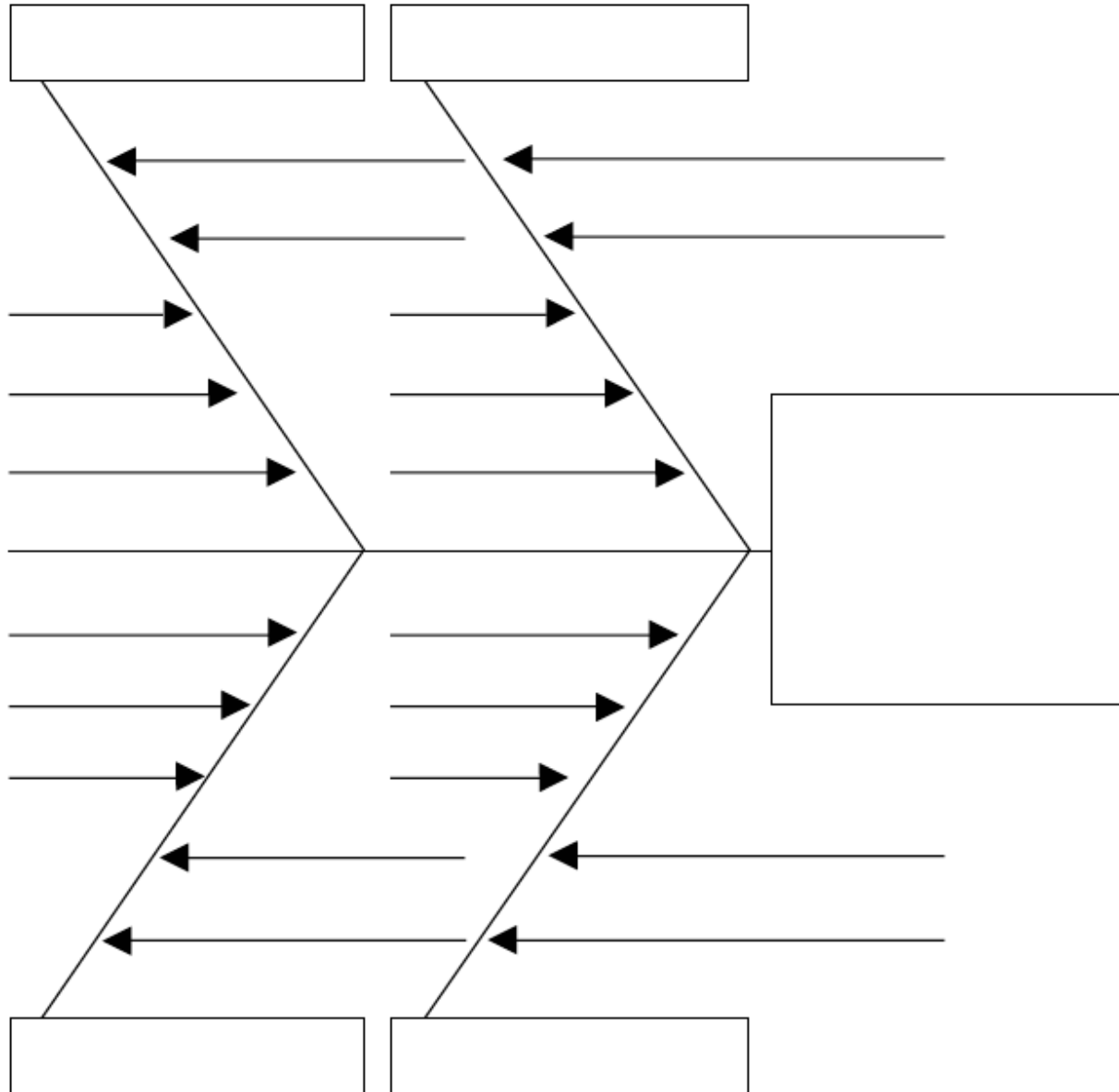
Source: Continuous improvement: Monitoring the quality of student learning by Joan Richardson. *Tools for Schools* February/ March 1998, pp. 3–5. Copyright 1998 National Staff Development Council.