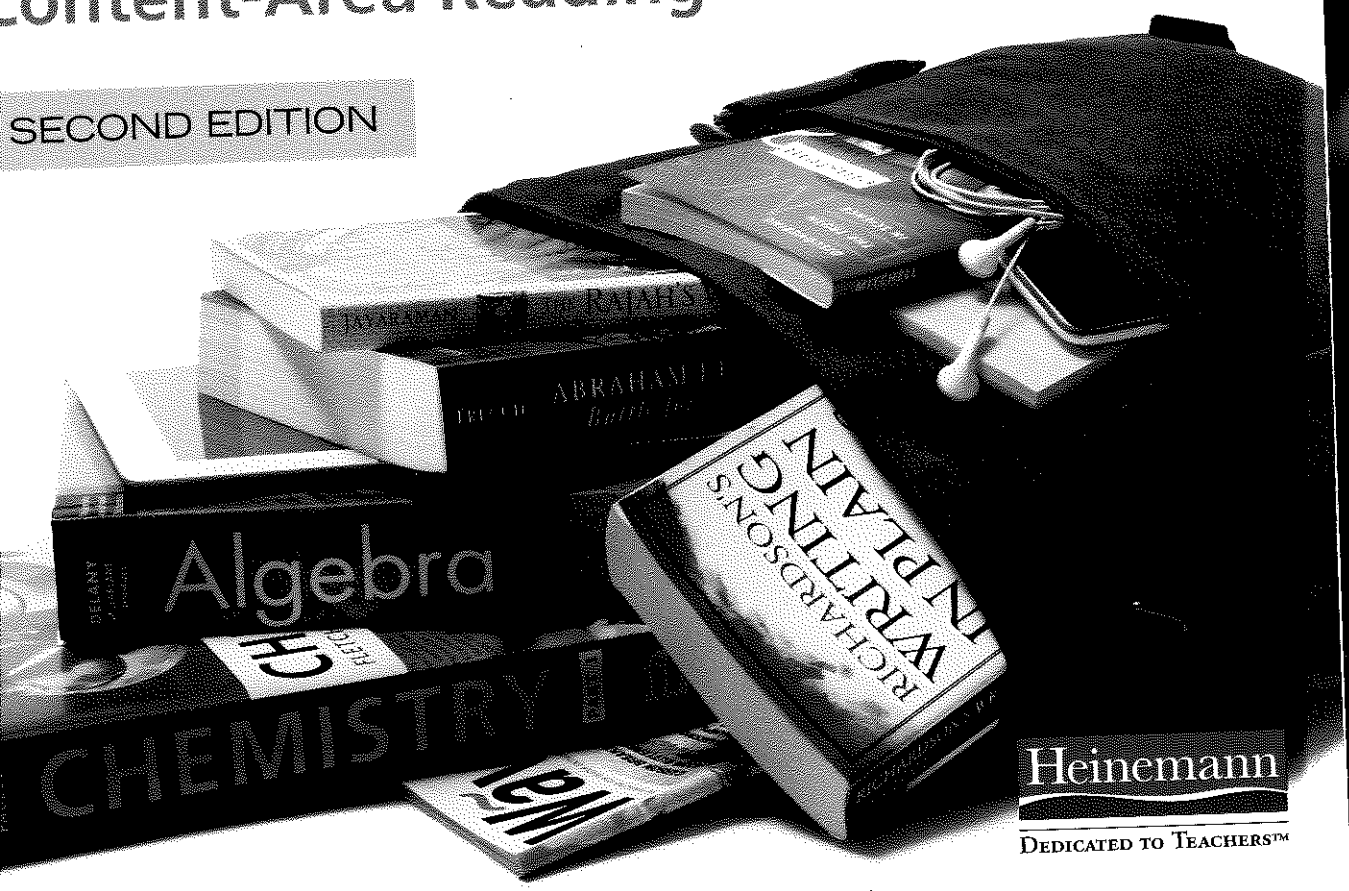
HAR

RVEY "SMOKEY" DANIELS • STEVEN ZEMELMAN

SUBJECTS MATTER

xceeding Standards Through Powerful Content-Area Reading

SECOND EDITION



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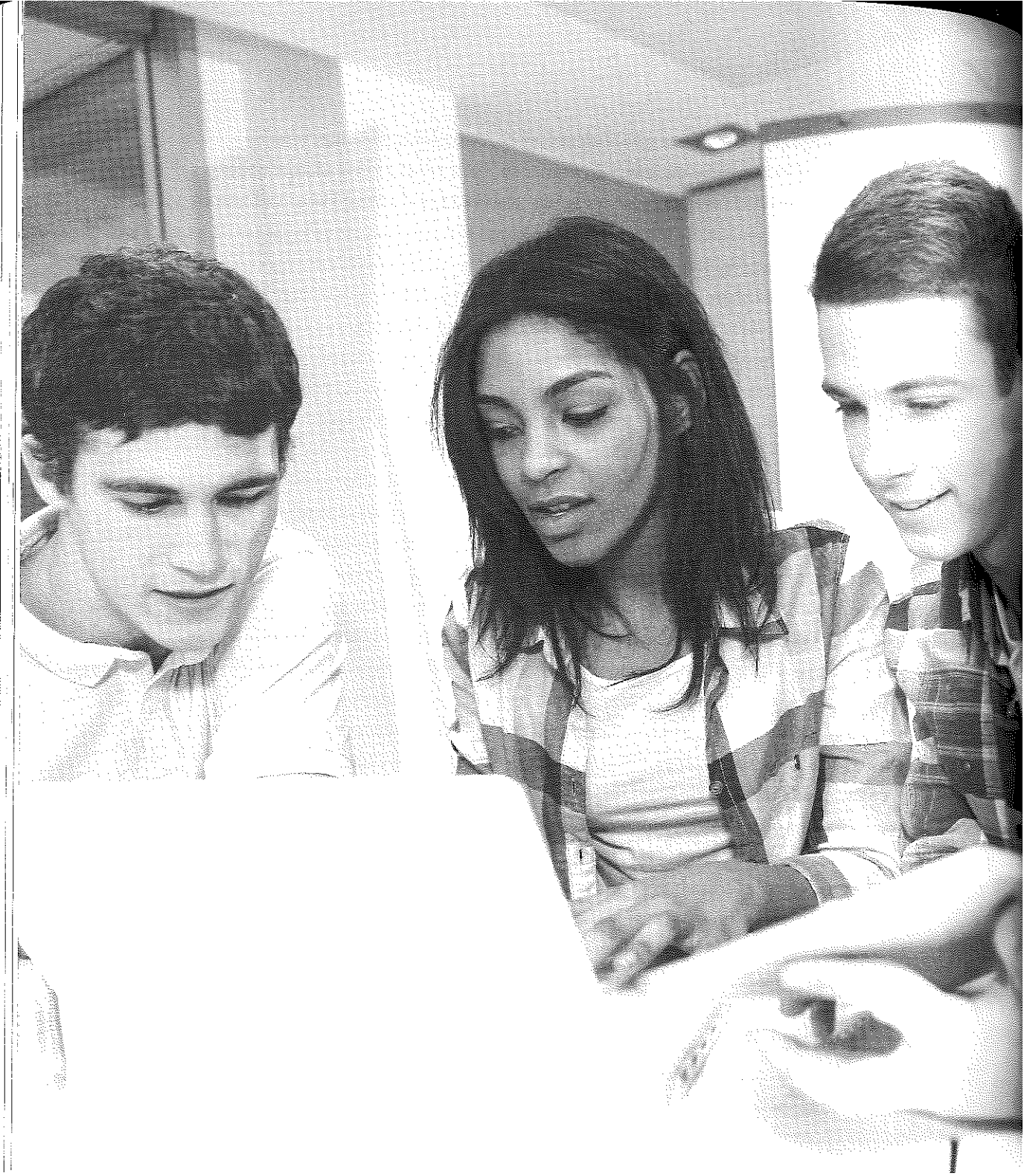


Inquiry Units

Vanessa Brechling wanted her advanced algebra students to learn about exponential functions and their practical applications, and so she launched the kids on a study of historic population trends in various countries. She brought in population reports on Russia, China, India, South Africa, Germany, Japan, and the United States. Drawing on sources like the World Bank, the United Nations Population Program, the Organization for Economic Cooperation and Development, and the websites of individual countries, Vanessa was able to gather information that went back as far as a hundred years. The documents included data about birth rate surges and declines, steadily but not invariably rising life expectancies, and even the death rates of infants and women in childbirth. For example, one graph showed the strikingly low numbers of people born during World War II, and a previous dip among people born during the Russian famine and economic disruptions of the 1930s.

To start the unit, Vanessa asks her students to choose which country they want to work on, with groups of three to five focusing on each one. Then, each group reads the reports on their country and creates a list of factors they think have had the most influence on that particular population. In Russia, for example, poor health care in the more remote regions appears to play a major role, as has an increased rate of abortion. In some underdeveloped countries, AIDS is a large factor, though high rates of childbirth still ensure the population there increases. The students' task is to create a mathematical model of the population trend in their chosen country.

Next, students graph the existing data and relate the graph to the factors they identified in the population reports. The graph provides the students with a visual representation of the population trends. Then Vanessa asks groups to find a mathematical equation to fit the data in the graph. The equation needs to incorporate both the general trend of population growth, which is best described by an exponential model, and any specific changes in growth patterns that may have occurred due to wars, epidemics, changes in birth control policies, and so on. Through their investigations, the students learn about using various forms of mathematical

models to represent numerical changes in these patterns over time. Ultimately, the kids make predictions about future population trends for their countries.

The level of engagement in this project is high. Students take pride in choosing their countries and learning about them. They decorate their graphs with national symbols—flags, pictures of major exports, scenery, and wildlife. They have fun while performing mathematical analyses similar to those government statisticians do. They use the reports to find explanations for increases or drops in population. They get the satisfaction that comes from investigating actual phenomena and making sense of it. And they explain their charts proudly to visitors.

By the completion of this project, Vanessa's class has covered a variety of topics on her Advanced Algebra curriculum list. In Common Core terms, this lesson has helped students learn math that is reflected in the standards shown in the chart.

COMMON CORE math standards covered by this inquiry

CCSS.Math.Content.HSF-LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

CCSS.Math.Content.HSF-LE.A.1b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

CCSS.Math.Content.HSF-LE.A.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

CCSS.Math.Content.HSF-LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

CCSS.Math.Content.HSF-LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

CCSS.Math.Content.HSA-SSE.A.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.

In listing the curriculum targets covered by her population project, we are "backmapping," a term we first learned from Wisconsin teacher Barbara Brodhagen (2007). Rather than start with a list of mandated standards and then design an isolated teaching activity to meet each one singly, Vanessa instead plans a longer inquiry project that has real-world significance, that is interesting to kids, *and* that involves key math concepts. Then she works backward to see which goals and standards the inquiry will address. This way, she can be sure that such an extended project is not taking time away from the items she needs to teach, but simply teaching them in a more powerful and memorable way.

CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.

CCSS.Math.Practice.MP2 Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations.

CCSS.Math.Practice.MP4 Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

CCSS.Math.Practice.MP5 Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software.

CCSS.Math.Practice.MP6 Attend to precision. Mathematically proficient students try to communicate precisely to others.

CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts.

Thanks for these correlations to Paul J. Karafiol, math teacher at Walter Payton High School in Chicago.

Inquiry: A New Old Idea

Engaging thematic units like Vanessa's may be fairly rare, but they are not brand-new. Dedicated and creative teachers have been creating such extended investigations for decades, maybe centuries. There is a whole family of project-based, problem-based, experiential, inquiry-oriented structures that focus on kids doing authentic and extended investigations of curricular topics. These approaches all share the goal of making kids active researchers instead of passive listeners. These instructional models also have a long and deep research base showing academic gains on a wide range of customary high-stakes measures. Linda Darling-Hammond's book *Powerful Learning: What We Know About Teaching for Understanding* (2008) is a compendium of this research.

Whatever the content and schedule, we can list some of the main characteristics of these projects, recognizing that creative teachers design many variations on the structures, adjusting activities to suit the learning needs of their classrooms.

Management Structures

Extended time: Students read, gather information, discuss, and write (or create other communicative materials) about a single topic for a substantial amount of time, usually over several class periods.

Focus on a significant issue: The topic involves a question or focus that connects with the larger world or a particular interest that students have. The topic often (but not always) crosses curricular boundaries. For example, subjects like climate change, recycling, globalization, animal extinction, child labor, space exploration, or gentrification inherently involve multiple disciplines—science, math, social studies, economics, and more.

Choice: The topic and questions around it are often generated by the students. Even with the more curriculum-driven inquiries, other elements of choice are introduced as much as possible—choices among subtopics, readings, other students to work with, kinds of research tasks (such as opinion surveys, Web searches, and phone calls to interview cooperating experts), and various ways for students to represent their learning.

Grouping: To allow for conversation and support and to tap the energy of social interaction, students often work on their inquiries in groups of three to five students. These groups are formed based on students' shared interest in a topic.

Teaming: Where possible, teachers conduct projects in interdisciplinary teams, each one helping students with a different aspect of the project.

Outcomes: Students complete reports, artifacts, presentations, activities, displays, and performances to represent their learning, share these with the rest of the class (or with a wider audience), respond to questions, and receive feedback.

Teacher Roles

Teach the research process: Provide activities and steps that help students become engaged, think critically about the topic, and work through stages to get it done (how to tell quickly if a book will be useful for your project, how to design good interview questions, how to take useful notes, how to decide whether a piece of information is important or tangential to your topic, etc.).

Build background knowledge: Build the "schema" or knowledge students need to comprehend relevant text, to understand and think about their topic more deeply and meaningfully.

Readings and resources: Share initial reading and viewing materials, and support the students in finding more (suggesting Internet websites, providing book lists).

Model research strategies: Instead of mostly presenting information, explicitly model your own research strategies. Just as we routinely do think-alouds with printed text, the inquiry teacher demonstrates through "search-alouds"—she projects the computer screen and narrates her thinking as she explores a topic online. Then she sits with kids side-by-side and coaches them as they try out these strategies with their own topics.

These principles can be brought to bear on wide range of curricular topics. In English, Jeff Wilhelm turned the classic play *Death of a Salesman* into an inquiry project by asking students to think about this question: "What are the costs and benefits of the American emphasis on sports?" Students started with a prereading questionnaire on their own attitudes about sports, and then went on to read sports-oriented short stories and poems, *Sports Illustrated*, newspaper sports sections, and athletes' endorsements in advertising, along with discussing Willy Loman and son Biff's interest in sports. They investigated particular questions related to the issue and concluded by making video documentaries and other visual displays. Three girls in the class even successfully campaigned to change the school's fall homecoming so it would recognize many activities, rather than just football. Jeff reports: "Every student completed the final project with uncharacteristic energy and passion" (Smith and Wilhelm, 2002).

English

In her eighth-grade social studies class in Chicago, Jacqueline Sanders meets a required consumer education standard with a unit she calls "Where does the money go?" She hooks kids by beginning: "You've been complaining that your parents say 'No' when you ask for that new Xbox. Do you wonder why? What do you think we'd need to know to understand whether your parents really can't afford those gifts, or are just putting you on?" The kids take some guesses about what rent and food costs are—a kind of KWL on family budgets. Jackie then distributes newspapers and sends the kids to the want ads to choose a job with a salary they think is adequate, and to write a resume and cover letter applying for it.

Consumer Ed.

Social Studies

The resumes require a pause for a minilesson, a look at examples on sites like www.Hotjobs.com and www.CareerBuilder.com, and some classroom writing time. Then work on family budgeting begins, based on the pay offered in the job ad. The kids learn that after dividing their annual salary into monthly gross pay amounts, they've got to compute and subtract withholding taxes. Next it's time for apartment hunting on the Web and in the newspaper. But now there's more tough news: they'll need to post a security deposit, with some landlords asking for two months' rent up front. Some students now realize they're in much too low a pay bracket and go back to choose another job—an interesting lesson about goals for their future.

Math

For food costs, the students return to the newspaper, with its Sunday ad pages. Motivated now to economize, the kids compare prices at Jewel, Dominick's, and other local chains. Next come utilities, with some initial discussion to clarify what these actually are. Jackie stipulates that heat and hot water are picked up by the landlord, so the kids just need to cover telephone and electricity—and cable, Internet, and cell phone service, if they can afford it. Interviews with parents confirm these costs. Using IRS instruction booklets,

students figure their final income tax returns. And at last they can determine if there's anything left over for treats and gifts. Since the seventh graders are working on a simpler version of the same project, the eighth graders also serve as "H&R Block" consultants to do the younger kids' taxes for them.

Obviously this project integrates economics, reading, writing, and math. While many good teachers have created projects similar to this one, we want to emphasize the range of reading for such a unit:

* newspaper want ads, apartment ads, and grocery ads
* sample resumes on the Internet
* booklets on wise shopping practices and guidelines for family budgeting
* news articles on the truth or illusion of price discounting in many stores
* articles on the comparative cost of living in various cities
* IRS form 1040EZ instruction booklet
* bills from home for electricity, telephone, groceries, car insurance, TV cable, cell phone, and other household expenses

By the time they are done with this lesson, Jackie says that most of her kids gain a new respect for how hard their parents work—and how expensive *everything* is!

What Is Inquiry?

In 2009, Smokey and our colleague Stephanie Harvey introduced a new version of small-group investigations called *inquiry circles*. Steph had already written a classic text about individual student inquiry called *Nonfiction Matters* (1998; a new edition is coming soon). Smokey had been updating a neglected fifty-year-old instructional model called "small-group investigations" (Joyce and Weil, 2008). They agreed that well-structured peer collaboration might be the missing link in many school research projects. After all, so many of today's most important developments, innovations, and breakthroughs are achieved by teams of people working together; think of the scientists on the Mars exploration team, the doctors conducting new drug trials, the tech wizards in Silicon Valley cooking up the Next Big Thing.

Steph and Smokey jokingly introduced these inquiry circles as "book clubs on steroids." Instead of just picking a book to read (as we discussed in Chapter 9), here small groups of three to five students pick a curricular *topic* to investigate—which opens up the whole world of resources to read, view, ponder, and analyze.

Types of inquiry projects

In their book, Steph and Smokey talk about four types of inquiry circle projects that can be done with small groups of students in any class:

Mini-inquiries: These are brief, in-class investigations of questions posed by students (e.g., why does lightning make noise?). Teachers call these "quick-finds" and use them to honor kids' curiosity as well as model how we get answers to questions of all kinds. These can last from five minutes to a couple of hours. We use these brief inquiries, especially early in the school year, to honor kids' curiosity and show them ways of getting answers to puzzling questions.

Curricular inquiries: More extended investigations of key concepts in the course (Civil War battles, probability in different casino games, marsupials, sonnets), these are the bread-and-butter version of inquiry circles. They can replace whole chunks of presentational teaching, and we use them all year long.

Book club inquiries: After reading a novel or nonfiction book, groups conduct research into lingering questions they have about the topic, issue, time period, author, or debate.

Open inquiries: Often done toward the end of the year, small teams of students choose their own "hot topics" or "burning questions" to investigate.

Steps in inquiry projects

In all types of inquiries, circles move through the same four steps of research:

* First they *immerse* themselves in the possible topics, browsing, marinating, building background knowledge, and wondering.
* Second, they *investigate*—develop research questions, search for information, collect data, develop hypotheses, ponder arguments, and question points of view.
* Third, they *coalesce* around a narrowed topic or question, intensifying research, digging deeper, synthesizing information, and building knowledge.

* Fourth, they *go public*, sharing what they have learned, demonstrating understanding, or taking action. This final, often neglected step is especially important because it gives students an authentic audience, purpose, and occasion for carefully presenting their findings.

Is this sounding a little abstract? Let's jump into Ben Kovacs' sixth-grade classroom at Burley School in Chicago, where the curricular topic at hand is civil rights. (For the classroom video of this lesson, see Harvey and Daniels, 2011.)

Ben's kids have already spent several class days studying the 1960s civil rights movement among African Americans in the South, and have a pretty good handle on the basic facts and the broad themes of justice, resistance, organizing, nonviolence, and negotiation. Now Ben wants them to explore the civil rights struggles of some other people, at other times in history. Inquiry circles will be the perfect tool for these explorations. Here's how the stages unfold.

Social Studies

Immerse. To open up the range of other civil rights struggles, Ben projects and thinks aloud about an article on migrant workers in California. The piece describes the difficult working and living conditions of migrant families in the 1970s. As Ben does his think-aloud, he stops to vocalize his own curiosity, reactions, and concerns and jot notes in the margin. After reading a sentence about how migrant families often live in a car, a tent, or a one-room shack, Ben stops. "Wow, I have to ask a question about this," he says. "How does a person's home affect their way of life? Turn and talk about that with your partner. What were your feelings when you heard this part of the article?" After a minute of conversation, he calls kids back to share. Ray volunteers: "If I were living there I'd feel endangered all the time. The weather gets bad. It would be hard to make friends if you were really poor and all the other kids were really rich. It would make me feel sad all the time." Ben quietly writes down the word *endangered* on the screen.

After working through the article, Ben points to the back table, where he has placed copies of seven short articles about different civil rights issues—the rights of women, homosexuals, workers, child laborers, elders, the handicapped, and illegal immigrants. Sending kids to the table a few at a time by their birthday month, Ben gives them plenty of time to peruse the choices and pick the article that most piques their interest. Meanwhile, he sits with the rest on the rug talking about their possible civil rights topics. Alexis' comments that she's interested in the rights of homosexuals: "Some people on my dad's side of the family are very religious, but

I have my own thoughts about gays and lesbians, and I want to learn more about their struggle." Alexis's assumption that all people of faith have a united point of view about homosexuality could become an important point to explore, and one that would easily be overlooked with a more traditional approach to teaching the subject matter.

Once they have made their selections, kids read and annotate their chosen article (and many read several). Ben helps them to mingle with others to find out who has similar interests, and gradually groups of three to five are tentatively formed around which civil rights struggle each student wants to investigate.

Investigate. Starting the next day, Ben and the kids have a "reading frenzy," gathering and devouring tons of stuff on the chosen civil rights topics, looking at online video clips, printing out key articles, and constantly talking with each other. They keep notes and documents in folders, but at this stage the emphasis is on hoovering up as much information as possible. Ben comes around to visit groups as they are feasting on this information. As he sits down with the group that's chosen to focus on LGBT rights, the kids are talking about how some states have passed laws approving same-sex marriage—and others haven't. Alexis comments, "As I was reading these articles, I've got a lot of questions. I believe the government was trying to deny them benefits like social security, when they're basically like regular marriages? The only difference is that it's same sex."

Anthony interjects, "Yeah, they are all citizens. It shouldn't really matter—it's not fair."

Alexis agrees. "I just feel like the government has been saying that all people have the same rights, but they don't."

At this point Ben suggests a next step. "This is such a complex situation you really have to read more about it. One thing I'm thinking is that you probably need a little comparing and contrasting between marriage and civil unions."

Tom blurts out, "I don't even know what a civil union is!"

Now, Ben helps the kids refine their search, homing in on missing information. Having offered this team a promising focus for their further investigations, he moves on to the next group.

Coalesce. Now the different civil rights groups target their key questions for deeper research. They've reshaped and refined their inquiry questions, and had a minilesson with Ben about how to turn these into searchable terms. Now they can dive into more focused research, using books, articles, websites, videos, library visits, telephone interviews of topic experts, and

more. While subtopics are typically parceled out to individuals, teams meet regularly to monitor schedules, complete specific tasks, and plan for going public. A big part of Ben's job as an inquiry circle facilitator is to help kids monitor their plans, workload, and schedule by making mindful "midcourse corrections" as the project unfolds.

As kids continue their research, Ben calls everyone together for a check-in. "So, you guys have already done a lot, but there's only two weeks left." He shows them a list of tasks achieved and a calendar for the remaining class time. In keeping with the principles of collaborative learning, each student will both do an individual project (in this case, writing a "feature article" summarizing their research) and join in a group project. At Burley, students always have multiple ways to share their inquiry circle learning through podcasts, gallery walks, skits, displays, presentations, or other performances. Most of the time, the audience is the rest of the class, or the other sixth-grade class across the hall. But at this particular time, the school's annual learning fair is coming up. This means Ben's kids can show parents and community members what they have learned about civil rights at an event they call "Explore More."

Go Public. On the appointed day of "Explore More," dozens of parents and neighborhood friends (including dignitaries from the school district) pour into Ben's classroom to enjoy a series of performances about civil rights—all presented by puppets kids have made, voiced, scripted, and rehearsed. Some turn out to be giant-sized, bigger than life, while others are handheld, and a few will be seen on video. In just minutes, an audience of over seventy people has crowded into the room, including the rest of the sixth graders sitting on the floor in back.

Right at center stage is the set for a new TV program—LGBT News. Rodney and Amy manipulate two puppet newscasters (comically made to look exactly like them) at the anchor desk. The group has rigged up a screen that rear-projects headlines and graphics, just like on a real news show. "Welcome to LGBT News!" Amy's puppet declares as the show hits the air. Headlines appear on the screen and the kids run through some key events in LGBT history. "Connecticut judicially declared same-sex marriage legal in October of 2008," she reports. "Meanwhile, in California, advocates of Proposition 8 changed the state's constitution to a restricted definition of marriage, only opposite-sex couples, and eliminated same-sex couples' right to marry."

Accompanied by a frenzied graphic, Tyrone breaks in with an urgent "Bleep bleep! Breaking news!" From backstage, remote reporter Alexis intones: "Quite recently, both judicial and legislative methods sought to allow same-sex marriage in Iowa and Vermont,"

and gives the dates on which gay marriage became legal in those states. The kids go on to recount, breathlessly, more key events they have researched. While it's clear where the kids' personal loyalties lie, the show is balanced and doesn't editorialize. The broadcast wraps up with "Same-sex marriage has been a political issue for decades. People have positions on both sides of the issue. American citizens should be aware of these recent changes and be informed of more to come." Coming to the end of their allotted time (more puppets are waiting in the wings), anchorwoman Amy declares, "That's all we have time for, tune in next time for more LGBT news!" And finally, just to cap off the TV show theme, all the kids working backstage continue: "And we're closing in 5, 4, 3, 2, 1. We're off air!"

A VARIETY of inquiries

Structures for inquiry projects can vary widely, serving many instructional purposes. Considering the projects we've observed at a variety of schools, we can think of several types:

* inquiries on subtopics of traditional school subject matter—such as digestive diseases (as part of human anatomy) or abolitionist biographies (within U.S. history)
* inquiries focused on a large, often controversial question, such as "Is recent violent weather caused by human impact on the environment?" or "Should the USA have dropped the atomic bombs on Japan in WWII?"
* information-gathering on a subject that crosses several subject areas and/or goes beyond traditional subjects, such as students delving into their own family or community histories
* simulation activities in which students take on particular roles, research how their characters would respond to a particular situation, and then enact the situation as a culminating role-play
* "jigsawing" projects, in which small groups of students become experts on one aspect of a subject area, meet to share their findings, and then engage with other teams to see what they have learned.

Management Tips for Inquiry Projects

Whatever inquiry variation you choose, based on your students' needs and your subject's demands, here are some important strategies we've learned for ensuring that inquiry projects don't get bogged down or backslide to traditional, mechanical, plagiarized research papers.

* Help the students identify a large, multifaceted, open-ended question, something people can disagree about, to focus and motivate their inquiry. This can be a single question for the whole class ("Why do we always have wars?" "Is space exploration worth what it costs?"), or separate questions for each small group or individual. It's most meaningful if the questions are ones students have posed, but your own can work too, if you choose well. Use interest-generating activities like questionnaires or comparison of brief, controversial cases to make the questions real and urgent for students—"If we can treat diseases with animal genes, will we still be 'human'?" "How do advertisers deceive us with numbers?"
* Create opportunities for student choice, even when you need to keep the focus on required course material. Sometimes enthusiastic teachers predesign a project so completely that students just march through the steps, rather than questioning and inquiring with real care. But even limited choices under a mandated curricular umbrella mean a lot to students, signaling that their judgment is valued and their voice heard.
* At the same time, you know your kids, and can probably anticipate some areas of probable interest. Have some materials ready in a number of likely areas so that you're not searching frantically at the last minute to find readings for ten—or thirty—different projects! Since finding good material the kids can understand is one of the most challenging of research tasks, you'll want to have books, articles, videos, and websites ready, or check on where they can be found on the Internet.
* If students are unfamiliar with the subject, arrange for them to do some reading of short pieces, or other information-gathering before they choose and begin specific projects. It helps to build prior knowledge so that students make choices they are truly invested in.
* Consider requiring kids to do some inquiry projects in groups of two to five, subdividing their main question into subtopics or aspects for which they take individual responsibility. That way, there will be fewer different

topics being researched at once, the kids can support each other, and you can more easily handle the demands for help. Of course, you'll often have the bright loner who demands to do something special on his or her own. Your own good judgment as a teacher will guide you here.

* Provide guidance for each step in the research process, and monitor kids' progress. If they're floundering on their own, they'll learn and succeed only if you help them. Conduct minilessons on how to take notes, develop searchable terms, ask good interview questions, organize information, create a Keynote/PowerPoint/podcast/video/blog—whatever your project requires and you see that the students need.
* Build in a meaningful process for sharing the knowledge that students have gained. For example, in an effective "learning fair," students not only create charts and demonstrations, but also present explanations and answer questions while visiting "judges"—parents, community members, other teachers, other kids—circulate and fill out response sheets. Science teacher Melissa Bryant-Neal also required her classes to ask questions of presenters, write entries in their journals after each presentation, and make lists of new vocabulary they're learning, so that the presentations became real learning experiences for the audience and not just recitations for the teacher.
* Don't start too big! A project that takes parts of three or four days can be plenty. Then if your structure works well, go ahead and expand it next time around.
* Team up with one or more teachers in another subject area, if at all possible. This will support integration of subjects and give each of you some welcome support. While most inquiry projects in most schools are planned and operated by individual teachers in their own classrooms, it's especially energizing when groups of kids and teachers can join in cross-subject investigations that involve several teachers and their classes. Some schools already invite this kind of collaboration with co-taught courses like American Studies. In a school that supports grade-level faculty teaming, teachers can easily work together on projects because they share the same kids and enjoy common planning time. They can divide up subtopics and each teach about one of them. Individuals can take charge of particular activities and the students cycle through all the classrooms. Teachers can reshuffle the kids according to the kind or focus of presentation they choose.

Assessment (and Grading) of Inquiry Projects

First, let's address the simpler subject of grading. For inquiry projects, we tend to use the same repertoire of grading strategies that we outlined for book club assessment on pages 250–251. That means awarding "good faith effort" points for preparation and engagement each day; collecting and reviewing work samples such as annotated articles; checking group work plans and schedules; using observation forms as we sit with individual groups; and scoring individual-accountability outcomes, like essays and reports.

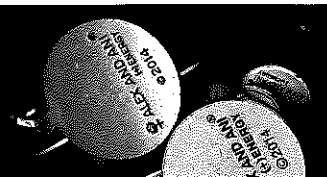
When we come to the end of a multiday inquiry, we use a co-created rubric to score group projects or performances. For example, take a look at the rubric on the following page that Melissa Bryant-Neal's biology students helped her develop for scoring presentations on digestive diseases. **Biology**

Hopefully, you can imagine creating a similar rubric for almost any inquiry topic your kids might investigate. We always begin by asking kids, "What would a successful performance in this domain look like? Sound like? Include? Avoid? Let's start by listing some of those criteria, and then we'll winnow them down to a manageable list of traits that we all agree are valuable. Next, we'll assign each one an appropriate weight, and then we'll affirm this as our assessment rubric for all groups on these projects. When people share their learning, we'll all fill out a form and hand them back to the presenting group. Afterward, I'll collect them all and compute the averages."

That probably covers our department and district needs, but what about state and national standards? How do we know that kids are learning what has been mandated and will be covered on the big tests? Back to the back-mapping strategy we introduced earlier in this chapter. Make yourself a three-column chart. In the left column, jot down *your own skill and content goals* for the inquiry project. Then in the center column, list items from your *district or state standards* that match those in the first column. In the right-hand column, list the *standards to be met if you are teaching a Common Core subject* like math or English, or a science class covered by the Next Generation Science Standards (2013).

Yes, We Do Have Time for Inquiry!

A chemistry teacher worried about covering all the topics for the district test, an English teacher with a prescribed list of novels to get through, a math teacher concerned about the kids' transition to advanced algebra and trig—all may wonder how to make room for these



Objectives	Low Performance 2 points	Needs Some Work 4 points	Getting There 6 points	Mastered 8 points	Earned Points
Case background detail	Fails to give background about the case, or gives very little.	Addresses patient profile somewhat, yet misses two or more necessary components.	Addresses patient profile in detail, yet misses one of the necessary components.	Addresses patient profile in detail: history, family, social, symptoms, mediations, lab data.	
Scientific accuracy	Many inaccuracies, terms not defined, group does not seem to understand main ideas.	Some inaccuracies; terms not explained. Group could respond to questions but not in detail.	Mostly accurate and research evident. Some terms a bit confusing but main ideas clear.	Well researched and accurate. Group could define and explain new terms and concepts, answer questions.	
Research questions	Many questions unanswered or incorrectly answered with little effort to tie to case.	Very little detail on questions and some inaccuracies.	Most questions answered accurately, with some detail missing.	All questions answered accurately, in detail, and group can relate them to the case.	
Teamwork	Group effort extremely unequal. One member dominated presentation and/or one person failed to participate.	Some group members seem more prepared & research-grounded than others.	Group mostly equal but at times one member dominated presentation or one left out.	All group members participated equally and helped each other research and explain case.	
Presentation style	Mainly reads from paper, rarely interests audience, lacks inspiration; little confidence in subject.	Reading often from paper, little eye contact, gets some audience attention but doesn't inspire discussion.	One of the qualities missing and lacking some confidence.	Gets audience attention, interests class in case, inspires discussion, shows confidence in subject.	
				SCORE	

ambitious projects when there's already so much to cover. And we won't tell you that in-depth inquiry projects don't take time—they do. But the reasons for doing these projects are irresistible.

First, the effect on students' approach to learning and reading is just too large and too important for them to miss out. These inquiry projects give students valuable experience in what it's like to be responsible, independent thinkers. We teachers often use the phrase *lifelong learner*, but we need to turn that platitude into a reality for kids. And these projects are often memorable, among the few learning experiences students remember long afterward. Too often, kids experience school reading as drudgery to muck through however they can. So it boils down to a trade-off. For sure, we can try to "cover" all the material, with most of our students passing a chapter test and immediately forgetting most of what was taught. Or, we can be more strategic in what we emphasize, going deeper into a smaller number of topics, exactly as the Next Generation Science Standards (2013) suggest. That way, we can make room for these valuable extended inquiries, so that more of our students will genuinely understand some key topics, and come to own the subjects we teach.

Project work may be even more essential for our struggling students. If they've had some time to read and inquire in depth on topics that matter to them, it's much more likely that they'll understand and engage with more of the standard textbook material we do have to cover. The choice is simple: stick to the textbook and lose most of these students permanently, or incorporate some inquiry projects that get students engaged and keep them going through the drier spells.

The national standards documents—not just the Common Core, but Next Generation Science Standards as well—desperately plead for students to be given opportunities to ask important questions, read a variety of real-world materials, think critically, and inquire more deeply into specific topics, rather than skim lightly over endless parades of facts. While test makers have not always honored these recommendations, we know that such in-depth inquiry is vital for the preparation of competent experts in our fields—as well as the fellow citizens who live on our block.

Anyway, the projects don't have to take forever. Melissa Bryant-Neal's digestive-system disease reports required a total of two double-period classes—one for her to introduce the structure and get the kids going on their research, and a second one for the groups to finish writing their reports and present them orally.

As tight as our curriculum and time schedules may seem to be, in-depth inquiry projects are some of our most powerful teaching strategies for making reading and learning matter for

our students. At Addison Trail High School, in the suburbs west of Chicago, the very popular Freshman Studies program focuses much of its entire curriculum on interdisciplinary learning, combining English, history, and biology. Here are some typical student comments at the end of the year:

> "When I really thought about this year, I enjoyed most of it. I enjoyed the class and the discussions. Also, there was a connection between the students and the teachers that you don't see often."
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> "Now that it is the end of the year, I am no longer afraid to go up to the front of the class to give a speech. I am much more confident."
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> "When I first signed up for Freshman Studies, people warned me not to take the class because there were too many projects. I did anyway, and I am so glad that I did. I will miss this class so much."