The Role of the Teacher

Planning

Where to begin?
There are certain decisions to make before beginning to use science notebooks in the classroom.

• What type of notebook should be used?
• What should be included with every notebook entry?
• What will students write about in their notebooks?
• What organizational tools will students need?
• Which experience will provide students with a meaningful starting point?

What type of notebook should be used?
To begin, the teacher must decide the physical structure of the science notebook. There are a variety of options, including composition books, spiral notebooks, three-ring binders, two-pocket folders with prongs, or pieces of folded paper stapled with or without a cover. Preference on the type of notebook varies; however, many have found that the composition book allows students to keep a running record of the work and thinking they do throughout the year and represents growth over time. Using a composition book provides ample flexibility for first-time use. Samples that appear in this book come from students who used composition books.

Thinking point: What type of notebook will you use?
What should be included with every notebook entry?

Another decision the teacher must consider is what information will be recorded with each entry; scientists often record the date, time, and weather. These items may not seem important in elementary science; however, by including this information in every entry, students are establishing habits of scientific documentation. Many teachers find it helpful for themselves and their students if a subject or title is included with each entry. This becomes a quick reference to locate information as students flip through their notebooks during discussion.

**Thinking point:** What information will you expect students to include in all entries?

What will students write about in their notebooks?

Notebooks provide a medium in which students document scientific investigations. It is the responsibility of the teacher to determine what is appropriate for the students to record. For example, it may be more realistic to expect drawings from first graders than the use of Venn diagrams. Chapter 2, “Elements of a Science Notebook,” offers a variety of ideas for recording at different grade levels. It may take time before students begin to utilize many of the elements, so it is important to have reasonable expectations. Beginning entries may appear discouraging. Figures 1–1 through 1–4 show beginning entries from students at four different grade levels. Some students may draw smiley faces on animals and write that their insect likes them. This should be expected, as students are most familiar and comfortable with that form of writing or drawing. Students

![Figure 1-1](image-url)  
**FIGURE 1–1** Beginning notebook entry of a second grader
It has a root and it has a little stem. And it has a shiny kiwi of seed. And it is green and a little hole. And it has white dots. And it was drawn on the dot mole. The sense is strong, smell sweet.

green

FIGURE 1-2  Beginning notebook entry of a third grader

will get better as they continue to work with notebooks and use them in their discussions with others. The more students use their notebooks, the more accurate their representations become. Students develop at different rates and their notebooks are no exception. Some students may take to their notebooks right away, recording in great detail, while other students may require extensive support in order to become proficient.

Thinking point: What are realistic expectations for your students' writing?

What organizational tools will students need?
In the beginning it may be necessary to talk with students about organizing their notebooks in a useful manner. One technique that may help with organization is the use of colored tabs. For example, a red tab could mark the section on insects and a yellow tab may signify the solids and liquids section. It may also be helpful to talk with students about using the next blank page rather than skipping around in their notebooks or using an entire page to record information rather than putting only one piece of information on a page. While these may sound like simple ideas, some students struggle with organizational skills, and such techniques may require direction in the form of guiding questions, minilessons, or modeling from both teachers and students.
Observation: apples

1. What it looks like:
   - It looks green with some little dots.
   - And with a stem sticking up.

2. What it feels like:
   - It feels hard.

When I poured the rice into the cup with the strange thing, it went fast and it made a loud rumbling sound.

I think the rice would go faster than the corn mill because the corn mill gets stuck and the rice doesn't. The green circle ones is green and some are brown. The brown one kind of gets stuck.
Pendulum

The Materials for this project we used are...
- tape
- pencil
- paperclip
- penny
- String

This project we made is called a pendulum. It looks like this:

![Diagram of a pendulum]

<table>
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<tr>
<th>Predicted R</th>
<th>R</th>
<th>Real</th>
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<tbody>
<tr>
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<td>23</td>
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</table>

I think that the higher the string goes, the longer it takes to make a complete swing.

FIGURE 1–4 Beginning notebook entry of a fifth grader
The teacher's style of organization, sequential or random, often impacts the outcome of students' notebooks. A word of caution about teaching only one style of organization: some students may have a difficult time following sequential thinking, causing frustration for both students and teacher. Yet it is important to establish some sense of organization initially; notebooks that are too random may not be useful tools. By allowing students choice in their organization, the teacher is helping them build an important skill. In time and with a little guidance, students will find an organizational technique that works for them.

**Thinking point:** What organizational tools do your students need?

**Which experience will provide students with a meaningful starting point?**

One of the most important things to consider in the beginning is which investigation will provide a solid foundation for the development of good scientific habits. The first experience should offer students the opportunity to record using various techniques. Observations that require more than one sense often work well. Having students observe familiar materials, such as fruit or the school grounds, would serve as an appropriate beginning activity. Since this investigation will set the stage for future recordings, it is important that it is engaging, promotes scientific conversation, and is developmentally appropriate. Ideas on how to set up this investigation are shared within the next section, "Implementation of Science Notebooks."

**Thinking point:** What will you use as your initial investigation?

After considering ideas on

- the type of notebook,
- information to be included in all entries,
- realistic expectations,
- organizational tools, and
- the initial investigation,

the teacher is ready to implement the science notebooks.
Implementation of Science Notebooks

As the teacher begins to put notebooks into practice, there are new considerations:

- What goals will science notebooks address?
- What will the first week actually look like?

What goals will science notebooks address?

One element of teaching involves setting goals for students' learning—objectives that students should achieve. In science, those goals come from state and district curricula in conjunction with the National Science Education Standards and the nature of science itself. The science notebooks enhance the scientific processes and encourage students to gain an understanding of scientific goals in a truly authentic manner. Content goals are often addressed in the curriculum materials adopted by districts; however, the process of science is similar across curriculum materials. Therefore, this book focuses on how science notebooks can be used in conjunction with any district curriculum and how the process goals, along with representation, help students understand the content.

With clear learning goals in mind, it is easier to facilitate students' experiences with science notebooks and guide students toward the desired understandings. Notebooks become a tool for helping students become better observers, classifiers, questioners, and so on. Notebooks may guide the teacher in planning the process skills on which to focus. For example, if students are having difficulty noting details, the teacher may focus on technical drawings to address the skill of observation. If a teacher doesn't have a clear understanding of the goals that are to be achieved, science becomes a series of activities rather than a connected investigation. The following classroom vignette demonstrates the goal setting of a teacher working with second-grade students.

At the beginning of each investigation, I look at what it is the students will be doing and consider (1) What are the content goals for this activity? For example, are students investigating the physical characteristics of an insect or determining what affects the pitch of an instrument? (2) What are the main process skills? For example, are students observing, comparing and contrasting, or collecting numerical data? In most science activities there are several process skills occurring simultaneously and it is difficult to separate them; however, I try to select one on which to focus. (3) What are different ways students might represent information?
Since I consider notebooks to be tools for the students, I focus on different ways the students might record the information, not necessarily the way I would do it. Once I have determined the focus of the lesson in terms of content, process, and representation, I am able to focus on facilitating the interactions between the students and their notebooks.

As with any good teaching, the goals of the lesson will shift according to students’ needs. This book focuses on the needs of students as they pertain to representation of information in words and/or pictures within notebooks. The content goals are always in mind but may be secondary to the ways students represent them.

What will the first week actually look like?
Since science notebooks may be new to students, it is important to thoroughly plan out the first few days of use. A thorough plan allows the teacher to think through all aspects and prepare for the unexpected. Although the scientific concept may differ from lesson to lesson, the process of learning to use notebooks is quite similar in all lessons. In the following example, the teacher begins by having students observe apples to provide a common experience with a familiar material. This allows students to focus on their notebooks rather than trying to make sense of the content of the investigation. The teacher then introduces a material that will be studied more in depth, as required by the curriculum guidelines.

Day One
Objective: Students will record observations of an apple.
Materials: apple, hand lenses, notebooks
Procedure (45+ minutes):
1. Introduce the lesson: discuss with students that they will be observing an apple and recording what they notice. (2 minutes)
2. Introduce notebooks as tools to help students keep track of their observations. Discuss the essential components of every entry (date and subject) with students. (5 minutes)
3. Have students observe the apple and record their findings. (10 minutes)
4. Ask students to sit on the floor and share observations of their apple with a partner. (3 minutes)
5. Ask students to share observations as a whole group using their science notebooks. Record observations on the board. (10 minutes)
6. Have students share how they recorded their information (words, sentences, pictures). Ask students to discuss the benefits of various recording methods. (5 minutes)

7. Introduce the hand lens and how to use it.

8. Provide time for students to continue observing their apples and adding to their recording. (10 minutes)

9. If time permits, students return to the floor and share their observations, if not, begin day two with sharing.

10. Let students know they may eat the apples.

Day Two

Objective: Students will record observations of plant structures. Establish patterns of discussion.

Materials: plants, notebooks

Procedure (50 minutes):

1. Gather students on the floor to read the observations they recorded on day one. Invite students to share their observations with the whole group by asking questions about the color and shape of the apples. Ask students how they know this information. (5 minutes)

2. Ask students to look at how they recorded the information in their notebooks. Have students share various methods. (5 minutes)

3. Introduce the plant(s): share with students that they will work with partners to observe and record information about their plant. (15 minutes)

4. Have students return to the floor and share their findings with a different partner. (5 minutes)

5. Ask students to share their observations with the whole group. After one student shares his observations, provide time for other students to ask questions or make comments regarding what was shared. (10 minutes)

6. After the discussion, give students time to record any additional information they would like to add to their notebooks. (5 minutes)

7. Have students return to the plants to make further observations. (5 minutes)

Day Three

Objective: Students will record observations of plant structures. Students will be introduced to relevant vocabulary. Students will discuss methods of recording.
Materials: plants, hand lenses, notebooks

Procedure (45+ minutes):

1. Ask students to sit on the floor and individually review their notebook entries from the previous day prior to discussing their observations with a new partner. (5 minutes)
2. Have individuals share observations with the whole group. Continue to provide time for questions and comments for each student. (5 minutes)
3. Discuss with students that they will be looking at the same plants as before, but this time a hand lens will be available. (2 minutes)
4. Prior to returning to the plants, ask students to think about what they are going to observe. Allow time for students to discuss ideas with others. Once they have a focus in mind, ask the students how they plan to record their observations. Have students share how they are going to record (pictures, labels, sentences, etc.). (5 minutes)
5. Have students return to the plants and make further observations. (15 minutes)
6. Ask students to return to the floor and share observations. As students share their observations, listen for the terminology they use to describe the plant structures. Direct the students’ focus on the formal vocabulary by connecting their informal language to the plant terminology. (10 minutes)
7. Prior to cleaning up, provide students with time to add to their observations. Students may or may not naturally incorporate new words that were introduced during the discussion. Encourage students to use the words if they find them helpful in describing their observations. (3 minutes)

Day Four

Objective: Students will draw and label plant structures.

Materials: plants, hand lenses, notebooks, colored pencils

Procedure (52 minutes):

1. Gather students on the floor and review their recordings from the previous days. (2 minutes)
2. In groups of three or four, ask students to discuss different ways they recorded their information. As students share, ask them to explain how they recorded their information. (5 minutes)
3. After all groups have shared how they recorded their information, focus on drawings of the plants. Discuss what information might be shown in a drawing. Guide students to notice that the plant structures can be recorded quite easily using a drawing. Ask students what else
might help them record plant structures along with the drawings. Guide students to use labels along with their drawings to show the various parts of the plant. (10 minutes)

4. Before students continue with their observations, have them discuss with a partner what they might draw and label while observing their plants. (2 minutes)

5. Introduce the colored pencils as tools that they may use to more accurately record their plant observations. (2 minutes)

6. Ask students to observe their plants and record their observations. (15 minutes)

7. Have students return to the floor and share their observations with a different partner. (5 minutes)

8. Focus the whole-group discussion on how observations were recorded. Are students drawing their plants and labeling the structures? Have students share their techniques for recording with the class. (6 minutes)

9. Have students discuss with a partner how they might improve their recording the next time they look at plants. They may need some suggestions such as using correct colors, labeling the structures, or labeling only the important things rather than everything. (5 minutes)

Day Five

Objective: Compare and contrast two different plants and their structures. Students develop strategies to record information on two different objects.

Materials: colored pencils, hand lenses, notebooks, different plants

Procedure (60 minutes):

1. Have students review their previous observations. Revisit how students might improve their recording. (5 minutes)

2. Introduce the new plant. Discuss with the students that they will be looking at a new type of plant today. Students may wish to revisit the first plant to compare it with the new plant. Have students think about how they are going to record their information on two different plants. Have a few students share their recording strategies. (10 minutes)

3. Have students observe and record information about their new plant with a partner. Students may revisit the first plant and add information to their notebooks. (10 minutes)

4. Gather students on the floor to share their findings with each other. (3 minutes)

5. Ask students to share their findings with the whole group. Students will need to clarify which plant they are discussing. (10 minutes)
6. After the students have shared, have them look at their notebooks and discuss how they were able to record information about the two separate plants. Share strategies with the whole group. (5 minutes)

7. Before returning to their plants, have students think about how they will continue to record their information. Let them know that it is okay to try new ways in order to find one that works best for them. (2 minutes)

8. Have students return to their plants and make more observations. (10 minutes)

9. Ask students to return to the floor to discuss their findings. (5 minutes)

This schedule is one way to introduce science notebooks. Teachers may have to make adjustments to accommodate student readiness. As in any subject area, the teacher needs to constantly assess where students are and adjust the plan accordingly. The next section looks more closely at the role science notebooks play in informing instructional practice.

**Formative Assessment**

Formative assessment refers to assessments that provide information to students and teachers that is used to improve teaching and learning. (National Research Council 2001, 25)

**What role do science notebooks play in formative assessment?**

As students use their notebooks, they become formative assessment tools for both the teacher and the students, serving as an aid in terms of making learning decisions. They are not used by the teacher for summative assessment, nor are they a graded product. Rather, notebooks are tools for informing the teacher if students are meeting predetermined goals or if more instruction needs to be given. Even in the beginning stages of notebook use, it is important to consider students’ progress. Following are some questions the teacher may ask regarding students’ science notebooks. These may be helpful in determining where students are and what next steps may be appropriate. Other sections of this book provide further information for the teacher on next steps using the information gathered.

- Do students’ drawings enhance their entries?
- How often are students using drawings and how much time are they spending on them?
- How comfortable are students in using labels with their drawings?
- How do labels enhance or detract from the drawings students create?
• Is the use of color enhancing or impeding the students’ drawings?
• What types of questions are students asking and recording in their notebooks?
• How much of the students’ recording is fact and how much is fiction?
• What types of recording strategies are students utilizing?
• What organizational strategies would make notebooks more useful for students?
• When observing live organisms, how do students represent the behaviors and structures of the organisms?
• What evidence do students show of their thinking and understanding?
• How do students make use of their notebooks in small- and whole-group discussions?
• When do students choose to record information in their notebooks?
• When do students choose to use information in their notebooks?

**What does formative assessment look like?**

While collecting and reviewing notebooks is one way to assess students’ progress, there are other methods that provide similar data. Two key elements in understanding how students are using their science notebooks are observing and listening. There is a great deal to be learned by sitting back and observing how students use their science notebooks. As students work, the teacher can walk around the room and use a checklist to make note of students’ methods of recording, use of process skills, or understanding of content. Class discussions serve as another source for assessing what students know. Observing how students use their notebooks during a discussion may indicate the amount of information contained in the notebooks or the usefulness of recording methods.

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**Thinking point:** How will I gather data to formatively assess my students?

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**Developing Science Notebooks**

**Now that students have begun using notebooks, how are they supported?**

One of the most important roles for the teacher is to support students’ use of notebooks. In order to be used in a scientific manner, notebooks need to be available during an investigation and then utilized in discussions with others. This does not occur naturally for many students and may
require assistance from the teacher to become habit. In the beginning, it may seem as though a great deal of time is being invested; consider it as time spent building a solid foundation for scientific thinking.

As students work to develop science content, they work through several experiences with the materials followed by class discussions. This cycle of interaction, described in the following sections, examines the roles of the students and the teacher throughout an investigation. It is important to note that this cycle may take place over the course of several days. The vignettes throughout the following sections describe how a teacher worked with a second-grade class throughout the cycle.

- materials: exploration
- discussion: setting the stage
- materials: recording strategies
- discussion: small and whole group
- materials: content
- discussion: content
- notebooks: reflection

Materials: Exploration
Whenever students are introduced to something new, it is important that they have time to explore the materials and concepts freely. This allows them to formulate ideas without any preconceived notions. Students may or may not record during this initial exploration—that is okay.

Discussion: Setting the Stage
This second phase of the cycle allows students to share initial ideas and provides them with the support they may need for recording. This discussion takes place only after students have manipulated the materials and had some time to form their own ideas.

Many times throughout an investigation I gather the students to a discussion area; this is an area away from their work space where we can go over directions and discuss the activity. To get students thinking about how they might record the information, I ask leading questions. For example, “How might you organize the information you are collecting about the way water flows?” They begin by sharing their thoughts with someone sitting near them before sharing with the group; this provides everyone the opportunity to share something in a nontoxic environment. It also allows students who may not have an
Idea or be able to verbalize their idea clearly to receive help from others. Then we share our thoughts about recording as a class; the students share their ideas about recording and then I ask the group for questions they may have about the recording strategies the students shared. Before ending the discussion, I ask students to talk about what recording strategy they plan to use when they return to the materials.

After this type of discussion, students have a variety of strategies they can use to record their thinking. This builds in a certain amount of success in using notebooks and focuses their learning for the investigation.

Materials: Recording Strategies
Once students are focused on how to record, they return to the materials. While this exploration looks similar to the initial one, there are differences. This time, the teacher formatively assesses students' learning and determines the focus of the next discussion.

I frequently walk around during the activity to observe how students are working with the content and the process. I keep their ideas of recording strategies in the back of my mind and ask myself how the students are progressing. I only interact with the students to clarify directions or redirect their attention to the activity. They need this time with the materials to continue formulating their ideas; if I jump in too quickly, I am likely to interrupt their learning. Students need time to work uninterrupted in order to fully understand their thought processes and questions, allowing them to truly internalize the science concepts. During this time, I note if students are struggling with any of the process skills, like organizing the data or labeling.

Discussion: Small and Whole Group
This discussion period becomes a pivotal point in students' recording. Based on data gathered during the last interaction with the materials and the recording strategies used, the teacher chooses a focus for discussion. Through careful questioning, the teacher guides the students to examine various techniques.

After a brief fifteen- to twenty-minute period working with the materials, I call the students back for a discussion using their
notebooks. I begin by asking students what type of recording strategy they used. Then I ask them to focus on one particular aspect of the investigation, directing their discussion toward the concept being learned. I give them a couple of minutes to look over their notes and make additions before they share their thoughts. I ask them to discuss with a friend, using their notebooks, what they have been doing and learning and what questions they now have. Then I ask the students to share as a class, again allowing the students time to question each other.

I never skip sharing with a friend because that is the most powerful part of the activity, as oral communication builds literacy. Students feel that sharing is valuable because they are working, making progress, and sharing that progress with each other. It holds everyone in the class accountable to each other.

Occasionally, if the content is difficult, we discuss it and I provide some guidance. However, I intentionally put off most of the content discussion until students have more time with the materials. The last thing we talk about before returning to the investigation is next steps the students will take. Again, the students discuss it with each other before sharing as a class.

**Materials: Content**

Once students have started to use strategies for recording information, the focus changes to understanding of the content. As students continue to work with the materials, the teacher assesses their understanding and determines next steps to take in terms of instruction.

When students return to the investigation, I observe how they are recording, but this time I am more focused on the content. I interact more with the students and ask them questions such as “What are you finding? What are your thoughts? What evidence do you have to support your thinking?” Sometimes I ask why they are recording the information the way they are. I determine how the whole class is progressing. Do they need more time with this experience or do they need more experiences to understand the content?

**Discussion: Content**

Science notebooks are tools to aid students in understanding scientific content. Once students have had experience with the concept and have formulated initial ideas, small- and whole-group discussions take place to help students solidify conceptual understandings.
After students have had time to focus on the content, I call them back to the floor. I provide a few minutes for them to write down any thoughts they may have but have not yet recorded, and then I ask them to share with a partner. The purpose of this discussion is to communicate their thinking. Keeping this in mind, I often begin the group discussion with a question such as “What did you discover?” Again, the students discuss this with each other before sharing ideas with the whole group. This discussion serves as an opportunity for students to examine the purpose of their work. It also serves as a time in which I can formatively assess students’ content knowledge.

**Notebooks: Reflection**

Students benefit from writing in science, as it allows them a means to process their thinking. By giving them time to reflect on their thoughts, the teacher is asking them to make sense of their learning. These reflections can serve as a window into their true understandings.

Students finish recording while I walk around the room and encourage them to record any thoughts, explanations, questions, and so on that might help them later. I have found that the students who were actively engaged with the materials benefit from this time; it allows them time to process their thoughts without distractions. There were times when we were at the end of the day and students would be so engaged in recording their thoughts that they stayed even after the bell rang.

By allowing students time to work without interruptions, the teacher is helping them internalize the science concepts and make them their own. Students need time to explore their own thought processes and questions. It is the teacher’s responsibility to pull the students’ thoughts together and begin to help students make connections between their thoughts and the concept being explored. These connections begin to form when students share in small- and whole-group discussions.

**What types of modeling support the development of science notebooks?**

While students need models of science notebooks, it is important to think about how much modeling should take place. Looking first at what students are able to do independently allows the teacher to determine how much guidance to provide. To develop a repertoire of strategies,
students may find it helpful to see models of various methods. Students are less likely to become dependent upon teacher guidance when they are encouraged to share their work with one another rather than learning from teacher-generated models. This allows the teacher to focus first on what students know and what they can learn from each other. If there is a particular strategy that would be beneficial, based upon the data collected through formative assessment, and students are not utilizing it, then it is important for the teacher to introduce that strategy to the students.

Thinking point: To what extent is modeling appropriate for your students?

Creating a Purpose for Notebooks

Why create a purpose?
Notebooks are an important component of scientists’ work, and they should be important components of students’ investigations. If students do not have a purpose for them, notebooks simply become a busy activity. Students also need a reason to record while they work; otherwise the materials are too alluring and recording does not take place. Students gain a better appreciation of the notebooks’ value if they use them in an authentic manner.

How is an authentic purpose for science notebooks created?
Scientists use their notebooks on a daily basis in the work they do and in conversations with others, similar to the way students use their notebooks. By having students use science notebooks to create a presentation of scientific findings to share with a larger audience, the teacher establishes an authentic purpose. Teachers should encourage students to share their understandings in scientific presentations to others that can be summatively assessed. These scientific presentations might take the form of an oral sharing, an expository text, a report, a slide show presentation, or a poster. Students use their notebooks to reference their questions, procedures, results, conclusions, and any new questions they may have while creating their presentations. The following vignette shows how fifth graders shared their understandings of environments.

My class had been studying different types of environments and how changes would impact plant growth. My scientific content goal was for students to recognize that several environmental
factors influence plant growth. Groups of students had planned and begun working on investigations based on questions they generated. A few days into their work, I announced that they would be sharing their investigations and results in the form of a slide show using a familiar computer program. The notebooks served as tools for students to recall their plans, data, thinking, results, and questions as they began to work on their slide shows. Students who recorded a great deal in their notebooks found them very helpful, while those who did not relied upon others. Following the presentations of their investigations, there was a noticeable change in students' recordings.

What is the vision for science notebooks?

The teacher's understanding of what is to be accomplished with science notebooks is used to create a vision of what the notebooks will look like and how they will be used. Naturally, this vision will evolve over time. The following vignette examines one teacher's vision over the first three years of notebook use.

Notebook development for me went from being very structured and teacher-centered to very student-centered over the course of three years. In my first year of implementing notebooks, my goal was student mastery of recording strategies. I wanted to show them all the different recording strategies I knew. I set up the structure for them, told them what to record, and showed them how to record it. Most of the notebooks looked similar, and many students met the goals. Reflecting back, I wonder if students really understood the strategies they used or if they were just following my directions.

The following year, I wanted my students to take more ownership of their notebooks. My goal was for students to select appropriate recording techniques. I introduced them to various recording strategies but left the decisions of what and how to record up to the students. When I looked at their notebooks, I focused on when and how they used the strategies. Over the course of the year, I began to realize that my students were using strategies I introduced to them, but they were not utilizing any other strategies. As students represented their understanding of the content, they used various recording strategies, but the data represented looked similar. At the end of the year, I wondered if the students really understood those strategies
or if they used them only because they thought that was the expectation.

In the third year, I gave control of the notebooks over to the students. My goal was for students to use notebooks in a way that made sense to them. At the beginning of the year, students brainstormed ideas for recording strategies, which were posted in the room for reference throughout the year. My mantra for the year became “Record in a way that will make sense to you later.” As the year progressed, I provided time for students to share the new strategies they were developing. I decided that the notebooks belonged to the students, not me, and stopped looking in them. Instead, I used conversations and presentations as guides in making my teaching decisions. I listened carefully to see what data and explanations they provided and evidence of their learning of scientific ideas to inform the choices I made.

Thinking point: What benefits and limitations are there to various amounts of structure?

There are many things to take into consideration when implementing science notebooks in the classroom. This chapter has brought those factors to light and posed thinking points throughout. Following are two final thinking points that are crucial to successful implementation of science notebooks.

Thinking point: Where are your students starting? What do you expect to accomplish with science notebooks?