Opportunities for ELA/ELD Connections

To help students develop their understanding of **causality [CCC-2]**, have them think of several effects for a cause or circumstance involving plants in different habitats using an "if/then" structure (either in narrative text or a poem). For example:

If a plant lives in the desert where there is not much water,

... *then* it needs long roots to get water.

... *then* it often has few leaves or a protective coating on the stem.

... *then* it won't grow much during times with little water.

CA CCSS for ELA/Literacy Standards: W.2.3, 4, 8, 10

CA ELD Standards: ELD.PI.2.2, 6, ELD.PII.2.6

Science Literacy and English Learners

Science classes are ideal environments for all students to learn and develop language skills. Science and engineering give students something to talk about because they address high-interest topics, manipulate real-world materials, and have collaboration inherent in science and engineering practice. To maximize the synergies between English language development (ELD) and science, the SBE commissioned a document—*Integrating ELD Standards into K–12 Mathematics and Science Teaching and Learning: A Supplementary Resource for Educators*—which provides examples of how the state ELD standards and the CA NGSS can complement one another (Lagunoff et al. 2015; http://www.cde.ca.gov/ci/sc/cf/ch3.asp#link12).

Excerpts from that document appear throughout this chapter as "Sample Integration of Science and ELD Standards in the Classroom."

The vignette below shows a glimpse into a classroom where a deliberate approach to integrate the CA NGSS, CA CCSS for ELA/Literacy, and the CA ELD Standards enhances all three of these areas. Like all the vignettes in this document, this is just one example approach to teaching these standards. In fact, the three performance expectations featured in this vignette also appear within snapshots in IS2 and IS3 in kindergarten to provide different perspectives on how to teach the same content.

This particular vignette highlights scaffolding approaches for English learners at both the level of lesson organization and individual student interactions. It is not a comprehensive view of all the factors that educators need to consider nor is it universal since pedagogical and scaffolding approaches will depend on individual student needs. Nonetheless, it attempts to illustrate a few research-based instructional practices.

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Performance Expectations

Students who demonstrate understanding can do the following:

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

Highlighted Science and Engineering Practices	Highlighted Disciplinary Core Ideas	Highlighted Crosscutting Concepts
[SEP-4] Analyzing and Interpreting Data [SEP-7] Engaging in Argument from Evidence [SEP-8] Obtaining, Evaluating, and Communicating Information	LS1.C: Organization for Matter and Energy Flow in Organisms ESS2.E: Biogeology ESS3.C: Human Impacts on Earth Systems ETS1.B: Developing Possible Solutions	[CCC-1] Patterns [CCC-2] Cause and Effect: Mechanism and Explanation [CCC-4] Systems and System Models

Highlighted California Environmental Principles and Concepts:

Principle I The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

Principle II The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies.

Principle V Decisions affecting resources and natural systems are complex and involve many factors.

CA CCSS Math Connections: 1.MD.3

CA CCSS for ELA/Literacy Connections: W.K.1, W.K.7 , SL.K.1

CA ELD Standards Connections (Expanding): ELD.PI.K.2, ELD.PI.K.5, ELD.PII.4

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Introduction

Mrs. J's Kindergarten classroom is a place where children can wonder about the world and actively engage in inquiry about it through observing, questioning, exploring, communicating, and working with others. At the beginning of this vignette, the children are learning about how people can choose to care about and protect the environment. Mrs. J's goal is to immerse her young students in interactive learning tasks during which they can explore new ideas about the environment and environmental issues, discuss their questions and thinking, and work collaboratively to problem solve. She does not merely want her students to learn about environmental protection and conservation; she wants them to be able to practice it by developing the knowledge and skills needed for lifelong environmental stewardship.

Mrs. J integrates environmental awareness every day, all year long. For example, the words and photographs on the alphabet cards the children use to learn their letter names represent the natural environment (*L* is for *Leaf*, *O* is for *Ocean*, *R* is for *Rainbow*, etc.). This allows her to (1) support the children in their foundational skills development and build their vocabulary knowledge, (2) use the rich context of the natural world and students' personal experiences, and (3) engage the children in conversations about the natural world and environmental issues related to the words.

Currently, the class is learning about water and water conservation: why animals, plants, and people need clean, fresh water to survive; the effects of a recent California drought; and how people can choose to protect and conserve fresh water (EP&Cs I and II). The three big ideas that guide lesson planning for the learning segment are

1. living things in the natural world have similar needs;
2. children can choose to care about nature and conserve natural resources;
3. children can engage other people to care about and protect the environment.

Mrs. J's students live in a culturally and linguistically rich urban neighborhood. Roughly half of the children in the class speak African-American English with their families at home, and several children are bilingual and proficient in both Spanish and English. The remaining students are English learners (EL), most of whom were born in the United States. Most of the EL children are at the Expanding level of English language proficiency, and they have a solid grasp of conversational, or everyday English. Three of the EL children are new to the United States and are at the early Emerging level of English language proficiency. Most of the children in the class have socioeconomically disadvantaged backgrounds and have limited access to academic English in their home environments. Mrs. J knows that each of her students is capable of thriving with an intellectually rich science curriculum and that she needs to both cultivate their curiosity about the world and support their deeper learning with appropriate types and levels of scaffolding.

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Lesson Context

At this point in the learning segment, the children have been learning about water for about a week. They have been listening to and discussing the ideas in many informational texts that Mrs. J has been reading aloud to them, and they have been exploring water during science investigation lessons and at the science observation station. The previous week, the children started learning about different marine and freshwater aquatic ecosystems in California (estuaries, salt marshes, lakes, ponds, rivers, wetlands), and they viewed short media pieces about some of the ecosystems. As they were learning about these ecosystems, the class started a large butcher paper mural representing them, along with labels and questions they had written on sticky notes. As they progress through this learning segment, they will add details regarding how ecosystems provide resources that living things need.

The class has also started building a scientific vocabulary wall with these and other words, including *conserve*, *protect*, *natural resource*, *pollute*, *reduce*, and *recycle*. The words are accompanied by pictures and illustrations, along with student-friendly explanations (for example, *reduce—use less*; *protect—keep safe*). Mrs. J would like the children to feel comfortable using these words in their conversations and when they write daily about the topic, so she has used students' natural language during class experiences and discussion to define the technical vocabulary in the lesson. For example, when the class washes their hands before snack time, she asks, "Is it ok to just let the water run for a long time while I wash my hands? Do I care how much water I use?" Students respond with ideas such as "No, the water costs money" or "That would waste the water." Mrs. J then asked, "So, we should save the water? Another way to say that is *conserve*. Let's be sure to turn off the faucet while we soap up our hands so we don't use more than we need to. That way, we're *conserving* water." She then encouraged students to say, "I am conserving water," when they turn off the faucet to soap up their hands.

At other times, Mrs. J explicitly taught some of the words to the children and encouraged them to use the words frequently in meaningful ways (for example, when they sing songs or chant poems or when they are making observations).[1] Mrs. J also models how to use the words several times each day.

By focusing intentionally on both content knowledge and language, Mrs. J is supporting the children to build both their science conceptual understandings and their awareness of how language works in science. The children will draw upon all of this integrated knowledge to write a letter about water conservation to the editor of the local newspaper. The following learning target and CA NGSS performance expectations guide Mrs. J's lesson planning.

1. See the *ELA/ELD Framework*, chapter 3, Kindergarten designated ELD vignette for an idea how to teach vocabulary explicitly.

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Lesson Excerpts

Everyday phenomenon: People use water in many different ways.

Mrs. J began the day's lesson by inviting the children to sit in a big circle. She showed them a large, clear bucket containing five gallons of water and asked them to think about all the different ways they and their families use water in their daily lives (EP&C I). She provided an example: drinking a glass of water when she's thirsty. Before she had the children share their ideas with a partner, she gave them about 10 seconds to think quietly about as many ideas as they could (at least three). This provided a valuable opportunity for the children to prepare a response. She checked in with each of the children who were ELs at the Emerging level of English language proficiency to make sure they understood the question and supported them to prepare a response. She then prompted all students to use a language frame to tell their ideas to their partner: "My family uses water to ____."

After the children had shared with their partners, Mrs. J asked them to share some of their ideas with the whole class. She then asked them to help her sort the activities, separating the ones for which water was needed to survive—or stay alive like drinking, watering the garden—from the ones for which it was nice to have water but not really necessary for survival (swimming, making popsicles). She wrote the children's ideas on a T-chart that was big enough for the whole class to see, and the class decided together by voting (thumbs up, thumbs down) in which category each activity belonged. The children discussed whether taking a shower or brushing their teeth were activities for which they need water in order to survive. In the end, the class decided that water was necessary for brushing teeth (because they need their teeth to eat food so they can stay alive) but not for swimming (because they don't have to swim in order to live).

Water Uses

Necessary for survival	Nice to have

Inquiry Activator: Where's the Water on Earth?

Investigative phenomenon: Water is found in many places on Earth, but freshwater is very rare.

Mrs. J then returned the children's attention to the bucket of water, next to which she placed a globe.

Mrs. J: Children, today we're going to be thinking and talking about how much water is on the planet and where it is stored. We're also going to talk about why it's important for everyone to conserve and protect fresh water, or the water we need in order to survive,

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or live. You all said we use water to do a lot of things in our daily lives. Where do you suppose the water we use for drinking, cooking, brushing our teeth, and many other uses, comes from? And why do you think that? You can use our water mural for ideas.

The children thought for a moment and then discussed their thinking with their partner as Mrs. J. listened in, making sure that each child had a chance to share. She also encouraged them to ask their partner clarification questions and to respond to their partner's ideas.

Chanel: I think ... I think the water we use for brushing our teeth comes from ... comes from ... I don't know.

Ana: (Pointing to the water mural.) Do you think it comes from the lake? Or from the ocean, maybe?

Chanel: From the lake! I think it comes from the lake 'cuz the water in the ocean, it's too salty.

Ana: Yeah, I think if you drink the water from the ocean, you get sick. And maybe the water comes from that. (Pointing to the mural.)

Chanel: That's a pond. I don't want to drink water from there. It has fish and stuff. Yuck!

Ana: The lake has fish in it too, right? I wonder if that's where we get our water to drink. How do they get the fish out?

Mrs. J told the children that she heard some very interesting ideas with good reasons to justify them and also some great questions that they'll be investigating. She clarified that the water we drink is fresh water and not the salt water from oceans, which would make us sick. Then, she asked them to look at the large bucket of water and the globe.

Mrs. J: (Points to the bucket.) This represents all the water on our planet Earth, including the water that is in the atmosphere, glaciers, ice caps, lakes, rivers, oceans, groundwater and streams. So, if this is all the water there is on the planet, how much of it do you think is available for us to use for drinking, cooking, and other things we said we need water for in order to survive?

Jesse: (Placing his hand in the middle of the bucket.) Like, up to here?

Sadie: No, I think it's more, 'cuz we have to use a lot of water at my house.

Ricardo: (Pointing to the Pacific Ocean on the globe.) But... but, look the ocean. Is big!

Mrs. J: That's a great observation, Ricardo. Yes, a lot of the planet is covered in ocean, and we can see that on the globe. All of you are doing some great science thinking. Let's find out how much of the water on the planet is in the oceans and how much is available for us to use for our survival needs. Ricardo, can you help me?

Mrs. J invited Ricardo to help her demonstrate where the Earth's water is located. She asked Ricardo to take out 25 tablespoons of water from the bucket and place it in a large, clear jar labeled "Fresh Water" as everyone counted to 25. She took the jar over to the mural so that she can point to the bodies of water as she explained what the bucket and jar represented.

Mrs. J: The water in this jar represents all the fresh water on Earth. Fresh water is in the air, glaciers, rivers, ponds, lakes, and groundwater. Let's say those words together as I point to them. All the remaining water in the bucket, or the water that's left in there, represents all the salt water on Earth, which is mostly in the oceans.

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Jasmine: There's a lot in that bucket. That's a lot of salty water.

Lawrence: Can we drink it?

Jasmine: No! You can't drink salty water! I went to the ocean one time, and I got water in my mouth. It didn't taste good. I don't think you can drink salty water.

Lawrence: But, can you make it not salty? Can you get the salt out?

Mrs. J: Jasmine is right, it's not healthy to drink salt water, and Lawrence, your question is one we could investigate. Should we put that on our water inquiry chart?

After placing the question on the chart, Mrs. J invited another child to help her take out eight tablespoons from the freshwater supply and place it in the jar labeled "Groundwater." She told the children that this represented all the groundwater on Earth. She showed them and explained an illustration of groundwater in a book and told them that in the area where they live, a lot of the drinking water they use is groundwater, and more so when there is a drought.

Solange: But, how do we get it if it's in the ground? How do they get it to the kitchen?

Jesse: And the bathroom!

Mrs. J: Hmm... That's another good question I bet we can investigate.

Solange: Put it on the inquiry chart!

After posting the question to the chart, Mrs. J invited another child to use an eyedropper to transfer 25 drops from of the freshwater supply to a very small jar labeled "Rivers and Lakes." She told the children that this water represented all the water in rivers and lakes on Earth. All the water contained in groundwater, rivers, and lakes from the world's fresh water has been removed. The "Fresh Water" container now represented all the water contained in the atmosphere (clouds, rain, snow, etc.) and all the water on the planet that is frozen (polar ice caps and glaciers). She asked the children to observe the containers and how much water was in each container and to discuss their thinking in groups of three. After a few minutes of discussion, she asked each triad to write down at least one of their questions on a sticky note and to place the question on the Water Inquiry Chart before going to their tables and writing and drawing one thing they learned about water that day. As the children were writing, Mrs. J encouraged the children to talk about their ideas at their tables, ask and answer one another's questions, and include any questions they are wondering about.

Hands-on Investigation: How Do We Clean the Water?

The next day, Mrs. J showed the children a short and engaging video about why it's important to turn off the water while brushing one's teeth (Sesame Street 2010). In their table groups, the children briefly discussed what they learned from the video and how it related to the activity from the previous day.

Mrs. J reminded the children about how much they've already learned about bodies of water and aquatic ecosystems (referring to the mural), and how much of the water on Earth is fresh water (referring to the bucket and jars, which are now displayed on a counter). She told the children that they were going to go outside and investigate what happens when the fresh water gets dirty (Clean Water Challenge).

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She took the children to the grassy area of the school grounds. Parent volunteers had worked with the school staff to create an outdoor space that allowed for science exploration and learning, including a vegetable garden and a large grassy area surrounded by bushes and trees, which provided a place for observing nature and conducting messy science investigations. She reminded the children that when they go outside, they are to handle plants and animals gently and with respect. Because it was a wide-open space, she knew the children would want to run around and that if she allowed them to, they would be more engaged in the science investigation she has planned for them to do afterward. She asked the children to pretend they were a body of water. They could flow gently, like the water flowing down a gentle stream, they could flow quickly, like the water rushing down a river, or they could be like any body of water they preferred. She asked them to try as many different bodies of water as they could, but before they did, she provided an example, inviting the children to say, "I'm flowing like a rushing river!" and run briskly with her to the other side of the yard.

After several minutes, Mrs. J asked the children to gather around her in a circle. She showed them a cup of clean water and a cup of *dirty* water (water with safe organic debris, such as orange peels or blades of grass). She asked the children to compare the two cups of water and discuss their ideas with their partner. She then asked them to think about which cup of water is best for plants and animals. She asked, "Which cup of water holds something that is not good for plants, animals, or humans?" She introduced the term *pollution* or *polluted* and explained that this is what we call water that has become dirty due to human activity.

Investigative phenomenon: How do we clean up polluted water?

Mrs. J explained that they will now try to clean a sample of *polluted* water. She used an empty plastic cup, a plastic cup filled with dirty water, as well as tools they might use to clean the water, such as paper towels, cotton balls, coffee filters, sponges, pieces of nylon (or other fabric), sand, gravel, and rubber bands. She told them that she wanted them to share ideas and discuss with each other what might work to clean the water before they started using the materials. She also reminded them that scientists test many ideas before finding one that will work, so, since they're kid scientists, they should try out many different ways of cleaning the water (there was plenty of dirty water in the bucket she had brought outside). She grouped the children strategically into teams of three, and the children collected their materials and began the challenge. As the children worked together, Mrs. J moved from team to team, listening to their discussions and prompting them to share their ideas before they started testing them. Solange, Hernán, and Rafael are working as a team.

Solange: I know, I know! Let's use the cotton. I think we can scoop up the dirty stuff with it.

Hernán: Yeah, we can do it. We can use this (pointing to the coffee filter).

Solange: That's a coffee filter. Okay, so we could use the coffee filter. But how?

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Hernán: You can...You can put the water in. Here (miming how he would pour the water through the coffee filter).

Rafael: Yeah, we could pour the dirty water through the coffee filter and into the clean cup. But will the water get clean?

Solange: Let's do it!

Mrs. J: Have you shared lots of different ideas first? Have you talked about all of the materials you have? You can test out many different ways of cleaning the water, and it's a good idea to talk about lots of ideas before you start testing them.

Rafael: I wonder if the water can go through the sponge. Maybe that would just keep it there.

Solange: I think, I think it would get stuck. So, we talked about the cotton balls, the coffee filter, and the sponge. What's the sand for?

As the teams shared ideas and then tested them out, Mrs. J encouraged them to explain their thinking to one another and to continue to ask questions about what was working best to clean the water. Through trial and error, most of the children figured out they needed to build a filter rather than adding items to the water to *clean* it. Once the teams had tried out many different ways of cleaning the water, Mrs. J asked a few students to help her pass out the children's science journals and pencils, and she asked them to discuss with one another which way or ways worked best, showing what they discussed through drawings with labels. The teams then worked together to write a brief explanation of their design solution, with evidence from their investigation. Once the children had recorded their notes on a large piece of chart paper she had brought outside, she would post it in the classroom afterward. At the end of the discussion, the children concluded that it is easier to keep water clean than to have to clean it up once it was *polluted*. She introduced the term *protect* in the context of keeping water clean and not polluted.

Using Science Informational Texts: How Dirty is the Water?

Mrs. J asked the children to join her so she could read them several pages from a complex science informational text about water protection and conservation. She asked the children to be thinking about all the things they had been learning about and wondering about as she read aloud. As she read, she stopped several times to explain new terms and concepts, refer to terms already discussed, such as *pollution* and *protect*, and have the children turn and talk about strategic questions she posed. On one page, she drew the children's attention to a circle graph representing all the water available on Earth. The graph showed that 97 percent of the Earth's water is ocean water and less than 1 percent of the Earth's water is usable by people (for drinking, sanitation, cooking, growing crops) and for wildlife that need fresh water. She asked students to reflect back to the activity they conducted with the bucket and eyedropper of water. She asked students to discuss how this graph compares. On another page, Mrs. J read that all the water that exists on Earth right now is all that is available and, even though this water is recycled over and over again, it is impossible to make more.

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Investigative phenomenon: Fish died in a river after harmful chemicals were poured in.

When Mrs. J got to a page with a photograph of a polluted river with dead fish floating at the top, she asked the children to discuss with a partner what they thought had happened (EP&C II). She asked students to reflect back on the *polluted* water they cleaned the day before. To make sure her three EL students at the Emerging level of English language proficiency were able to engage in the conversations, she had paired each of them with an English-proficient partner who spoke the same primary language. She also used the water distribution activity and clean water challenge to provide context to the information in the text. After the children had had a chance to discuss their ideas, she called on a few of them to share. She called on Hernán, one of the EL children at the Emerging level of English language proficiency. At first, he was hesitant to respond, but then his partner, Victor, prompted him to respond in Spanish.

Hernán: *Se mueren. Los peces se mueren porque el agua está bien sucia*.

Victor: He says, the fish die because the water is very dirty.

Hernán: (Nodding, then repeating) The fish die. Water is very dirty.

Mrs. J: (Expanding on Hernán's response.) Yes, the water does look very dirty. It has a lot of greasy stuff and garbage in it (looking closely at the photograph and then showing it to the children). Is this like our polluted water yesterday? Let's read the caption underneath the photograph. It says that some harmful chemicals were dumped into it. Hernán, tell me more about what you're thinking.

Hernán: *Podemos… Podemos limpiar el río. Podemos limpiar el agua, y así, los animales, los peces pueden vivir*. The fish can live. And the river, we can also swim there. We can … we can clean the water.

Alicia: Yeah! We can clean it! We learned how to yesterday. Let's clean up the water so the fishes can survive!

Mrs. J: Do you think we can do that? Can we clean up the water? Can we protect the animals that live in water?

All of the children: Yeah!

Mrs. J: Okay! Well, let's see if we can find a way to do that. Let's read on to see what else we can learn from this book.

Investigative phenomenon: Water held deep underground can be contaminated by human pollution.

Later in the book, the children learned that, in some places in the world, people do not have access to clean water. In some places, aquifers have been contaminated, and water is

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scarce. Mrs. J asked students to think about the clean water challenge activity and explained that some people have only dirty water or very little water in their cup.

Alicia: How come the people don't have clean water to drink?

Mrs. J read the text, pointing to the illustration of an aquifer:

Some of our drinking water comes from under the ground in pools of water, called aquifers. People drill down into the ground, through soil and rock, to get the water, which we call ground water. Unfortunately, the ground water can become dirty, or contaminated, with things that shouldn't be in it, such as the chemicals in products people use to clean their houses. Some farms use chemicals on their crops, and that can get into the water, too.

Mrs. J: Let's think about that for a minute. It says that people drill through the ground to get water for drinking and to use for other things. But sometimes, things that are not safe for animals, plants, or people, like poisons in some chemicals, get into the aquifer, and they *pollute* the ground water. That can make people and animals sick if we drink the water. But, the aquifer is so far down in the ground, under the rocks and soil. How do you think the water gets polluted?

Mrs. J gave the children a few moments to think about this question, and then she asked them to discuss it in triads. Using the document reader, she projected an illustration in the book, which showed a model of how an aquifer can become polluted, and she told them that they should refer to the illustration as they explained their thinking. She listened carefully as the children discussed their ideas. Many of the children struggled to explain how the toxins in some chemicals might get from someone's house or lawn all the way down into the groundwater, and Mrs. J encouraged them to refer to the illustration. After a couple of minutes, Mrs. J strategically calls on one student, Inés, to explain what she and her partner, Rafael, discussed.

Inés: My partner say that maybe the bad stuff, the chem-, the chem-

Rafael: Chemicals. That's pollution!

Inés: Oh, yeah! He say the chemicals get into the ground, the ground water because maybe people they put it in the street, they pour it there, and it can all go down into the ground.

After hearing other children's explanations, Mrs. J realized that the concept of groundwater and how it can become polluted is quite complex for young learners and that the book alone is insufficient to help them understand this process. She decided that later that week, the children would build a classroom model of an aquifer so that they could observe its structure and how it works, as well as what happens when it becomes polluted. (The children would also build their own aquifers and take home a kit so they could recreate it at home to teach their families about aquifers.)

Writing an Argument: Why Should We Protect and Conserve Water?

Later, and after many discussions, book readings, videos, and hands–on experiences—including building both the class model and individual models of aquifers—the children had much to say about why people should protect and conserve water. Mrs. J asked the children if

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they would like to write a letter to the newspaper so that they could share their ideas with a lot of people. The children decided that this would be a way for them to help others know how to make choices that would help both the natural environment and their communities.

Mrs. J guided the children to co-construct the argument, prompting them to provide evidence to justify their claims. She explained that they should provide evidence from what they had read and discussed but that in science it is important to provide evidence from their investigations. During the joint construction of the text, she asked the children to tell her what to write, first by having them brainstorm all of the different ideas they could use, and then grouping the ideas together. Mrs. J. wrote the ideas on a chart, and then showed the children how she grouped them together by circling each word or group of words with a different color marker. Next, she asked the children to tell her what to write, using the ideas from the brainstorm and all of the ideas they had in their heads. She did not write what they said verbatim, but rather, supported them to rephrase and extend their thinking, as needed.

Henry: We could say, please don't get the groundwater dirty 'cuz we want to drink clean water, not dirty water.

Mrs. J: That's a great idea, Henry! Hmm… I'm thinking that there's another way of saying "get the water dirty." Maybe we could use one of the words from our "kid scientist" word wall.

Henry: Pollute! We could say, please don't pollute the groundwater 'cuz we don't want to drink dirty water. We want to drink clean water.

Mrs. J: Can anyone say more about why we don't want to drink polluted ground water?

Rafael: We don't want to drink the polluted ground water because when it's dirty like that, it can make us sick. That's what the book said.

Celeste: And, don't get the chemicals in there.

Mrs. J: Can you say more about that?

Celeste: Please don't get the chemicals in the water because that can make the fishes sick, and they can't survive. The polluted water can make people sick, too. And it's really, really hard to clean the water when it's polluted!

Solange: And if the river is polluted, we should clean it up 'cuz that's not fair to the animals that live there. They could die, and then the river is sick, too.

All of the students had ideas to add to the letter and solutions to this environmental problem: turn off the water when you brush your teeth so you don't waste it; use the bath water to water the plants because it's good to reuse water; and do not put chemicals into the ocean or rivers because then the fish get sick, and sometimes we eat the fish, and we don't want to get sick (EP&C V).

After the class had completed their letter to the editor, which Mrs. J typed up and e-mailed to the local newspaper, the children worked on creating a class book focused on teaching younger students about protecting the environment. They decided to call the book *We Can Protect Water*. Each child made a small poster with illustrations, labels, and writing, which was then gathered into a book that the children could read together in the library corner and later share with their families at the monthly family science nights.

KINDERGARTEN THROUGH GRADE TWO INTEGRATED SCIENCE, ELA, AND ELD VIGNETTE 3.4: CARING ABOUT AND PROTECTING THE ENVIRONMENT

Teacher Reflection and Next Steps

When Mrs. J met with the kindergarten teaching team for their weekly grade-level planning time, the teachers shared their reflections about the learning segment and examined student work together. They used their observation notes and the children's science journals and big book pages to make strategic decisions about the teaching and learning tasks they would modify or add to the learning segment, as well as how they would plan scaffolding approaches for individual students. They also discussed the types of activities they would plan for the next monthly family science night, during which the students would teach their families what they had been learning about in science that month.

Based on their observations of student language use and analysis of written work, the teachers also discussed how they would design or adjust their designated ELD lessons moving forward. They used the CA ELD Standards to plan focused language development lessons for designated ELD, differentiated by the children's English language proficiency levels. These lessons build into and from the science teaching and learning tasks. For the EL children at the Emerging level, the teachers had noticed that the children were gaining confidence using everyday English, but they were not yet using some of the new domain-specific vocabulary (e.g., *pollute*, *protect*) needed to discuss the science ideas. Although she had taught these words explicitly to the whole class, Mrs. J felt that these children would benefit from some additional practice using them orally, so she planned structured conversations during which the children could use the new words as they discussed the illustrations in the books the class had been reading, using strategies such as sentence starters or conversation prompts that explicitly asked students to use the target words. For the EL children at the Expanding level, Mrs. J and the other teachers planned to try out a technique they read about called *sentence unpacking*, during which they discussed all of the meanings in the long, information–dense sentences that were in the science informational texts they read aloud to the children. The teachers recorded their agreements in their Team Meeting Record Sheet so that they could reflect on how the activities they planned have worked out when they met again the following week.

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