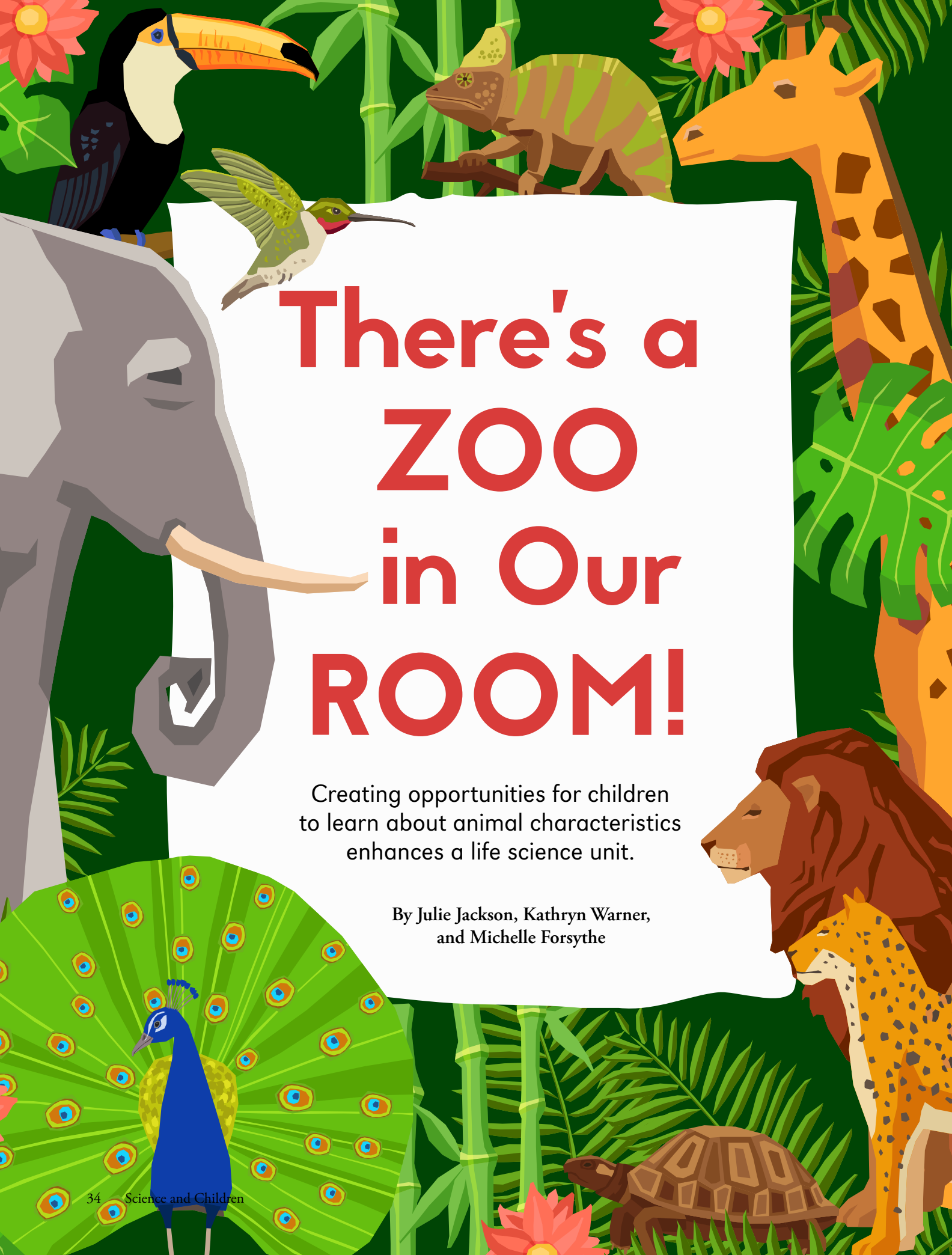

There's a ZOO in Our ROOM!

Creating opportunities for children to learn about animal characteristics enhances a life science unit.

By Julie Jackson, Kathryn Warner, and Michelle Forsythe

Life science is a familiar and comfortable topic for many early childhood teachers because most educators are familiar with the basic science concepts associated with plants and animals. Planting seeds, watching plants grow, and labeling plant parts are fairly simple hands-on activities. However, it can be a struggle to create hands-on, engaging lessons about animals. This is especially true of units that require exposure to a wide range of animals from a variety of habitats.

Many teachers have access to animals that they can borrow, and some classrooms have pets. Birds, gerbils, hamsters, snakes, and lizards are commonly found in classrooms. Classroom or school pets allow students to have authentic interactions with animals. Other classrooms rely on animal artifacts (biofacts) that are available for student exploration in science centers or interpretation stations. Bird feathers, turtle shells, shark teeth, animal bones, and snakeskins fill this role. Sadly, some animal units rely completely on reading books and watching videos. Our kindergarten animal unit was limited to interacting with one real animal, a few biofacts, reading a lot of books, and watching videos. We knew our animal unit needed a redesign, so we decided to shake things up a little—by creating a Kindergarten zoo!

FIGURE 1.

Animal sorting cards.

PHOTOS COURTESY OF THE AUTHORS

In this article, we describe our "There's a zoo in our room" unit. This unit sequences critical concepts needed to build understanding of core life science ideas as well as science and engineering practices. Students sort and classify animals based on physical characteristics, they speak and write about animals, draw animals, read grade-appropriate text, and use media to obtain the information needed to create a physical replica of a zoo. We believe these activities could be easily adapted or modified for use in early childhood classrooms and have included references to the *Head Start Early Learning Outcomes Framework* (U.S. Department of Health and Human Services 2016) to assist preschool teachers.

Designing the Unit

The first step in the unit redesign required a review of kindergarten life science standards. In Texas, the K–1 science animal structure and function standards are fairly simple. Kindergarten students are expected to sort animals into groups based on physical characteristics such as color, size, or body coverings and identify parts of animals such as head, eyes, and limbs. First-grade students investigate how external characteristics of an animal are related to where it lives, how it moves, and what it eats. That's it! Similarly, the *Next Generation Science Standards* (*NGSS*) state that kindergarten students should observe and describe patterns of what animals need to survive (K-LS1-1) and use a model to represent the relationship between the needs of different animals and the places they live (K-ESS3-1). First-grade students should understand that all organisms have external parts, different animals use their body parts in different ways (LS1.A), and animals have body parts that capture and convey different kinds of information needed for growth and survival (LS1.D) (NGSS Lead States 2013). The *Head Start Early Learning Outcomes Framework* does not address specific life science content, but it does include scientific reasoning, language and communication, and literacy goals. *Head Start Early Learning Outcomes* covered in this zoo activity include encouraging preschool students to engage in scientific talk; compare and categorize observable phenomena; ask questions, gather information, and make predictions; analyze results, draw conclusions, and communicate results; ask and answer questions about a book that was read aloud; write (draw, illustrate) for a variety of purposes; and show ongoing connection to a conversation, group discussion, or presentation (U.S. Department of Health and Human Services 2016).

Close examination of our state standards focused the unit redesign. We did not have to teach about adaptations

or food webs. We did not have to teach our students the difference between reptiles and amphibians. Our job was simple. Instead of spinning our wheels trying to teach students material that may be developmentally inappropriate or possibly cause them to develop misconceptions, we designed instructional activities that supported the development of a thorough and sound understanding of the science concepts we were responsible for. And we wanted to make sure we all had lots of fun doing it!

Engage: *Good Night Gorilla* Read-Aloud

We launched the unit by reading *Good night Gorilla* by Peggy Rathmann (1994). This book introduced students to the concept of a zoo, a few animals found in zoos, and the role of a zookeeper. Preschool children should be able to ask and answer questions about books shared during a read-aloud. After reading the book, we asked the students general questions about zoos, zoo animals, signage used to identify zoo animals, and zoo keepers. We also asked them if they wanted to make a (pretend) zoo in our classroom and the answer was a very enthusiastic YES! We explained that if we wanted to turn our classroom into a zoo, we would need a plan. Many students wanted to contribute their own pets to our zoo. We had to explain that, no, they could not bring their pets to school. One student's mother brought his turtle to school for a short visit. The National Science Teacher's Association (NSTA) position statement for *responsible use of live animals in a classroom* (see Internet Resources) supports using live animals to support science instruction, encourages teachers to become familiar with the care requirements of classroom pets, and reminds teachers that they must follow local, state, and national laws, policies, and regulations regarding live animals. As a class we decided that, in lieu of live (real) animals, students could bring stuffed animals (and other animal toys) to school. But they would need to make sure they were as realistic as possible (no pink leopards or red teddy bears). We would also need to make signs/placards that included information about the animals so visitors to our zoo could learn about the animals. To do this, we needed to study animals.

Explore and Explain: Animal Card Sort, Interactive Word Wall, and Science Notebooks

We began our study of animals by sorting animal cards using student-generated categories and moved to sorting the animal cards by standards-based physical characteristics. The animal cards (Figure 1, p. 35) we used are available for free (see Internet Resources). First, we gave the students a few minutes to explore and talk about the animal cards in a whole-group setting. Preschool children may develop language and communication skills by showing ongoing connections to a conversation, group discussion, or presentation. Next, we let them work together in table groups of three to four students to sort the cards any way they wanted to! Preschool students should be encouraged to compare and categorize observable phenomena. We did not tell the students how to sort the animal cards, and we did not explain physical characteristics. We let them sort the cards multiple times and they sorted them in some unexpected ways—like cute and gross. Finally, we guided them to sort by the physical characteristics included in the Texas kindergarten science standard (color, size, body coverings, and number/type of limbs). Some of these categories naturally emerged.

For example, one group independently sorted by *color*. YES! So we had all the groups sort the animal cards by color. We discussed their results and the teacher recorded student "color" observations/words on an anchor chart. If

FIGURE 2.

Physical characteristics interactive word wall.

the students failed to mention one or more of the animals, the discussion was scaffolded by asking, *What animal is this? What color is it?*

Then students used the "color" vocabulary words listed on the anchor chart and pictures of animals from an extra set of cards to create picture word strips for our interactive word wall. Students used a pink word strip for the pink flamingo, a red word strip for the red ladybug, and so on. Visual supports including photos and colored word strips support English learners as well as students who are still learning to distinguish between colors and/or learning to read (Echevarria, Vogt, and Short 2009). Students used the interactive word wall (Figure 2) throughout the unit. It provided students with a ready reference of academic vocabulary that they could use during classroom discussions and when writing in their science notebook (Jackson and Narvaez 2013). Preschool students could use words on an interactive word wall to support the use of a wide variety of words to analyze and communicate results.

Students selected one or more animal cards from an extra set of cards and glued it/them in their science notebooks. We accidentally printed two extra sets of cards, so we used the extras for notebook entries and the word wall. However, we believe that student-generated illustrations are more authentic and will ask the student to draw their own pictures in the future. As the class completed sections of the physical characteristic interactive word wall, they wrote the appropriate information about their animal in their science notebook. The number of animal cards selected depended on the students' ability to complete the writing assignment. If they finished early, they were encouraged to select another animal and write about it. Preschool teachers could differentiate this activity by preparing cards with black line illustrations that students can color or by providing labels with words that can be traced.

We repeated this process (card sort, discuss card sort, teacher creates an anchor chart based on the discussion, students use anchor chart to create interactive word wall strips and add strips to the interactive word wall, students write in their science notebooks) for several days during our science time and guided the students to include all of the physical characteristics included in the standard color, size, or body coverings and number/type of limbs. For example, when sorting by limbs, the students sorted all the cards of animals they believed had six legs into one pile. Then they put the remaining animal cards together in another big group. We had to prompt the students to expand their sorting categories (no legs, two legs, four legs) as well as encourage them to ask questions or look for information if they did not know the answer.

> Teacher (looking at a pile of six-legged animal cards that is missing the bee card): What about the bee?
>
> Students: It doesn't have any legs!
>
> Teacher: Are you sure? If we're not sure, we need to look it up.

We rarely provide answers and always ask students to tell us how they can find the answer to a question. Available resources for this unit included books from our classroom library, books from the school library, and access to zoo websites (see Internet Resources). To add rigor and deepen understanding, after counting the number of legs and sorting, students could be asked to describe "how animals move," leading into understanding animal structure of leg, fins, wing, and so on. Because most of the animals the students brought to class were plush, we had a few misconceptions about body coverings—some students thought penguins have fur. So we had to double check a few things using books and/or zoo websites. Conducting research to

FIGURE 3.

Anchor chart comparing and contrasting physical characteristics of animals.

FIGURE 4.

Classroom zoos.

confirm or dismiss ideas provided students with opportunities to take a closer look at body coverings, how animals move and grow, and similarities and differences of animals.

After covering the required physical characteristics, we decided to have the students compare and contrast the physical characteristics of two animals. The class selected two animals from our zoo and we discussed, *How are they the same?* and *How are they different?* An inverted Box & T-chart (Fulwiler 2000) was used to capture their ideas. This anchor chart (Figure 3, p. 37) served as a reference during independent work.

The "we do – you do" sequence provided support for beginning writers. Student notebook entries were completely student-generated. They drew the animals and used an inverted Box and T-chart (Fulwiler 2000) to compare and contrast the animals. A review of their science notebook entries revealed that students used a combination of sight words, words from our interactive science word wall, and phonetic spelling to describe how their animals were the same and how they were different. The activity could be extended for students who finish early by including an independent project where students create an animal based on what they learned to show understanding of how color, size, body coverings, and the number of legs may help an animal live and survive.

The repeated structure of this lesson became familiar to the students, which minimized classroom management challenges. The teacher modeled each step and small group/individual student expectations were clearly articulated. Students were motivated, on task, and engaged.

FIGURE 5.

Classroom zoo entrance.

Connecting to the *Next Generation Science Standards* (NGSS Lead States 2013):

K-LS1 From Molecules to Organisms: Structure and Function

www.nextgenscience.org/topic-arrangement/1structure-function-and-information-processing

The chart below makes one set of connections between the instruction outlined in this article and the *NGSS*. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectation listed below.

Performance Expectation	**Connections to Classroom Activity** *Students:*
K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.	• sort animals into groups based on their needs and survival in specific habitats.
Science and Engineering Practices	
Asking Questions Analyzing and interpreting data Engaging in argument from evidence Obtaining, evaluating, and communicating information	• sort animals into groups based on external physical characteristics such as color, size, and body covering. • investigate how the external characteristics of an animal are related to how it moves and where it lives. • collaboratively arrange classroom zoo exhibits. • read grade-appropriate text and use media to obtain scientific information needed to prepare classroom zoo signs/placards to communicate information.
Disciplinary Core Ideas	
LS1.A: Structure and Function • All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find and take in food, water and air. LS1.D: Information Processing • Animals have body parts that capture and convey different kinds of information needed for growth and survival.	• sort animals into groups based on external physical characteristics such as color, size, and body covering. • Investigate how the external characteristics of an animal are related to how it moves and where it lives. • read grade-appropriate text and use media to obtain scientific information needed to prepare classroom zoo signs/placards to communicate information.
Crosscutting Concept	
Patterns	• sort animals into groups based on external physical characteristics such as color, size, body covering, and number of legs.

Elaborate: Creating the Classroom Zoo

Next, the students made signs/placards to inform the zoo visitors about their animals. Students wrote simple sentences describing their assigned animal's physical characteristics. Once again, students referenced science notebook entries, words from our interactive science word wall, used sight words, and phonetic spelling. Once the signs/placards were completed, it was time to create our zoo.

We needed to decide how to arrange the animals in our zoo. Because we were not learning about habitats, we let the students decide how to group the animals. They surveyed the available stuffed and toy animals, discussed where the animals can survive based on their needs, and decided that our zoo should include the following exhibits: forest, arctic, savanna , farm, jungle, desert, and ocean (see Figure 4, p. 38). The students were familiar with "savannas" because we completed a language arts research project about cheetahs earlier in the year and they remembered it. Otherwise, they probably would not have selected it. The students had a few misconceptions about habitats, but identifying habitats was not our standard, so we corrected ideas as needed, and did not dwell on teaching about habitats.

We borrowed fake *Ficus* trees from our school library and placed them in the jungle exhibit. The students enjoyed hanging stuffed monkeys from the tree branches. We also used butcher paper, leftover bulletin board fabric, and whatever else the students could find around the room to decorate each exhibit. The students had a lot of fun preparing the exhibits, arranging the animals, and placing signs/placards. A finishing touch included hanging a crepe paper doorway curtain (Figure 5, p. 38) that visitors had to pass through to enter the zoo. We used construction paper to make zoo entrance tickets that served as invitations students could share with family and friends. Everyone was invited to visit our classroom zoo.

Evaluation: The Zoo

Finally, the big day arrived. Students, acting as zookeepers, taught our visitors about the animals in our zoo. They confidently discussed their animal's color, size, body covering and number/types of limbs. Students added details about how their animal moves, what it eats, and the habitat in which it survives. The students loved turning our classroom into a zoo. They were beyond excited to share our classroom zoo with family and friends. They were engaged every day throughout the two-week unit, and when it was all done, their zookeeper talks and science notebook entries revealed that they knew a lot about the physical characteristics of a variety of animals and their needs.

During this unit, our students obtained and evaluated information about the physical characteristics of animals while conducting multiple card sorts. They read grade-appropriate text and used zoo websites to view animals and obtain scientific information. They used this knowledge during group discussions, to construct the interactive word wall, when writing in their science notebooks, when preparing zoo signs/placards, and when acting as zookeepers. The sequence of activities included in our revised unit provided multiple opportunities for science learning via rich and varied language experiences. With a few thoughtful revisions, we turned a lackluster unit into a blockbuster experience for everyone. Wondering what to do with your animal unit? Create a classroom zoo! ■

Julie Jackson* (jj32@txstate.edu) *is an associate professor of science education at Texas State University in San Marcos, Texas. Kathryn Warner is a kindergarten teacher at Old Town Elementary School in Round Rock, Texas. Michelle Forsythe is an assistant professor of STEM education at Texas State University.

References

Echevarria, J., M. Vogt, and D. Short. 2009. *Making content comprehensible for elementary English learners: The SIOP model*, Boston, MA: Allyn & Bacon.

Fulwiler, B. 2000. *Writing in science: How to scaffold instruction to support learning*. Portsmouth, NH: Heinemann.

Jackson, J., and R. Narvaez. 2013. Interactive word walls: Create a tool to increase science vocabulary in five easy steps. *Science and Children* 51 (1): 42–49.

Kindergarten, Kindergarten (06/29/2016) *www.kindergartenkindergarten.com/science*

NGSS Lead States. 2013. *Next Generation Science Standards: For states, by states*. Washington, DC: National Academies Press. *www.nextgenscience.org*

Rathmann, P. 1994. *Good night, Gorilla*, New York, NY: G.P. Putnam's Sons

U.S. Department of Health and Human Services, Administration on Children and Families. 2016. *Head Start Early Learning Outcomes Framework*. Washington, DC.

Internet Resources

Animal sorting cards (FREE)
www.teacherspayteachers.com/Product/Animal-Sorting-Cards-2606905

Houston Zoo Kid Website
www.houstonzoo.org/new-at-the-zoo/kids/

Responsible Use of Live Animals and Dissection in the Science Classroom Position Statement. National Science Teachers Association. *www.nsta.org/about/positions/animals.aspx*

San Diego Zoo Kids
http://kids.sandiegozoo.org/animal-cams-videos

Smithsonian's National Zoo
https://nationalzoo.si.edu/

NSTA Connection

Download animal sorting cards at *www.nsta.org/SC1710*.