

## SCIENCE SORT

### KINDERGARTEN-SECOND

#### TEKS

<i>Kindergarten:</i>	K.7B, K.8A, K.8B,
<i>First Grade:</i>	1.7B, 1.8B, 1.8C
<i>Second Grade:</i>	2.7B, 2.8B, 2.8C, 2.8D

#### Vocabulary

axis, coral reef, day, decomposition, dinosaur, environment, fall, fern, fossils, infer, Jurassic, moisture, night, roots, rotation, seasons, spring, summer, temperature, tropical, weather, winter

#### Pre-Show Activity

##### Pre-Show Lesson: Climate of the Dinosaur (Seasons)

Post this question on the board: “How do scientists know what the weather was like millions of years ago when the dinosaurs roamed the Earth?”

##### *Materials:*

Per Class: fern, picture of fern fossil (Appendix A-1), *Oh Say Can You Say What's the Weather Today?* by Tish Rabe, dinosaur video.

Per student: 3-4 small dinosaur cut-outs (Appendix A-2), sheet of paper.

##### *Procedure:*

1. Hold up a fern. Ask students, “What am I holding?” What do you know about it?” Possible responses include plant, roots, stem, leaves, needs water, etc. Ask, “Can this grow in a snowy area?” Tell students that some ferns can.

##### *Teacher Information:*

What can Ferns tell us about their environment?

Many people think that ferns are delicate and can only survive in moist locations with a continuous water supply, neither too hot nor too frigid. To some extent this is true. Ferns need liquid water during their development from spore to full plant. But once growing in the soil, some ferns are very hardy indeed. And different ferns tolerate different climatic extremes. Some can survive prolonged drought in semi-desert conditions. Other species are adapted to surviving under feet of snow. Yet others thrive in alkaline soil.

The interesting point is that each fern has its own preferences for temperature; humidity; soil type, moisture and pH; light levels etc. In many cases, ferns are very specific indicators of the conditions they need - often more so than the flowering plants.

Source: <http://www.home.aone.net.au/~byzantium/ferns/index.html>

2. Tell students that many different types of ferns were on Earth when the dinosaurs were alive. Ask students how scientists know this if no people were alive. Answer: fossils.
3. Show a picture of a fern fossil. Ask, "How do scientists know what the weather was like millions of years ago when the dinosaurs roamed the Earth?" Hopefully, students will realize that scientists infer this based on the fossils that they find. If not, lead students to understand this by asking questions like, "Do scientists know what a fern needs in order to live?" If scientists find a certain plant or animal and they know what kind of habitat and temperature these living things need, they can infer what the climate was like in the years they existed. Certain types of plants require specific temperature and moisture condition. If we know the types of plants and animals that lived, we can infer something about the kind of environment in which the organism thrived. Was it wetter than today or drier? Colder or warmer? The kind of fossils that are found together and the kind of deposit that they are found in also provide clues to past environments.
4. Show students a video about dinosaurs. Tell them to pay attention to the types of plants and what the weather was like in that time period. Remind students that the video is not real; it was created by scientists and movie makers, to show us what they think life was like during the age of dinosaurs. Older students may want to take notes by either drawing or writing about the plants and weather that they see. Tell students that they will need to pay close attention to the film because they will be giving their observations at the end of the show. You can then write the notes on the board.
5. Debrief with the students and talk about what they saw. Explain to students that scientists believe that during the Jurassic Period most areas experienced comfortably warm conditions all year long. The overall atmosphere was moist and temperate or tropical (warm), providing the perfect backdrop for animal and plant life. Source: Discovery Channel

6. Tell students that they are going to compare the weather in dinosaur times to the weather today. Read aloud the book *Oh Say Can You Say What's the Weather Today?* Discuss questions with students as you read.
7. Give students a sheet of paper, and ask them to fold it into four sections. Older students can divide a piece of paper in their science notebook into four sections. Label each of the sections: winter, spring, summer and fall. Write each of the four seasons on chart paper. Ask students to brainstorm what makes each of the seasons special. Write student ideas on the chart paper. Students need to add pictures or list characteristics of each season on their folded paper.

Give each student some small dinosaur cut outs. Have them glue a cut out into each of the squares that show weather that a dinosaur probably lived in. Students should have a cut out in all squares except the winter square with snow. You may need to have these cut out ahead of time or just have them in squares so the students are cutting a square not the details of the dinosaur.

## Post-Show Enrichment Activities

### Activity One: Squishy Versus Hard T-Chart

*Materials:* T-chart

*Procedure:*

1. Review with students that it is usually the hard parts of an organism that become a fossil and the squishy parts that decompose.
2. Have students make a T-chart in their science notebook. On one side, write the label *Squishy*, and on the other side, label it *Hard*. Students will work together to draw or list parts of their body that are squishy and hard in each column.
3. Lead the class in a discussion about their findings. What parts of them could turn into fossils? Which parts would decompose?

### Activity Two: Decomposition Experiment: Squishy Versus Hard

*Materials:* banana peel, chicken bone, soil

*Procedure:*

1. Students will set up an experiment to compare the decomposition rate of the soft parts (banana flesh) and hard parts (chicken bone) of organisms. The students should bury both parts in the same soil at the same depth.
2. They should record their problem and hypothesis and draw a picture of their experiment in their science notebooks.
3. After a couple weeks, they will check their experiment to see which decomposed faster.
4. Students will draw a picture to record their results in their science notebook.
5. Lead a discussion with students, talking about their findings.

### Activity Three: Did Dinosaurs Sleep? Modeling Day and Night

*Materials:* globe, lamp, T-rex picture, sauropod picture

*Procedure:*

1. Using a globe (Earth) and a lamp (sun) model day and night (the rotation of Earth on its axis) for students. Hold the globe and rotate it on its axis.
2. Discuss with students how much time has passed (24 hours). Discuss the reason it is day on one side of Earth and night on the other. Make sure that students understand that the sun is not moving. Earth is rotating on its axis. Earth rotates once every 24 hours (approximately). This is what causes day and night.
3. Tape a small picture of a T-rex to the globe, and a small picture of a sauropod (4-legged dinosaur).
4. Assign half of the students to role-play each of the two dinosaurs. Some will be the two-legged dinosaurs that slept lying down and some will be four legged that slept standing up.
5. Start out in the day; have the "dinosaurs" remain in their position and, without making noise, role play the actions of their assigned dinosaur during the day.
6. Tell students that 12 hours have passed. Turn the globe slowly. Night time is approaching. Students should now role-play how the dinosaurs slept. Another 12 hours passes and it is morning.
7. Continue to role play as days go by. Next, have students switch their dinosaur roles and continue reviewing day and night.

You may want to have dinosaur sounds playing during the day. You can find dinosaur sounds on the Internet.

*Teacher Background:*

*Article: Did Dinosaurs Sleep?*

Dinosaurs probably did sleep, though "it's all speculation, because we don't know enough about their physiology," said David Varricchio, a paleontologist and doctoral student who is working on dinosaur excavations for the Museum of the Rockies in Bozeman, Mont.

The speculations are based on their structures and diets and on the habits of the presumably most similar living species, like crocodiles and birds, which do sleep.

Mr. Varricchio suggested that carnivorous dinosaurs like Tyrannosaurus rex and deinonychus would probably have slept a lot.

"Predatious animals of today, whether warm or cold-blooded, get their meals in big chunks after a quick pursuit, then go back and rest," he said. He mentioned lizards, which often rest after dining on mice, and lions and cheetahs, which spend most of the time lounging around between hunts.

Herbivorous dinosaurs probably did not get a chance to sleep as much, because they would have spent more time eating continuously throughout the day, like elephants, Mr. Varricchio suggested.

As for their sleeping positions, he said he suspected that two-legged dinosaurs would have slept lying down, whereas sauropods like the brontosaurus (or apatosaurus), with their long necks and tails and their elephant-like stance on four straight legs, would have been the best candidates for sleeping standing up.

Source: The New York Times

#### Activity Four: Making Patterns with Dinosaur Tracks: Math

*Materials:* cut-out patterns (Appendix A-3)

*Procedure:*

1. Make copies of the student cut-out patterns below. You will need two pages per partner.
2. Students should cut out the individual footprints and put them in a baggie. You will use the larger footprints below. You will need to make several copies so that you have at least 10 of each footprint. You may want to make copies on a brightly colored paper.
3. Create a pattern using the footprints.
4. Students will create the same pattern on their desk and extend it using the cutouts in their baggies.
5. After you have practiced this many times, students can create their own patterns and have their partner try to figure out the pattern and extend it.

#### Activity Five: What Did Dinosaurs Drink?

*Materials:* hot plate, pot with ice, dinosaur habitat picture with water source (Appendix A-4)

*Procedure:*

1. Take students to the drinking fountain and have them get a drink of water. Tell them that while they are drinking, they should think about where that water came from.
2. Back in the classroom students will turn and talk about where they think the water came from? How long has it been on Earth? Where was it before they drank it?
3. Create a model of the water cycle and explain it to students.
  - a. Explain to students that you will be using a hot plate in today's demonstration. Make sure safety rules are clear.
  - b. Show students the skillet filled with water. Ask them to imagine that this water is a puddle or body of water on earth.
  - c. Turn hot plate on high and place the skillet on top. Ask students for predictions about what will happen as the water is heated. Do not leave hot plate unattended. Make sure that they understand that, in the real world, the sun heats the water and it is a much slower process.
  - d. Observe the steam that rises off of the liquid water. Have students verbalize what is happening. Define the term "evaporation" and explain that water on the earth evaporates and becomes a gas (water vapor). Students should be able to observe the steam from a safe distance.
  - e. As steam rises, hold the pot full of ice over the hot skillet. Ask students to predict what will happen when the water vapor comes in contact with the cold pot.
  - f. Observe water droplets forming on the outside of the pot. Have students verbalize what is happening. Define the term "condensation" and explain that this is what happens as water vapor forms into clouds.
  - g. Observe as water begins to fall back into skillet. Have students verbalize what is happening. Explain that this is like when it rains and define the term "precipitation."
  - h. Have students verbalize that the water falling back into the skillet will become vapor again and continue the cycle. Define term "water cycle."
4. Show students a picture of a dinosaur's habitat which includes a water source. Ask students what happened to the water after the dinosaurs drank it. Lead students to see that water continues to cycle through the environment. Much of the same water that we had back then is still here today, so it is very possible that the water they just drank was once drank by a dinosaur.

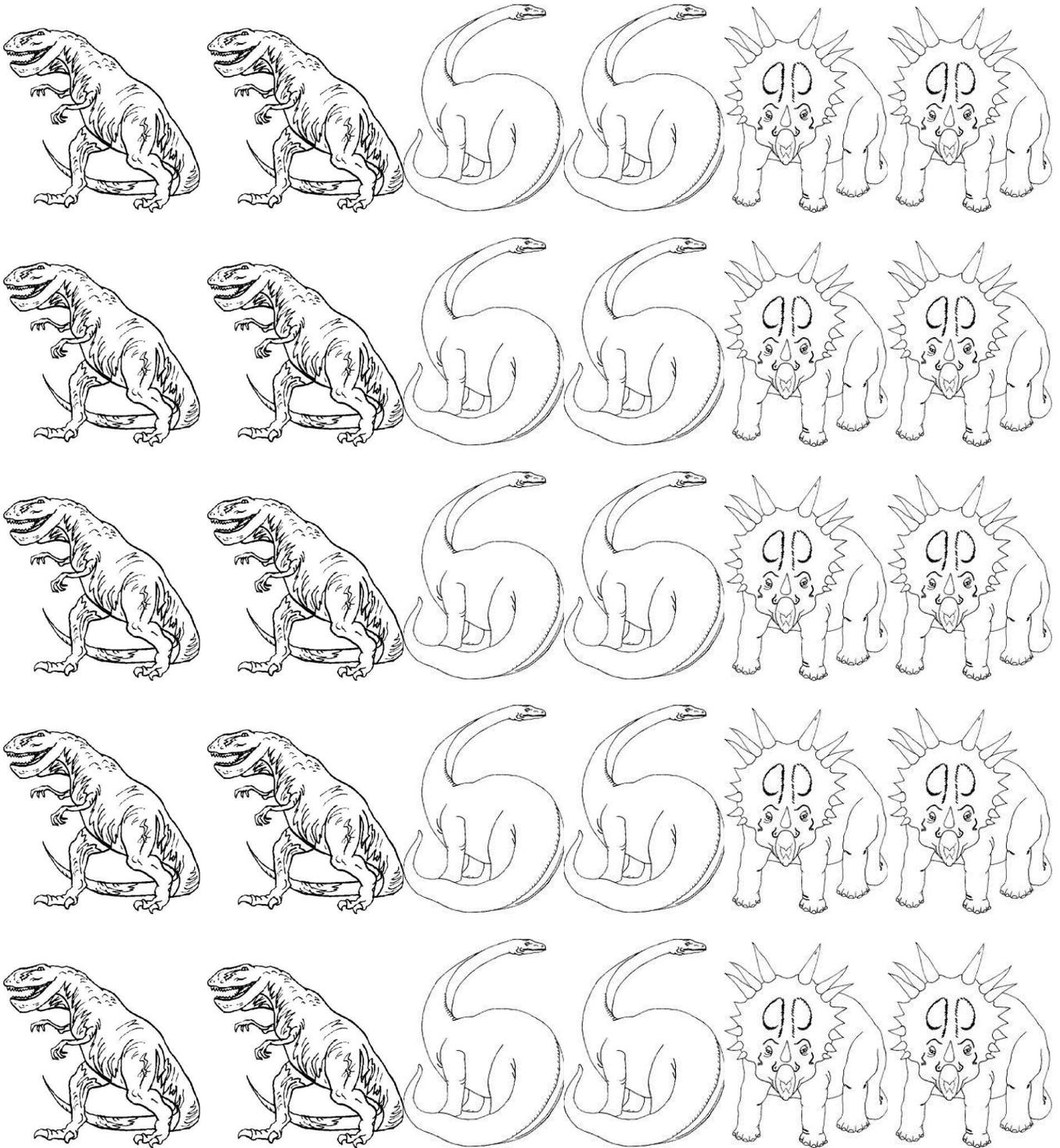
## Appendix

A-1



Graphic Source: Fossilmall.com

A-2



Graphic source: Kaboose

**A-3**

Megalosaurus Footprint



Source: Everything Dinosaur

Sauropod Footprint



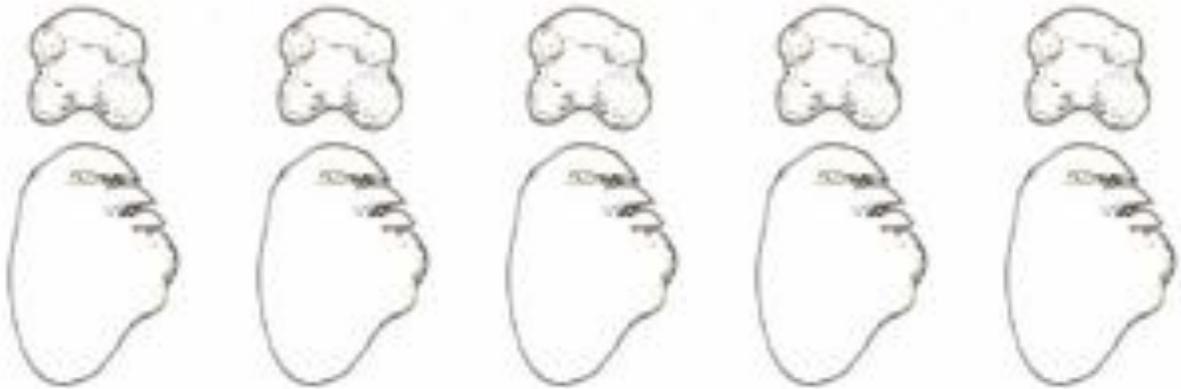
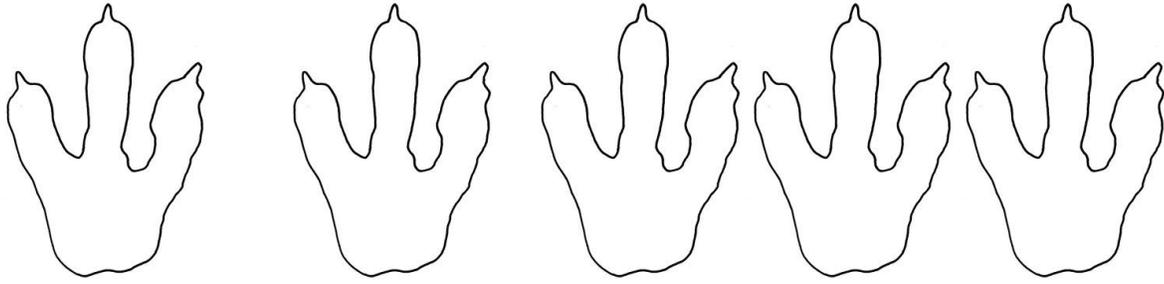
Source: Different Directions

Amblydactylus Footprint



Source: Different Directions

Student Cut-outs



A-4

## Dinosaur Habitat



Source: Everything Dinosaur