

# SCIENCE·3D

## TIGER QUEEN

In this packet, sample student answers are provided in **red** and notes to teachers are in **blue**.

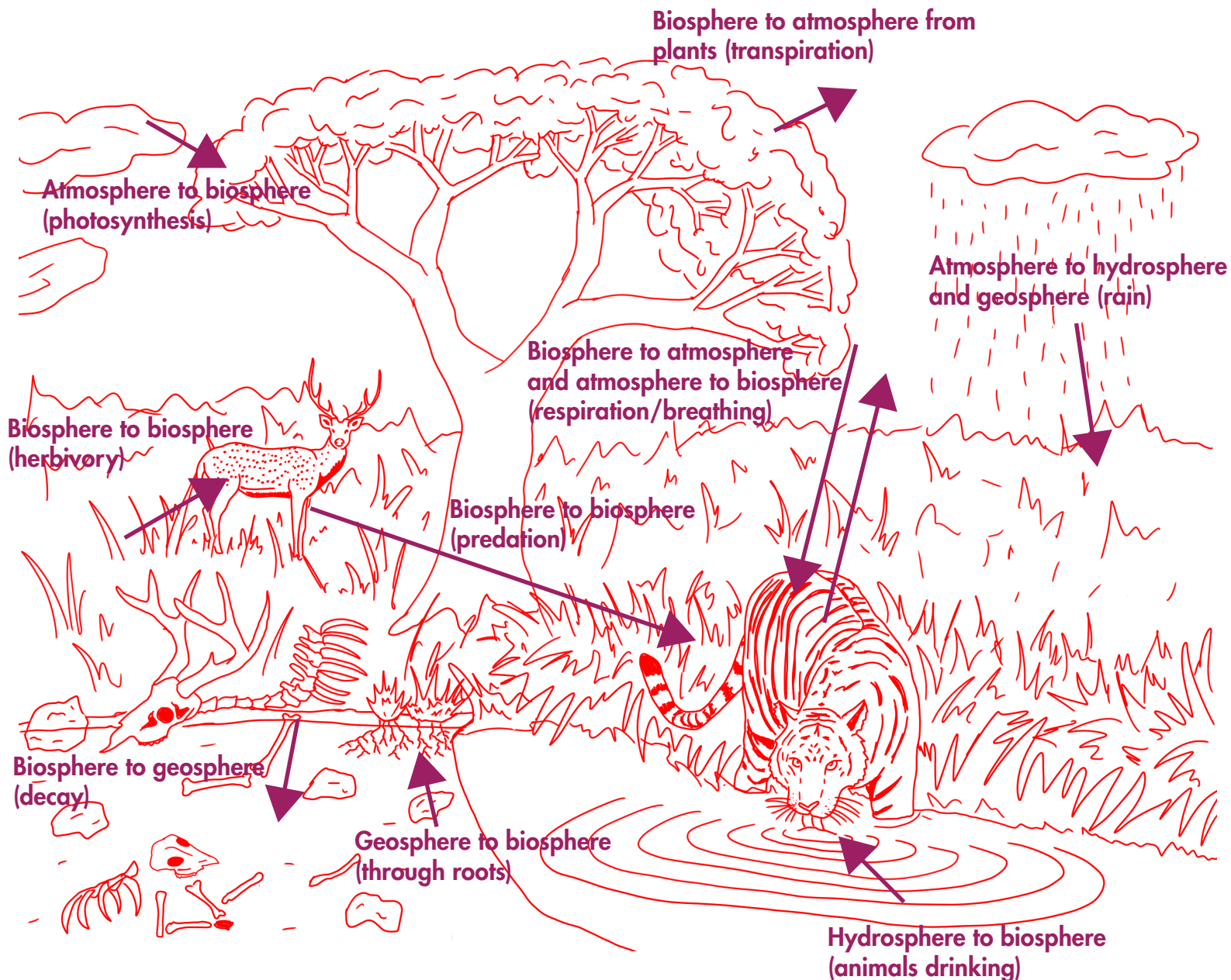
This **Explore Your Backyard** activity has students compare and contrast the flow of matter and energy in a local ecosystem and the tigers' forest in India. An alternate activity has students record local observations about the timing of sunrise and sunset and compare that to other locations around the globe. Then, they relate these observations to the Earth-Sun system.

The idea of this activity is to reinforce understanding of the “four spheres” and to have students be able to make generalizations about how matter flows through these spheres. Ideally, this activity could be done on school grounds, with students thinking of places they have visited, or through a virtual exploration of a local ecosystem (going to a park's website or reading a book). This assignment could be given in class with teams working together or even as homework. Either way, encourage students to share their work as posters, presentations, or a story they write. For the first part of the activity, have students use their **Mission Reader** if they need support.



No matter where you live, matter flows between the four “spheres” of the planet – the hydrosphere, the atmosphere, the geosphere, and the biosphere. Even though plants and animals may look very different in two places, or a place may be wild or have a lot of people, these flows are very important. Let’s compare Kismet’s forest in India to an ecosystem near you! Your teacher will help you figure out which ecosystem to study.

1. **Draw** a diagram of Kismet’s forest that shows all four “spheres.” In your picture show how matter flows between the four spheres. Label each arrow you draw to show a flow of matter. Answers will vary, but should include aspects of the biosphere, hydrosphere, geosphere, and atmosphere. An example drawing is below.



Now, let's explore your backyard! Your teacher will tell you what to explore. Use the space below to take notes about the environment. Be sure to write down information about the atmosphere, biosphere, geosphere, and hydrosphere.

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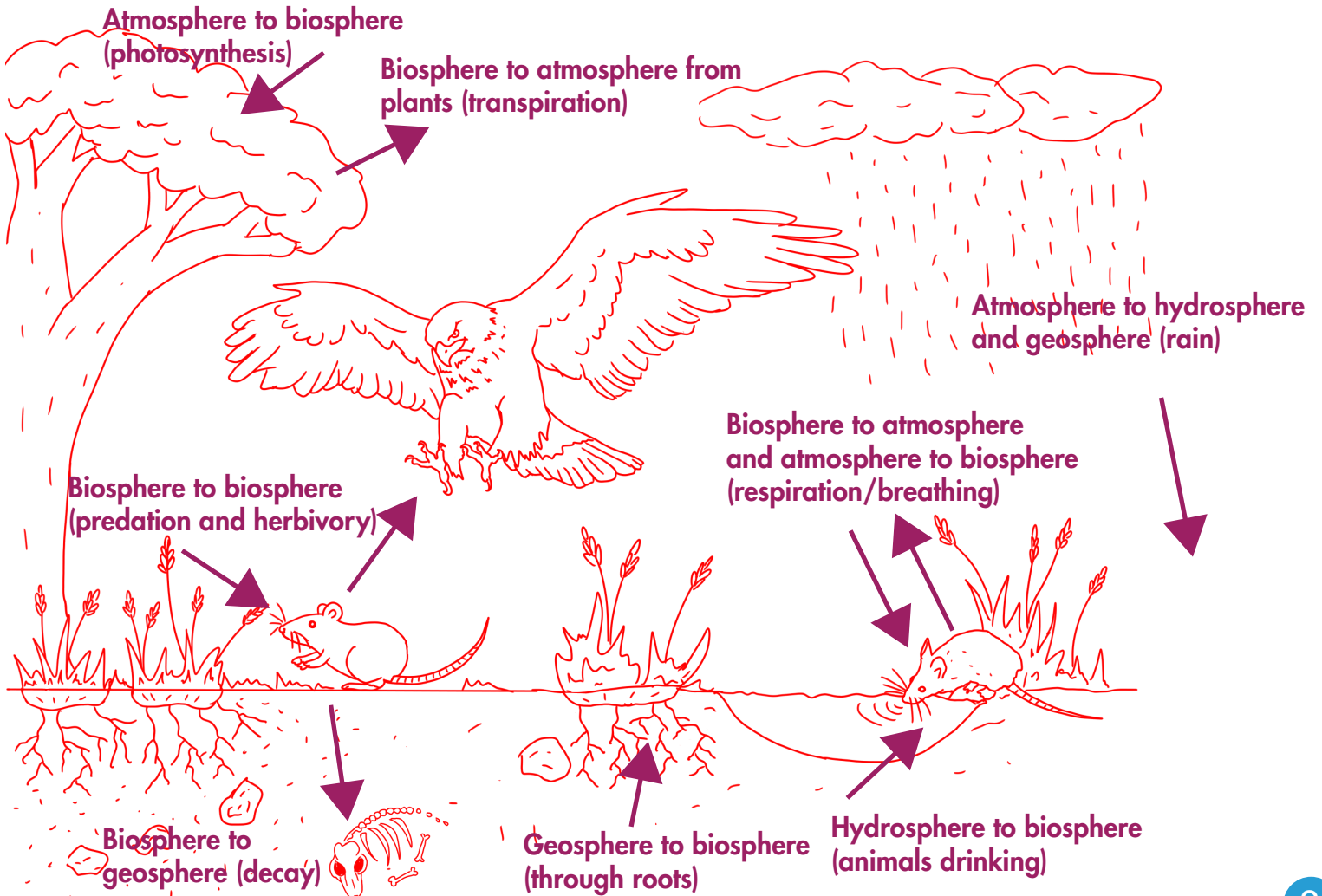
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2. **Draw** a diagram of your local environment that shows all four "spheres." In your picture, show how matter flows between the four spheres. Label each arrow you draw to show a flow of matter.

Answers will vary based on student's local environment. Complete answers should include aspects of the biosphere, hydrosphere, geosphere, and atmosphere. An example drawing is below.



3. **Compare and contrast** how matter flows in your environment and Kismet’s forest in India.

*Answers will vary. Complete answers should indicate that matter flows in similar ways*

*between the four spheres in the two ecosystems, even though the location, wildlife,*

*climate, and landscapes may be different.*

**Expand the Lesson** (also included in **Mission Research** for flexibility): While students may have done this activity in the **Sea Turtle World** mission, consider having students draw the flow of energy in the Indian forest. Be sure that they show the fate of energy as it flows between organisms and from organisms into the physical environment (lost as heat). You could then have them compare this flow to the one in the **Sea Turtle World** mission or a local ecosystem. This activity will help reinforce their understanding of what happens to the 90% of energy that isn’t available to the next step in the food chain. You can further expand the lesson to have students trace the cycle of matter among the spheres in Kismet’s forest. This can be expanded on to compare to a local ecosystem as an alternative **Explore Your Backyard** activity. In this activity, focus on matter being incorporated into producers and flowing back to the atmosphere during cellular respiration and photosynthesis and into the geosphere during decomposition.

**Alternate Option:** Have students use <https://sunrise-sunset.org> to determine the day length and the time of sunrise and sunset. Have them create a table to record their data. Have them fill in the time of sunrise and sunset at other locations around the world. Be sure that they include areas in the Northern and Southern Hemispheres. Then, have students construct an explanation for these differences. To help, they can use their **Mission Reader** and locate the places they have selected on a map. You can have students revisit this activity in the fall, winter, and spring. Have them observe the differences locally and at the other points they have selected. You can have the class create a master list that shows all the places in the world they have chosen to investigate. *Note: The times listed on this website are in local time. You can have students correct to Coordinated Universal Time (UTC) to have them model how the sun rises and sets as it moves around the globe.*