

Plant and Animal Relationships: Investigating Systems in a Bengali Forest

Problem students work to solve

What is happening to the chalta trees in the Bengal Tiger Reserve?

Chapter 1 Question

Why aren't new chalta trees growing in the Bengal Tiger Reserve?

Investigation Questions

How do scientists study habitats? (1.2, 1.3, 1.4)

How do new plants grow? (1.5, 1.6)

Evidence sources and reflection opportunities

- Read *My Nature Notebook* (1.2)
- Discuss and record ways to study a habitat (1.2)
- Investigate a sample study site habitat (1.3)
- Read about the broadleaf forest and other habitats in *Handbook of Habitats* (1.4)

- Observe and sort seeds (1.5)
- Read about seeds in *Handbook of Habitats* (1.5)
- Sequence plant growth cards (1.5)
- Investigate water and seeds (1.6)
- Investigate sunlight and plant growth (1.6)
- Discuss relationships between science words (1.7)

Key concepts

- One way scientists study habitats is by observing the plants in them over time. (1.4)
- There are many types of habitats. Each habitat has many different types of plants and animals. (1.4)

- Plants make seeds that can grow into new plants. (1.5)
- Only seeds that get enough sunlight and water sprout and grow into full-grown plants. (1.6)

Application of key concepts to problem

- Count the trees in the Bengal Tiger study site and discuss data (1.4)
- Revisit Bengal Tiger study site maps (1.5)
- Discuss data about chalta trees in the Bengal Tiger Reserve (1.7)
- Explain why there are no new chalta trees growing in the Bengal Tiger Reserve (1.7)

Explanation that students can make to answer the Chapter 1 Question

The chalta trees in the Bengal Tiger Reserve make seeds. Only the seeds that get enough water and sunlight will sprout and grow into new adult plants. There are no new chalta trees because the chalta tree seeds must not be getting enough water and sunlight.

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Problem students work to solve

What is happening to the chalta trees in the Bengal Tiger Reserve?

Chapter 2 Question

Why aren't the chalta seeds getting what they need to grow?

Investigation Questions

How do plants get the water and sunlight that they need to grow? (2.1, 2.2)

Why can't plants always get the sunlight and water they need to grow? (2.3, 2.4, 2.5)

Evidence sources and reflection opportunities

- Observe and measure roots and leaves (2.1)
- Read *A Plant Is a System* (2.2)
- Discuss and record relationships between science words (2.2)

- Write about roots and leaves (2.3)
- Play Growing Roots game (2.3)
- Observe Sunlight and Leaves Model (2.3)
- Participate in Plant Growth Body Model (2.3)
- Test predictions of which seeds will grow with digital Modeling Tool (2.4)
- Write about a good place for a seed to grow (2.4)
- Discuss and test predictions with Modeling Tool (2.5)

Key concepts

- Plants have leaves that get sunlight. Plants have roots that get water from the soil. (2.2)

- Without enough space, plants can't get sunlight and water they need to grow. (2.4)
- Leaves need space to get sunlight. Roots need space in the soil to get water. (2.4)

Application of key concepts to problem

- Compose a scientific explanation about why the chalta seeds are not getting the sunlight and water they need to grow (2.5)

Explanation that students can make to answer the Chapter 2 Question

The chalta trees in the Bengal Tiger Reserve use their roots to get water from the soil and their leaves to get sunlight. The chalta tree seeds need to move away from other plants and get to a place where they can spread their roots and leaves to get what they need to grow. The chalta tree seeds must not be getting to a new place where they can grow.

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Problem students work to solve

What is happening to the chalta trees in the Bengal Tiger Reserve?

Chapter 3 Question

Why aren't the chalta seeds getting to places where they can grow?

Investigation Question

How can seeds get to new places in their habitats? (3.1, 3.2, 3.3, 3.4, 3.5)

Evidence sources and reflection opportunities

- Read *Habitat Scientist* (3.1)
- Model how animals hide seeds (3.1)
- Model how seeds are dispersed (3.2, 3.3)
- Diagram a habitat (3.4)
- Reread *Habitat Scientist* (3.4)
- Read "Broadleaf Forest in India" section of *Handbook of Habitats* (3.4)
- Diagram and write about a habitat (3.4)
- Investigate habitats in the Plant Growth apps (3.5)
- Write about how a plant and an animal in a habitat depend on each other (3.5)

Key concepts

- Animals sometimes disperse seeds by eating fruit, moving to another place, and leaving droppings with the seeds inside. (3.3)
- Before they investigate, scientists decide how they will measure the thing they want to learn about. (3.3)
- Some plants depend on animals to disperse their seeds. These animals depend on the plants for food. (3.5)

Application of key concepts to problem

- Explain why the chalta seeds are not getting to places where they can grow into new plants (3.6)

Explanation that students can make to answer the Chapter 3 Question

The chalta trees in the Bengal Tiger Reserve depend on elephants to move their seeds so the seeds will get the sunlight and water they need to grow. Elephants eat the chalta fruit for food, move to other places in the habitat, and leave droppings with seeds inside in places where the seeds might get the water and sunlight they need to grow. Because a fence has blocked the elephants from coming into the reserve, they are not able to eat the fruit and move the seeds to places where they can grow.

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Problem students work to solve

What is happening to the chalta trees in the Bengal Tiger Reserve?

Chapter 4 Question

How are other seeds in the reserve able to get to places where they can grow?

Investigation Question

How do seeds that animals don't use for food get dispersed? (4.1, 4.2, 4.3)

Opportunities to engage in practices and apply key concepts

- Read *Investigating Seeds* (4.1)
- Plan and record seed investigation (4.2)
- Conduct seed investigation (4.3)
- Examine and categorize seeds (4.4)
- Write about how wind disperses the sal and red silk seeds (4.3)
- Discuss why the chalta seeds and burclover seeds are dispersed the way they are (4.4)

Practice that students can do in response to the Chapter 4 Question

Students can more independently investigate how other seeds in the reserve are able to get to the places where they can grow, deciding what and how to measure in their investigations in order to answer their questions.