

1.2: Plants Storyline Reading

Learning from the Work of Asima Chatterjee

Purpose for reading: As you read this text, work to make sense of the roles you will take on during this unit and how those roles relate to the work scientists do.

In *Systems and Scale*, you collaborated with your classmates as questioners, investigators, and explainers to figure out what happens to ethanol when it burns. You then used that understanding to explain what happens to other materials when they burn. Now, you will be taking on the roles of questioner, investigator, and explainer to figure out how plants use matter and energy to grow and move. Plant scientists move through these same roles.

Let's consider how Asima Chatterjee, a plant biochemist, studied how plants change matter to make molecules that can be used in medicine. Chatterjee was born in 1917 in Calcutta, India. She grew up and studied there. She was the first woman in India to get a doctoral degree in science! After getting her doctorate, she continued to work and teach in India. In her career, she was a questioner, investigator, and explainer.



Asima Chatterjee, CC BY-NC-SA 3.0

Chatterjee was a questioner. Chatterjee wondered about the molecules different plants make as they grow. She asked questions about the molecules in plants that were common in India. She also asked questions about how molecules from plants may be useful people. All of her questions were about the material world and could be explored by collecting evidence. During this unit, you'll be a questioner. You will develop scientific questions through discussions with your peers and the Expressing Ideas Tool.



Jatamansi, PD-1923

Chatterjee was an investigator. Collaborating with colleagues, Chatterjee conducted investigations to answer her questions about the molecules in plants. Her investigations built on the methods and results of other scientists and people. For example, a plant called Jatamansi was commonly used in Indian medicine to reduce stress. Chatterjee dried and powdered small pieces of the plant's roots to investigate the molecules that the roots are made of.

During the unit, you'll be an investigator. You'll make predictions and then collect evidence to help answer the questions you asked earlier in the unit. Your methods will build on what you learned during the *Systems & Scale* unit. It will be important to keep notes of your predictions, your methods, and the evidence you collect on the Predictions Tool, the investigation worksheets, and the Evidence-Based Arguments Tool. Your notes will help you remember your ideas and evidence so you can discuss them with your peers.

After Chatterjee completed her initial investigations, she had evidence about some of the molecules plant cells made as they grow. The Jatamansi plant contained a molecule called

an ester. However, her evidence left some questions unanswered and prompted more questions. She wondered about what other molecules the plants were making and how those molecules could be used for medicine. Similarly, the evidence you collect will help answer some of your questions, but may lead to more questions or leave some unanswered questions.

Chatterjee was an explainer. As scientists answer their questions, they write explanations to share with other scientists. Chatterjee published over 300 papers about her investigations! She used the work of other scientists and the results of her own investigations to identify important molecules and explain how they are useful. Other scientists conducted their own investigations to confirm, refute, and build on Chatterjee's explanation. Other scientists also learned from her methods and could use them to answer their own questions. For example, other scientists learned from the method she published of identifying particular molecules in plants and used it in their own investigations.

When you have enough evidence, you'll take on the role of explainer to put together the evidence and tell a scientific story. The Explanation Tools will help you figure out how to put the pieces together to tell a single story. Toward the end of the unit, you'll explain how a specific plant grows and then how other plants grow. Your peers will read and critique your explanations, providing feedback to help you improve your explanations.

At the end of the unit, you'll be able to answer some of your initial questions about how plants move and grow. While your answers will be based on evidence and tell a scientific story, there will still be more to investigate and understand. Chatterjee died in 2006, but scientists continue to ask questions that build on her ideas and people continue to benefit from her work. Some of the molecules that Chatterjee found in plants are being used for chemotherapy and to prevent seizures. You'll be able to apply what you learn about plants to other science units as you continue to ask scientific questions to deepen your understanding as well as the understanding of your peers about the material world.