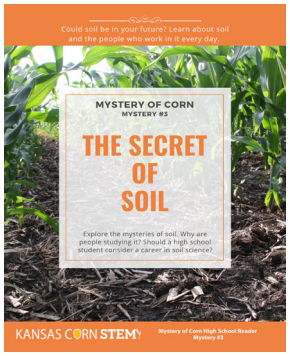


## MYSTERY #3

# THE SECRET OF SOIL

High School Teacher Guide

KANSAS CORN STEM

This teacher's guide is broken into different sections with suggestions of how to use the reader in the classroom and provides ideas on how to extend the learning for your students. A PDF version of this teacher guide with active links can be found at kansascornstem.com under Mystery of Corn Reader.

**Reader QR Code Links**

If your students are unable to use QR codes in the classroom here are the links to share videos in alternative ways.

- Bioturbation: Worms at Work- https://vimeo.com/110880643
- Land Management Activity provided by The Concord Consortium- https://bit.ly/3eM266V
- How is Soil Created?- https://bit.ly/3Be8XOR
- Can a Farmer Improve Their Soil- https://bit.ly/3HguaLI
- Ag Explorer- https://agexplorer.ffa.org/search/node/soil
- Soil Science Society of America- https://www.soils.org/
- Ag Explorer (Soil Scientists Careers) - https://agexplorer.ffa.org/career/soil-scientist
- U.S. Office of Personal Management- https://www.usajobs.gov/Search/Results?j=0470
- Soil Jar Test- https://bit.ly/3XY3pBE

**Vocabulary Words**

There are seven vocabulary words to be found throughout the reader. They are bolded with a small explanation to help define the word. Other ways to learn more about these words are:

- Have your students find the definitions to the words on their own before reading.
- Draw pictures of the words which will help them make meaningful connections.
- Have them create online or physical flashcards, graffiti posters or PowerPoint presentations to help them understand the meaning of the words.

**Soil Health/Worms/Bioturbation**

- Provide students with the Soil Health handout that has ten questions. They can use this as the starting point for their research.
- Have students watch the video and write a response on their reader to the question provided in that section.
- You can have students create a PowerPoint presentation or Google Slides presentation to show their findings after conducting their research.
- Optional: you can provide a copy of the worksheet digitally by assigning it in Google Classroom or any other learning management platform.

If you have access to Newsela, search the topic soil or use the link here, https://newsela.com/search?needle=soil. There are some wonderful articles on how soil is formed, soil erosion, and even the use of soil to help straighten the *Leaning Tower of Pisa*.

**Job Connections**

In this section students focus on soil science careers and will research careers in this field.

- Students can practice creating a resume for a soil science position they find. This is a great way to have students practice finding the skill sets needed for a job and how to build a resume to make them qualified for that job.
- A resume template can be provided to them as a starting point for creating their own. A resume template can be downloaded here: https://kscorn.com/wp-content/uploads/2021/12/HS-Reader-3-Resume-Template.docx

**Interactive Soil Health Lab**

- The Interactive Land Management activity has an accompanying worksheet that can be handed out to the students.
- This activity can be completed alone or with partners.
- It can take roughly 20 minutes of a class period, which could be a great way to extend the reader over multiple days/class periods or to use as a time filler as the soil is settling during the Corn Science Investigation.

**Corn Science Investigation**

This investigation explores a soil mystery. Students will look at various soil composition elements including mass, density, volume, texture, and mineral composition and try to find the soil from the crime scene that match a soil from a certain location.

- Hand out the Corn Science Investigation worksheet. This worksheet will help students with the investigation and provides assessment questions.
- The video on the page provides background information on how to conduct the soil jar test and analyze the findings.
- Keep in mind that you need time for the contents in the jar to settle. You could turn this into a two-day lab or have students complete other activities in the reader while they wait for the soil to settle in the jars.
- You can have students extend their research by perusing the Soil Explorer website and focusing on Kansas. They can challenge their skills by identifying different types of soil across the state and more. Link to soil explorer: https://soilexplorer.net/
- There are also several other mini lab extensions that can be done using the compiled list from NRCS Soil Scientist, Kim Vinson. The majority of these activities require minimal, easy to access materials. They've been included as an additional teacher resource page.
- If you have the ability to download software to student computer, STEAMpowered has an awesome game called "Secrets of Soil" that can be played for free once downloaded and a free account is made. The link to the game can be found here: STEAMpowered app/ https://store.steampowered.com/app/1610820/Secrets_Of_Soil/

**Additional Kansas Corn STEM Resources**

This reader can be used as a stand-alone activity, or you can pair it with other Kansas Corn STEM offerings.

- ***Lesson*** - Just Dirt lesson. You can find the lesson guide and training videos here https://kscorn.com/topic/soil/
- ***Breakout Box Challenge*** - Challenge your students to learn more about soil using a breakout box. Grow your NPK Knowledge and Sifting Through Soil would go well with this reader. It is available online or for physical breakout boxes. Check out the lessons and others at https://kscorn.com/topic/breakout-box/
- ***Guest Speaker*** - Request a guest speaker to visit the classroom and expand learning about soil and corn. https://kscorn.com/guestspeaker/
- ***Other Lessons*** - Other middle school labs can be found in the lesson library. Check out the TEACH-FLEX lessons that use easy to find classroom materials to complete a lab. https://kscorn.com/lesson-library/
- ***Seed to STEM Workshop*** - Seed to STEM is a 2-day workshop where teachers learn 10 labs, attend a farm dinner and ethanol plant tour and receive $500 in supplies to use in their classroom. Learn more about the workshop: https://kscorn.com/middle-school-science-teacher-professional-development/#AboutSeedtoSTEMWorkshops