



COLLEGE LESSON PLAN TO ACCOMPANY THE *LIVING SOIL* DOCUMENTARY

Living Soil is a 60-minute documentary film available from the non-profit Soil Health Institute. The documentary features diverse scenes of food production and farmers from across the United States. Producers talk about reasons they prioritize soil health and strategies they have used to improve soil health. The film also includes soil health researchers and other soil health experts commenting about new trends and developments in soil health. The film was shot in 2016 and 2017 and released in 2018. Individuals who have viewed the film have rated it very highly for beautiful cinematography, the original music score, and especially the educational content provided.

The film is available to stream and download at www.livingsoilfilm.com.

This lesson plan to accompany the *Living Soil* film is for **college level classes**. The film is appropriate to classes in agriculture, natural resources, environment, ecology, biology or human nutrition and food systems.

Primary learning goal:

Develop an understanding of why soil health is important and some of the ways that farmers are working to improve the health of our nation's soils, benefiting all members of our society.

Specific educational objectives:

- Learn why soil health is important
- Gain awareness of the types of organisms found in soil
- Understand some approaches farmers are taking to improve soil health
- Describe the role of cover crops in protecting and improving soil health
- Discuss ways to increase adoption of soil health practices like cover crops and no-till and overcome barriers to more widespread adoption
- Connect soil health to consumer interests and issues

Teaching time: 1-2 hours plus time for watching the 60-minute film in or out of class



Class prompts for small groups or whole class film discussion:

- The film ended with a conversation between a Chesapeake Bay fisherman (Ooker Eskridge) and a Pennsylvania farmer (Steve Groff). What did you find interesting about their conversation? Did the fisherman feel that water quality in the Chesapeake Bay was improving as a result of more use of cover crops and other conservation practices on farmland? In Maryland and some other areas near the Chesapeake Bay, over half the corn and soybean fields have cover crops – can this high level of cover crop adoption to improve water quality be replicated elsewhere? What can help make it happen and what barriers might get in the way?
- Which of the farmers made the biggest impression on you with their remarks and what you saw and heard about their farms? What did you take away from listening to that farmer (or farmers)?
- The film started out with the Dust Bowl era of the 1930s and then made the connection of preserving the soil because we all like to eat. Is there an opportunity to make more people in society aware of the importance of our limited soil resources, and how would you do that?
- One of the farmers (Dan DeSutter from Indiana) talked about how soil organic matter has declined significantly since modern agriculture began, and his desire to restore his soil organic matter. Why is that important and what can help build soil carbon and soil organic matter?
- The farmers and soil experts in the film talked quite a bit about the living organisms and the need to keep them fed and healthy to have a healthy soil. Can you think of any parallels to how a healthy soil ecosystem functions in prairies or forests?
- Soil health encompasses soil chemistry, soil physics AND soil biology. In the past, soil biology was not given as much attention as the physical or chemical aspects of soils. Now that there is a growing awareness of the importance of soil biology and soil health, how do you think that will change farm management in the future?

Individual learning activities/student reflections:

- Write a reflection (200-300 words) on one of the following three topics:
 - ▶ Select a farmer from the film and write about why that farmer's comments made an impact on you and what you found interesting about their situation and their approach to soil health.
 - ▶ Given what you learned about soil health in the film, write about why soil health will be important to food production going forward.
 - ▶ After watching the film, describe whether you feel more or less optimistic about the future of agriculture and our food system going forward, and explain why you feel that way.

Sample quiz questions, including definitions:

1. What steps or practices are farmers using to improve soil health?
2. What types of organisms are present in a healthy soil ecosystem?
3. List four benefits of cover crops, including for soil health.
4. Why is it helpful to increase soil carbon and build soil organic matter?
5. What are at least three key principles of soil health?
6. Why do plants exude carbohydrates out of their roots to feed soil organisms?
7. How do cover crops and improved soil health relate to water quality?
8. Give three examples of ways that more farmers can be motivated to use cover crops and other soil health practices.
9. How can livestock help improve soil health?
10. Why is improved soil health important to feeding a growing world population?

Define/describe:

- Soil biology
- Cover crops
- Cover crop cocktails
- No-till farming
- Soil erosion
- Soil organic matter
- Soil carbon sequestration
- Water quality
- Soil nutrient management
- Cropping system resiliency

Summary notes for instructors:

The film should serve as inspiration for small group or whole class discussion with your students. After having some group discussion, you can reinforce the learning objectives on soil health by having the students do a writing activity and/or take a quiz on the topic. You may wish to have them read some of the brief fact sheets or more in-depth articles on soil health available free on the following websites, and/or watch additional short videos, possibly of farmers from your region (the SARE Cover Crop Innovator video series listed below has more than 20 short 2-3 minute farmer videos on cover crops and soil health from various parts of the country). There are also illustrations, photos, PowerPoint presentation slides and additional videos on cover crops and soil health available free on several of the websites listed below.

The USDA Natural Resources Conservation Service (NRCS) defines soil health as:

Soil health, also referred to as soil quality, is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. This definition speaks to the importance of managing soils so they are sustainable for future generations.

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>

NRCS describes the four principles of soil health as:

1. Minimize disturbance
2. Maximize soil cover
3. Maximize biodiversity
4. Maximize presence of living roots

ADDITIONAL REFERENCES

- 1) Two-page fact sheet on “Ten ways cover crops enhance soil health” – joint publication of Soil Health Institute and USDA-SARE <https://soilhealthinstitute.org/wp-content/uploads/2017/12/10-ways-cover-crops-enhance-soil-health-FINAL.pdf>
- 2) Other Soil Health Institute educational resources – publications and videos <https://soilhealthinstitute.org/resources/>
- 3) Soil health fact sheets from the USDA Natural Resources Conservation Service <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/soils/health/?cid=stelprdb1049236>
- 4) USDA-SARE Cover Crops Topic Room – www.sare.org/covercrops
- 5) USDA-SARE Cover Crop Innovator Video Series (includes two dozen 2-3 minute video clips of farmers from across the U.S. expressing why cover crops and soil health are important to them) <https://www.sare.org/Events/Cover-Crop-Conferences/National-Conference-on-Cover-Crops-and-Soil-Health/Cover-Crop-Innovators-Video-Series>
- 6) USDA-SARE Cover Crop and Soil Health illustrations, photos, and slide sets <https://www.sare.org/Learning-Center/Topic-Rooms/Cover-Crops/Cover-Crop-Images-Library>
- 7) USDA-SARE Cover Crop Resource Series – short fact sheets on various benefits of cover crops <https://www.sare.org/Learning-Center/Topic-Rooms/Cover-Crops/Cover-Crops-and-Water-Quality-Resource-Series>

Some in-depth popular media articles on cover crops and soil health:

- 8) Cover crops: A farming revolution with deep roots in the past. New York Times cover story. <https://www.nytimes.com/2016/02/07/business/cover-crops-a-farming-revolution-with-deep-roots-in-the-past.html>
- 9) Can American soil be brought back to life? Politico feature article. <https://www.politico.com/agenda/story/2017/09/13/soil-health-agriculture-trend-usda-000513>
- 10) A grass roots movement for healthy soil spreads among farmers. NPR feature story. <https://www.npr.org/sections/thesalt/2018/04/09/597617822/a-grass-roots-movement-for-healthy-soil-spreads-among-farmers>



More on the Soil Health Institute

The Soil Health Institute is an independent, non-profit organization charged with coordinating and supporting soil stewardship and advancing soil health. The Institute's leaders recognize that soil health must emerge as the cornerstone of land use management decisions throughout the world. Its stakeholders respect that agriculture is vital to civilization. Nations throughout history have risen through the benefits of healthy soil, and no civilization has lasted if it could not feed its people. Yet, due to a number of factors, our soil is degrading.

Our Mission – Safeguard and enhance the vitality and productivity of soil through scientific research and advancement.

Our Vision – The Soil Health Institute will be the primary resource for soil health information and research. Its outcomes will yield healthy, sustainable soils to serve as the foundation for society, benefit the environment and contribute to the productivity and profitability of agriculture.

Our Values – We believe that healthy soil is the foundation of life and society, and should be treated as an irreplaceable resource. We believe that knowledge advancement and research will improve soil health and sustain the earth's most valuable asset.

Website: <https://soilhealthinstitute.org>

