

Name: _____

Factors Affecting Soil Health

Aligned to the following standards:
CS.03; CS.04; CS.06; NRS.02; NRS.04; FFA.PL-A; FFA.PL-B; FFA.CS-M; FFA.CS-N; AG3; AG4; AG6; AG-NR2; AG-NR4; CCSS.ELA.SL.9-10.1; CCSS.ELA.RST.9-10.3; HS-LS2-7; HS-ESS3-4; CRP.02; CRP.04; CRP.05

Part 1:

Directions:

After properly sorting the Soil Health Sort Cards, complete the table below. Be sure to record all the factors and their descriptions underneath each category.

PHYSICAL FACTORS	CHEMICAL FACTORS
BIOLOGICAL FACTORS	HUMAN ACTIVITY FACTORS

1. Which soil health factor do you think is most challenging to manage? Why?

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Part 2:

Directions:

In the table below, choose one soil health situation per category from the sort cards and write a two- or three-sentence explanation for why that situation is good or bad for overall soil health. Then answer the reflection questions.

PHYSICAL FACTORS	CHEMICAL FACTORS
BIOLOGICAL FACTORS	HUMAN ACTIVITY FACTORS

Reflection Questions:

1. Can improving one part of soil health (like adding nutrients) harm another part (like biological life)? How do you think we balance those needs?
2. What are two ways that the physical, chemical and biological aspects of soil interact with one another?
 - a.
 - b.
3. What might happen to our food systems if soil health continues to decline globally?

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Soil Doctor: Diagnose and Recommend

Directions:

Read over each of the scenarios below and discuss with your group what the problem is and how you would go about solving it. You may need to use additional research and resources to diagnose and make recommendations. Below are a few options you may consider (but are not limited to). Be ready to share your research and solutions in a class discussion.

- USDA Natural Resources Conservation Service (NRCS), Soil Health: <https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soils/soil-health>
- USDA NRCS, Soil Health Key Points: <https://www.nrcs.usda.gov/sites/default/files/2022-12/soil-health-key-points.pdf>
- Soil Health Institute, Resources Page: <https://soilhealthinstitute.org/resources/>
- Farmers.gov Soil Health Page: <https://www.farmers.gov/conservation/soil-health>

Scenario 1: Compacted Cornfield

A cornfield has been driven over repeatedly by heavy tractors after rainfall, compacting the topsoil. The farmer notices that water tends to pool on the surface after irrigation or rain, and crop roots are not growing very deep. Yields have dropped, and the plants appear stunted.

1. What is the main issue and the factors involved?
2. What would be a realistic solution to improve soil health in this scenario? Be specific about actions or practices that could be implemented.

Scenario 2: Over-Acidified Soil

A small vegetable farm has used ammonium-based synthetic fertilizers for many seasons. Soil tests now show that the pH has dropped below 5.5, and the farmer is beginning to see poor plant performance, especially in leafy greens. Some nutrients appear to be “locked up” and unavailable to plants.

1. What is the main issue and the factors involved?
2. What would be a realistic solution to improve soil health in this scenario? Be specific about actions or practices that could be implemented.

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Scenario 3: Depleted Organic Matter

A field used for hay has not had any organic inputs (like compost or cover crops) added in several years. The soil is visibly dry and crumbly, and the farmer notices fewer earthworms than before. Crops seem to require more watering than in the past.

1. What is the main issue and the factors involved?
2. What would be a realistic solution to improve soil health in this scenario? Be specific about actions or practices that could be implemented.

Scenario 4: Overgrazed Pasture

A livestock pasture has been overgrazed during dry months, with very little grass left in many spots. The soil is bare in areas, and rainfall tends to run off quickly, taking topsoil with it.

1. What is the main issue and the factors involved?
2. What would be a realistic solution to improve soil health in this scenario? Be specific about actions or practices that could be implemented.

Scenario 5: Salinity Buildup in Greenhouse Beds

In a high tunnel greenhouse, beds are irrigated frequently due to high temperatures. Over time, white crusts have appeared on the soil surface, and salt-sensitive crops are underperforming.

1. What is the main issue and the factors involved?
2. What would be a realistic solution to improve soil health in this scenario? Be specific about actions or practices that could be implemented.