

Guided Notes: Soil Respiration

Slide 1 – Title

Unit: Soil Science

Topic: _____

Slide 2 – Objectives

By the end of this lesson, I should be able to:

1. Define: _____ and _____
2. Explain the role of soil respiration in determining _____
3. Diagram the role of soil respiration in the _____
4. List and explain factors that affect _____
5. List and describe soil respiration _____
6. Interpret management impacts on _____
7. Measure soil respiration and _____

Slide 3 – What is Soil Respiration?

- Soil respiration is a measure of the _____ released from the soil by microbes decomposing _____ and from the respiration of _____.
- Soil respiration indicates soil health by showing:
 - Soil organic matter _____
 - Soil organic matter _____
 - Level of _____ activity

Slide 4 – Respiration Rate & Microbes

- Respiration rate depends on the amount of _____ present.
- Soil organic matter is a _____ source for microbes.
- More microbes = _____ respiration.
- Fewer microbes = _____ decomposing activity.
- Soil microbes include: _____, _____, _____, and _____.
- One heaping tablespoon of soil may contain over _____ billion microbes.

Slide 5 – Cycle of Life Diagram

Fill in the missing parts:

- Plants → _____ + Oxygen
- Soil → Water + _____
- Sun → _____

Slide 6 & 7 – Key Definitions

- Ammonification: Converts organic-nitrogen into _____.
- Nitrification: Converts ammonia into _____ and then to _____.
- Denitrification: Loss of nitrate as _____ gases when soil is saturated.
- Bulk Density: Weight of _____ soil per unit volume.
- Respiration: Release of _____ from soil.
- Soil Porosity: % of total soil volume made up of _____.
- Water Holding Capacity: Difference between _____ capacity and _____ point.
- Soil Water Filled Pore Space: % of pore space filled with _____.
- Soil Water Content (Gravimetric): Weight of soil _____ per unit of dry soil weight.
- Volumetric Water Content: Amount of _____ in soil by volume.

Slide 8–12 – Factors Affecting Bulk Density

- Climate: Cannot be changed; affects _____, _____, and biological activity.
- Biological Activity: Varies with _____ and _____.
- Soil Moisture: Respiration increases with moisture until _____;
- Ideal respiration at _____% pore space saturation.
- Dry soils = _____ respiration.
- Soil Organic Matter: More organic matter = more _____ activity.
- Soil Texture:
 - Clay → organic matter “_____” from decomposition.
 - Sand → too _____ organic matter.
 - Medium texture (silt/loam) → _____ for respiration.

Slide 13–14 – Managing Soil Respiration

Practices that improve soil respiration include:

1. Leave _____ on the soil surface.
2. Use _____ practices (instead of tilling).
3. Minimize _____ use in fields, especially when soils are wet.
4. Use cover _____ (roots provide respiration).
5. Add _____ matter to nourish microbes.
6. Irrigate _____ soil to boost microbial activity.
7. Drain _____ soil to prevent lack of oxygen.