**Introduction: What is Tillage?**

Tillage is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the soil in preparation for \_\_\_\_\_\_\_\_\_\_\_

**Purpose**

1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Primary Tillage is** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Effects of Primary Tillage-**

1.\_\_\_\_\_\_\_\_\_ up compacted soil layers

2. Buries \_\_\_\_\_\_\_\_\_\_ and crop \_\_\_\_\_\_\_\_\_\_\_

3. Enhances water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. May cause \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ if done excessively

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Equipment | Description | Best Use | Advantages | Disadvantages |
| Moldboard Plow | Turns over the \_\_\_\_\_\_\_\_ top layer of soil | In \_\_\_\_\_\_\_\_\_ residue fields and for breaking new ground or \_\_\_\_\_ | Excellent \_\_\_\_\_\_ Control, Completely buries \_\_\_\_\_\_\_\_\_ | High \_\_\_\_\_\_ Use, soil erosion risk |
| Chisel Plow | Loosens soil but leaves \_\_\_\_\_\_\_\_\_\_ on the surface | For Breaking up \_\_\_\_\_\_\_\_\_\_\_\_\_\_ soil without excessive soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Reduced soil \_\_\_\_\_\_\_\_\_\_\_\_ (compared to moldboard plow) | Doesn’t fully bury \_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_ |
| Ripper/Subsoil Plow | Uses deep \_\_\_\_\_\_\_\_ to break up the soil \_\_\_\_\_\_\_ below the surface without \_\_\_\_\_\_\_\_\_\_ the soil over | For breaking up \_\_\_\_\_\_\_\_\_\_\_\_\_\_ soil layers | Relieves soil \_\_\_\_\_\_\_\_\_\_\_\_, improves \_\_\_\_\_\_\_\_\_\_\_\_, preserves soil \_\_\_\_\_\_\_\_\_\_\_\_ | High \_\_\_\_\_\_\_\_\_\_\_\_\_\_ requirements, does not mix residue |

**Secondary Tillage is** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Effects of Secondary Tillage-**

1.Breaks up large \_\_\_\_\_ from \_\_\_\_\_\_\_\_\_ tillage

2. Improves \_\_\_\_\_\_\_-to-\_\_\_\_\_\_\_\_ contact

3. Reduces weed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Helps with \_\_\_\_\_\_\_\_\_\_\_\_\_\_ conservation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Equipment | Description | Best Use | Advantages | Disadvantages |
| Field Cultivator | Uses rows of \_\_\_\_\_\_\_ to aerate the soil while breaking up \_\_\_\_\_\_\_\_\_ clods | For preparing a \_\_\_\_\_\_\_\_\_\_ and even \_\_\_\_\_\_\_\_\_ and for light \_\_\_\_\_\_ control | Helps incorporate \_\_\_\_\_\_\_\_\_\_\_\_\_ and fertilizers, low fuel and horsepower requirements | Less effective in \_\_\_\_\_\_\_\_\_-residue fields and has a limited penetration \_\_\_\_\_\_\_\_\_\_ |
| Disk Harrow | Uses rows of \_\_\_\_\_\_\_\_ \_\_\_\_\_ to slice through the soil and mix \_\_\_\_\_\_\_\_\_\_ | For Breaking \_\_\_\_\_\_ of dirt and \_\_\_\_\_\_\_\_\_\_ soil after primary tillage | Good for incorporating residue and \_\_\_\_\_\_\_\_\_\_\_\_. Can be adjusted for different \_\_\_\_\_ conditions | Multiple \_\_\_\_\_\_\_\_\_\_\_\_ may be needed |
| Rolling Basket/ Soil Conditioner | Rollers with metal \_\_\_\_\_\_ break up small \_\_\_\_\_\_ and \_\_\_\_\_ the soil surface | For final soil preparation before \_\_\_\_\_\_\_\_\_\_\_\_ | Prevents soil \_\_\_\_\_\_\_\_\_, enhances \_\_\_\_\_\_\_-to-\_\_\_\_\_\_\_ contact | Very limited affect on \_\_\_\_\_\_ compaction. Requires \_\_\_\_\_\_\_\_\_\_\_ tillage for best results |

Reflection Questions

1. Emilia has been farming the same fields for years, and she has noticed her crops aren’t growing as well. Her soil seems hard and compacted, especially below the surface. Water pools in her field after heavy rain instead of draining properly. She doesn’t want to disturb the topsoil too much but needs to break up the hardpan. **What tillage implement should she use?**

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1. Jake’s field is almost ready for planting but there are still some small soil clods that could make seed-to-soil contact uneven. He needs something to firm the soil and create a uniform planting surface. **What tillage implement should he use?**

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1. Carlos used a chisel plow in the fall to loosen his soil, but now in the spring, his field is too rough and cloddy to plant soybeans. He needs to break up the clumps and create a smooth, even seedbed so that his planter works efficiently. **What tillage implement should he use?**

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1. Amanda just bought a piece of land that has never been farmed before. It is covered in thick grass and weeds, and she wants to grow soybeans next year. She needs to completely break up the soil and bury the plant material to start fresh. **What tillage implement should she use?**

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