

Fundamentals of Plant Growth

- The primary elements of plant growth are: _____, _____ and _____.
- Plants use _____, _____ and _____ to make their own food to give the plant energy to grow.
- There are _____ essential nutrients plants need to grow. _____ are needed in large amounts. _____ are needed in moderate amounts. _____ are needed in very small amounts.

Parts of the Wheat Plant

- Head: _____
- Beard: _____
- Kernel: _____
- Stem: _____
- Leaves: _____
- Roots: _____

Parts of the Kernel

- Bran: _____
- Endosperm: _____
- Germ: _____

Stages of Wheat Growth

- Planting: _____
- Germination & Emergence: _____
- Tillering: _____
- Dormancy: _____
- Regrowth: _____
- Reproductive Stages: _____
- Maturation & Harvest: _____

Measuring Wheat Growth

- The _____ is used to measure the growth of wheat.
- The main stages of the Feekes scale are:
 - _____
 - _____
 - _____
 - _____
 - _____
- Farmers use scales to know when to apply inputs like _____.



**FIELDS OF
LEARNING**
TEXAS WHEAT PRODUCERS BOARD

Wheat Anatomy & Plant Growth Guided Notes

Other Notes:

Fundamentals of Plant Growth

- The primary elements of plant growth are: sunlight, water and air.
- Plants use carbon dioxide, sunlight and water to make their own food to give the plant energy to grow.
- There are 16 essential nutrients plants need to grow. Macronutrients are needed in large amounts. Secondary nutrients are needed in moderate amounts. Micronutrients are needed in very small amounts.

Parts of the Wheat Plant

- Head: The part of the plant where the kernels develop. The head contains 16-24 spikelets, which produce 2-3 kernels each.
- Beard: The bristly spike that protects the seed kernel. Some wheat varieties do not have a beard. The beard may also be called the awn.
- Kernel: The main part of the wheat plant. The kernel, also called the seed, can be planted to grow new wheat plants, used for human use in food and other products or used as animal feed.
- Stem: The stem supports the wheat plant and transports water and nutrients. It is also called the stalk. After harvesting the kernels, the stem can be used for animal bedding (usually called straw).
- Leaves: Plants rely on photosynthesis to convert sunlight into energy. Leaves also help the wheat plant collect water.
- Roots: Wheat has a fibrous root system, meaning there are numerous, shallow roots that anchor the plant in the soil and absorb water and nutrients.

Parts of the Kernel

- Bran: The outermost protective layer of the wheat kernel is rich in fiber and nutrients and makes up approx. 14.5% of the kernel weight. It is separated during milling to produce refined flour. The bran layers are included in whole wheat flour and can also be sold separately.
- Endosperm: The starchy middle layer of the wheat kernel makes up approx. 83% of the weight. It is ground into flour and contains carbohydrates, protein and vitamins. White flour is composed of the endosperm.
- Germ: The nutrient-dense embryo of the wheat plant makes up approx. 2.2% of the kernel weight. While it is important for plant growth, it is not included in enriched flour because it can limit shelf life due to high fat content.

Stages of Wheat Growth

- Planting: Farmers plant winter wheat in late fall and try to plant as close to rainfall as possible to give the seed moisture to kickstart growth.
- Germination & Emergence: The wheat seed will germinate as soil temperature decrease and emerge from the soil roughly two weeks after planting.
- Tillering: The wheat plant develops tillers, which are additional stems that grow from the main stem of the wheat plant. Tillers are essential for yield and helps the crop survive dormancy during the winter.

- Dormancy: As temperatures drop (around 32°F), the wheat plant goes dormant and growth stops above ground while the roots continue to develop underneath the soil.
- Regrowth: When temperatures rise, active growth resumes. Tillering will start again, the stem will elongate and leaves will expand.
- Reproductive Stages: The wheat plant will head out, flower and the kernels (the grain) will begin to fill and then harden.
- Maturation & Harvest: Kernels mature and then will dry out ahead of harvest.

Measuring Wheat Growth

- The Feekes scale is used to measure the growth of wheat.
- The main stages of the Feekes scale are:
 - Tillering & Leaf Development
 - Stem Elongation
 - Heading & Flowering
 - Grain Filling
 - Ripening
- Farmers use scales to know when to apply inputs like fertilizer.