What is Seed Germination?

Seed germination is the process by which a seed starts to grow into a new plant. This happens when the right conditions meet, allowing the seed to wake up from its dormant state.

Key Factors That Make a Seed Germinate

1. **Water:** Seeds need water to germinate. When a seed is planted in the soil and it gets wet, it absorbs the water. This process is called *imbibition*, and it helps the seed swell and breaks down stored food inside the seed.
2. **Temperature:** The right temperature is important for seeds to germinate. Most seeds prefer a warm environment, typically between 65°F to 75°F (18°C to 24°C). If it's too cold or too hot, the seed may not germinate at all.
3. **Oxygen:** Seeds need oxygen to grow. During germination, the seed uses stored energy to start growing, and it requires oxygen to do this. Normally, there is enough air in the soil to give the seed the oxygen it needs.
4. **Light:** Some seeds need light to germinate, while others prefer darkness. Generally, small seeds like lettuce need light, whereas larger seeds like beans do not. It depends on the type of seed.

The Germination Process

Once a seed has absorbed enough water, warmed up, and, depending on its type, feels it's in the right light conditions, it begins the germination process. Here's what happens step by step:

1. The seed expands and cracks open.
2. The embryonic root, called the **radicle**, pushes down into the soil to anchor the new plant and absorb water and nutrients.
3. Next, the stem, or **shoot**, pushes up towards the sunlight.
4. As the shoot breaks through the soil, the first leaves, known as **cotyledons**, begin to grow. These leaves provide energy to the growing plant until it can produce its leaves.

Conclusion

In summary, seeds germinate when they have enough water, the right temperature, oxygen, and sometimes light. This exciting process is the beginning of new life, leading to beautiful plants that provide us with food, oxygen, and much more!