**Class Discussion:** Parts of a seed

*Embryo* –the immature plant inside a seed

 *Radicle* –embryotic roots

 *Coytledons* – embryotic leaves

*Endosperm* – food source for the embryo, like the yolk in a chicken egg.

*Seed Coat* – protects the seed in dormancy, before germination.

Some seed coats are so hard that they keep out all air and water until special conditions are met. If conditions are not right, the seeds will wait to germinate. This creates a *seed bank* in the soil for another year.

**Class Discussion:** Life cycle of a seed

1. The life cycle of a seed starts when the egg is *fertilized* by genetic material in pollen.

2. When the seed is mature it falls on the ground or it is *disseminated* by wind, water or animals.

3. In the Pacific Northwest where we have cold and wet winters, the seed stays *dormant*, or inactive, through winter. Seed dormancy is a survival mechanism so that the tender young sprouts don’t start growing right before winter when they could freeze.

4. C*old stratification* and/or *scarification* help break dormancy. Frost and moisture soften the seed coat during cold stratification. This makes it easier for the seed to germinate by allowing water to enter. Sometimes animal digestion or fire causes scarification, creating small scratches in the seed coat for water to enter.

5. *Germination* requires water and warmth:

The seed swells, taking in nutrients and water.

The seed sends out a root in search of food and water.

The seed forms its first leaves underground, called the cotyledons.

The cotyledons protect new young leaves as the sprout pushes above ground.

The new leaves start making food for the plant using photosynthesis.

The cotyledons wither and fall off, they are no longer needed.

**Review Questions:**

What is a seed bank?

How could we simulate scarification for a seed like Lupine?

Why do seeds go dormant during the winter?

What do the different parts of the seed do?

What is germination?

What conditions do seeds need to germinate?

Why might only some seeds germinate, leaving behind a seed bank?

**Worksheet & Activity:**

1. Hand out the Seed Parts Diagram or have students follow along as you draw it on the board / overhead. Label all parts and explain functions.

Have students take notes on the life cycle of a seed.

Discuss cold stratification and scarification.

Come up with class definitions for all vocab words.

2. Hand out the Stages of Germination diagram or put it on the overhead and discuss each step.

Show the time lapse video of beans germinating. <http://youtu.be/G2RuVxdr0mA>

**Vocab:**

*Fertilization* is when the pollen enters the egg that then grows into a seed or *embryo*.

*Disseminate* is to spread the seeds.

*Cold stratification –* seeds are layered in a wet medium for the winter or in the fridge by humans for at least a month to break dormancy. We store them in coconut fiber. They are moist to simulate the rain, and they are refrigerated to simulate the cold.

*Scarification* – the seed coat is damaged by the stomach acid or the animals’ teeth when it is eaten. One example is Lupine. Only some plants need scarification to break dormancy. Fire can cause scarification.

*Dormancy* is a period of inactivity over the winter, similar to hibernation.

*Germination* is when the seed stops being dormant and starts sprouting and growing.

*Cotyledons* are the embryotic leaves that become the first leaves.