

Name: _____

Date: _____

Period: _____

How do seeds spread?

Directions: You will be moving through a series of stations in which you will examine different kinds of seeds. Draw a picture of each seed, read the corresponding information, and answer the set of questions. The last question in each section will **NOT** be provided for you. You must use your own brain to answer them!

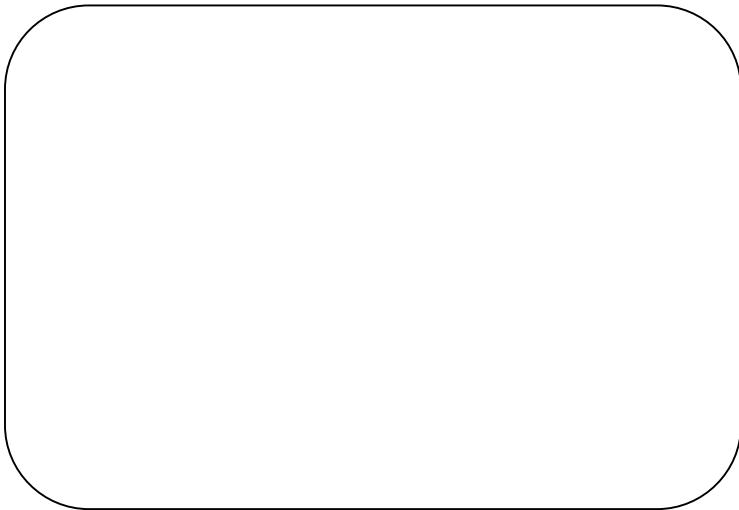
General Seed Information:

1.) How are monocot and dicot seeds alike? Different? _____

2.) What is the function of the endosperm of a seed? _____

3.) In your own words, briefly summarize the process of germination. _____

Wind Dispersal:



1.) What are 3 types of structures that wind dispersed seeds can have?

2.) How many seeds do wind dispersed plants produce? Why?

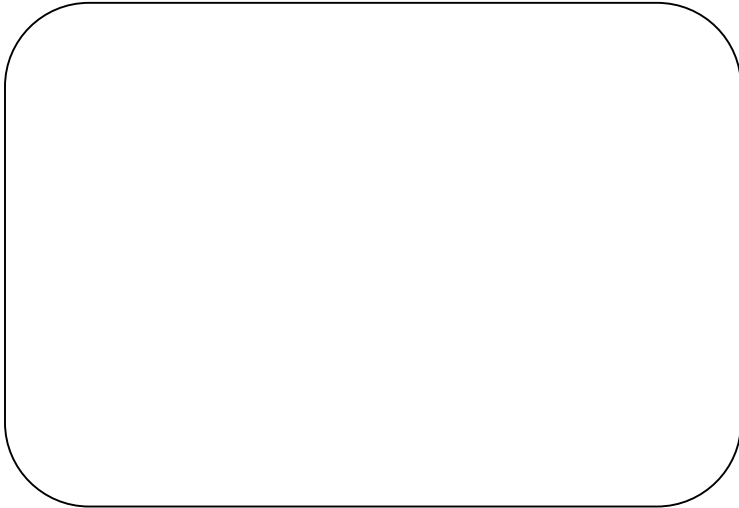
3.) Can you think of any difficulties a wind spread seed might face? (list at least 2!)

Water Dispersal:

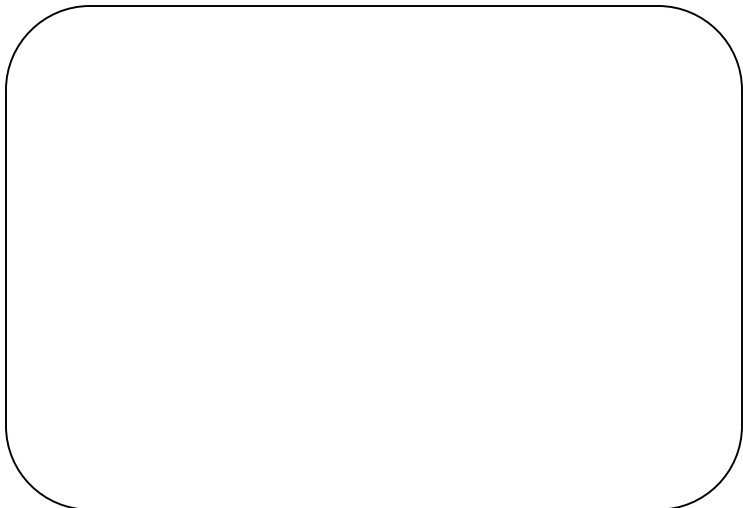
1.) What are 3 qualities a water dispersed seed has?

2.) What carries seeds over oceans?

3.) What kind of problems could a water dispersed seed have? _____



Animal Dispersal:



1.) Besides hooks, how can a seed be dispersed by an animal? _____

2.) What are 2 reasons why some plant seeds are surrounded by sharp hooks?

3.) Why might a seed want to be dropped away from its parent plant? _____

Fruit Dispersal:

1.) What 3 qualities do animals look for in a fruit? _____

2.) What is a frugivore? _____

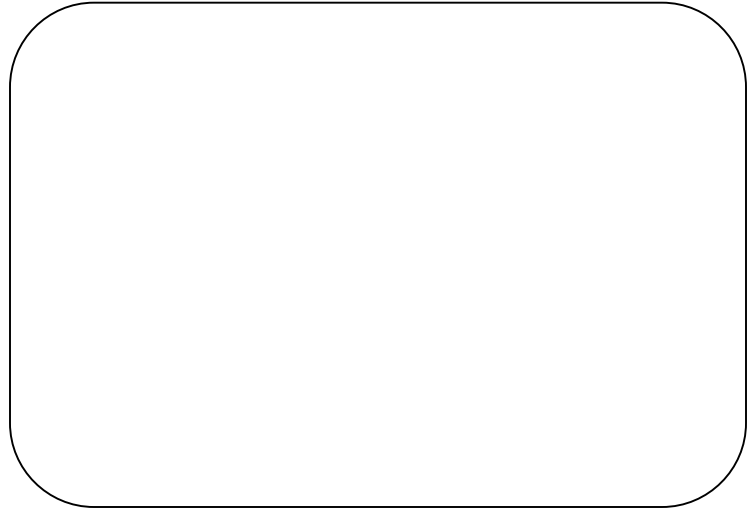


3.) In your own words, briefly summarize the process by which animals help plants disperse seeds.

Mechanical Dispersal:

1.) How are seeds dispersed mechanically?

2.) What kinds of plants most commonly disperse mechanically? _____



3.) Do you think someone could be hurt if they were hit by the exploding plant? Why or why not?

Extra Credit:

Design a seed that is dispersed by one of the five dispersal methods explored above. Specify which method your seed uses. Be creative with your design!

A large, empty rectangular box with a thin black border, intended for drawing a seed design as part of the extra credit question.

Water Dispersal



Plants that grow in or near water are likely to utilize water to disperse their seeds. These seeds can be dropped from the plant into the rivers, lakes or seas. The fruits or seeds of most water plants are buoyant. This means that they are less dense than water, and can, therefore, float. Some seeds also have hairs to help it float. To keep the seeds from being broken down by the water, they have woody waterproof coverings to keep them dry (example: coconut). Trees found on tropical beaches often have their seeds carried there by the sea and can be carried along by ocean currents to land on shores halfway around the world.

Mangroves are another familiar tree of tropical beaches. Their seeds are unusual in that they can begin germination while still on the parent plant, and they drop into the ocean when about a foot long. These 'sticks' float upright in the sea, waiting to be flung onto the beach to continue germinating.

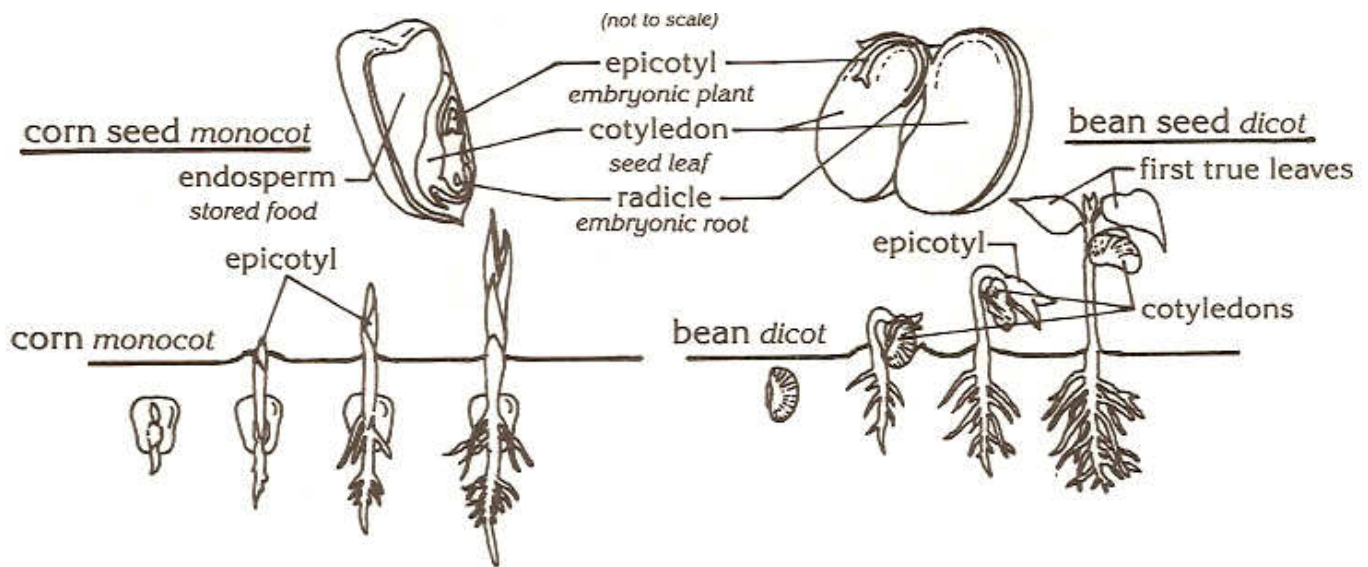
Wind Dispersal



The kind of seeds which are often wind dispersed are smaller seeds that have “wings” or other hair-like or feather-like structures. Wind dispersed seeds are very light weight and often very aero-dynamic. The smaller and more aero-dynamic a seed is, the further away from its parent plant it will fly. Plants that produce wind blown seeds, like the dandelion shown in the picture above, often produce lots of seeds to ensure that some of the seeds are blown to areas where the seeds can germinate.

Some seeds have wings that are twisted and balanced so that the seed spins around as it is carried along by the wind (example: maple). These natural adaptations for using the wind to transport the weight of the seed must be technically accurate, as the wings of modern planes and helicopters are designed in the same way. This “wing” system only works well if a strong wind is present or if the seeds fall from a tall tree.

Seed Germination



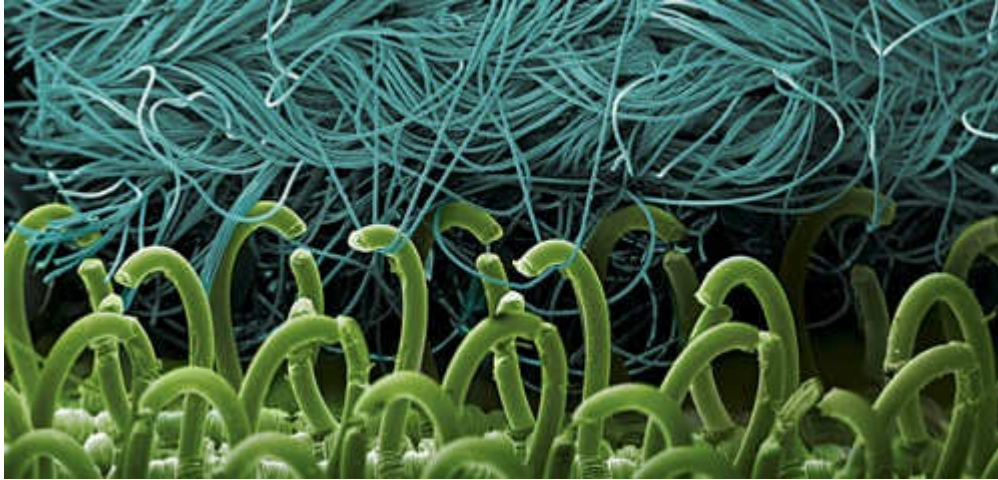
Germination requires moisture, proper temperature, and oxygen.

Both monocot and dicot seeds develop in similar ways and have the same parts. There are a few minor differences: monocots start out with one seed leaf, while dicots have two. The technical word for seed leaf is cotyledon, it is the first leaf to emerge from a developing seed. As a seed, both monocots and dicots are covered by a seed coat

The seed consists of the outside seed coat and a large area called the endosperm which functions as a source of reserve materials and food for the developing embryo. As germination occurs, the endosperm will be broken down and used by the plant.

Germination occurs when the seed begins to sprout, usually in the spring and under appropriate conditions the radicle, the part of the seed that will become the root, begins to elongate and grow downward. Meanwhile, the coleoptile begins to grow upward. The coleoptile is a sheath that encloses the shoot of the embryo. The primary function of the coleoptile is to provide protection to the developing shoot as it is passing through the soil. Extending out from the coleoptile is the shoot. Eventually adult leaves grow on the plant.

Animal Dispersion



Burr hooks locked in dog hair

Animals can help disperse seed in many different ways. Some birds eat the fruit and then throw away the seeds. Squirrels collect nuts like acorns and bury them for winter food, but they often forget where they have buried them and these grow into new trees. Mistletoe has sticky fruits which are attractive to birds. The sticky seeds stick to the bird's beak. They then rub their beaks clean on the bark of trees where the seed can grow atop the tree.

Have you ever had a prickly seed stick to your clothes or socks when you walk around trees or other plants? Although they may stick to your clothes, they are meant to stick to animal fur. These seeds are commonly known as burs and are also dispersed through the help of animals.

Burs have hooks lining their entire surface. When an animal brushes against a plant that contains burs, they get caught in the fur of an animal. As the animal moves along, the fruit gets more and more tangled up in its fur until it touches the skin of the animal. At this point the animal is irritated by the fruit and uses its legs or teeth to pull the fruit out of its fur. The fruit is then left on the ground and the seed can germinate well away from the parent plant.

Fruit Dispersal



Plants can spread their seeds by producing fruit that animals like to eat. For this dispersal method to work, an animal is attracted to these fruits based on their characteristics. Animals will prefer fruits that fulfill nutritional requirements, but avoid those that are toxic. Toxin content, fruit appearance, and nutrient content may influence how fruits are selected and where seeds are deposited.

Once a fruit is selected, the animal begins to feed. After these fruit-eating animals (also known as frugivores) ingest fruit, they process them in their digestive systems, and then regurgitate seeds or deposit seeds in their feces. Seeds are expelled, only after the long process of digestion has occurred. For this reason, they are often discarded in areas far from where the fruit was eaten.



Mechanical Seed Dispersion

In mechanical seed dispersal, the fruit or pod bursts open to fling the seeds out. Mechanical dispersal is sometimes also referred to as self-dispersal. When the fruit or pod bursts open, some seeds travel up to 3 meters (about 10 feet). One example of mechanical dispersal is this sandbox tree seed pod (above). It bursts open suddenly and releases round, flat seeds.

Mechanical dispersal is common in many legumes (like peas and beans). They have pods which open along the edge when the pod dries.



Mechanical

The fruit of the squirting cucumber (left) releases its seeds in a powerful jet of liquid. The Cannonball tree (right) creates a fruit that explodes when ripe.

