Observing & Comparing Beans

• As children do each observation, have them draw what they see in their notebooks with numbered sections. Create class notebook pages to record results during whole group discussions
  o Ask children what plants start growing from? (seeds)
  o Show them several types of seeds including several types of dried beans.
  o Ask them what will happen if you plant a seed? (it will grow if it gets the things it needs)
  o Have them name and draw the basic needs of plants. (sunlight, soil, water, air)

• 1st observation – Dried large lima bean and a jellybean
  o Give each child a large dried lima bean, a jellybean and a magnifier.
  o Draw and make comparisons of the two beans. Make measurements.
  o Ask them to predict what is inside each bean?
  o Put all their lima beans in a container and cover with water. Put all their jellybeans in a container and cover with water. Explain that the hard beans will soak up some of the water (like a sponge) and they will be soft enough to open and observe the insides of their beans the next day. Soak many extra lima beans and jellybeans to use in the 3rd observation and later for planting.

• 2nd observation – Soaked beans before opening
  o Give each child a soaked lima bean, a soaked jellybean and a magnifier.
  o Ask them what changes they notice from the 1st observation? (lima bean is larger and skin is split and easy to remove, jellybean may have lost some color, remains the same size)
  o Draw and make comparisons of the two beans. Make measurements.

• 3rd observation – Inside of soaked beans
  o Show children how to carefully pull apart the two parts of the bean (cotyledons). These two pieces provide stored up food for the baby plant to use when it starts to grow from the seed. Notice the tiny little baby plant (embryo) on the inside of one of the pieces. Look at it with the magnifier to see a tiny pale colored leaf. Tell children this is the baby plant that comes out of the seed. If children pull seeds apart too forcefully the embryo may get damaged and be hard for them to see (try again using the extra soaked beans).
  o Cut the jellybean into 2 sections for each child (using a knife). Have children look for anything inside the jellybean similar to what they saw in the lima bean.
  o Draw and make comparisons of the insides of both beans.
• 4th observation – Planting the seeds (beans)
  o Let children fill clear plastic cups with soil and plant another soaked lima bean and another soaked jellybean about an inch below the surface. They should add just enough water to moisten the soil (water should not be standing at the bottom).
  o Cover each cup with clear plastic wrap held in place by a rubber band creating a tiny terrarium.
  o Place cups in a lighted location.
  o Draw how the cups look when they are ready to place in a lighted location.
• 5th (and subsequent) observations – Watching the seeds (beans) grow
  o Let children observe their seeds daily and record, measure and draw changes.
  o Questions to ask:
    ▪ Why did the tiny leaf inside the bean turn green after it came out above the soil? (At first the plant uses the stored food from the cotyledons to start making roots to find water. At the same time the stem moves up through the soil to search for sunlight. When the roots can find water to soak up and the stem can find sunlight the plant can begin to make its own food. When the plant leaf turns green you know it is now "grown up" enough to make its own food.)
    ▪ Why didn’t some lima bean seeds grow? (maybe they didn’t get enough water or light, maybe they were planted too deep in the soil, maybe they got too much water-plants can drown)
    ▪ Why didn’t the jellybeans grow? (they are not living things and cannot grow, they don’t have a baby plant inside of them)

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<th>What Plants Need</th>
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<tr>
<td><img src="image" alt="Sunlight" /></td>
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<td><img src="image" alt="Water" /></td>
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