Wild Discover Zone: Discovery Forest— Seed Drop

Theme: Seeds have many different adaptations that help them disperse.

Investigation Question: Which will fall faster – seeds with long wings or seeds with short wings?

Step 1: Hook (Facilitator A)

Props:
Cacao pod (large and red)

Introduce Topic  Carrying the cacao pod with you, greet guests as they make eye contact with you. Welcome them to the tropical forest and ask them if they are enjoying their day at the Zoo. Ask them if they have ever thought about why tree seeds come in so many different shapes and sizes. For example, about 30 seeds of the cacao tree live inside this fleshy pod which is actually a fruit. Other trees produce pinecones, coconuts, and even fruits like apples, oranges, cherries, etc.

Introduce the Question  For seeds to grow and survive into plants, they need their own space, soil and sunlight. If a seed were to drop directly down to the ground from its parent tree, it would have a hard time finding enough soil, space and sunlight. Some trees use the wind to help spread their seeds, like the maple tree. Their seeds look like a lot like this (show paper seed examples). The seeds are designed like little airplanes so they float on the breeze and drift away from the parent tree.

Which seed do you think falls faster - The one with longer wings or the one with shorter wings? Point them towards Facilitator B to find out.

Supporting Information
- The cacao tree is from Central and South America, but now grows in many different countries. It takes 20 to 25 pods to get 2 pounds of cocoa. Cocoa butter and chocolate are made from cacao pods.
- Seeds disperse by:
  - Wind
  - Animals and/or people (fruits, hitchhikers)
  - Floating on water (coconut)
  - Bursting (shooting seeds into the air)
  - Other (dropping & rolling, shaking out of flowers…)

Step 2: Doing the Investigation (Facilitator B)

Note: Facilitator B can also initiate this investigation directly by simply asking, “Do you want to help me with my investigation?”

Props:
- Dry erase board  
- Dry erase markers  
- Cacao pod  
- Paper seed examples  
- Stopwatches
Set Up: Write the investigation question at the top of the board, and draw a blank graph on it that looks like this:

![Graph](image)

Introduce the Question Greet guests that approach and/or make eye contact with you. Invite them to help you figure out whether the long winged seed or short winged seed will drop faster.

Make a Prediction Have them make a prediction. Ask guests what they think will happen. Will the long winged seed fall faster or the short, and why? Hint: In nature, seeds often depend on wind to help spread them from their parent tree. A long wing might glide better on the wind and travel further, or perhaps a shorter wing does?

Collect Data Explain how to collect the data. Have two guests take the seeds to the top of the stairs while the rest of the group stands below with two stopwatches. On the count of three, start the stopwatch and let the seeds drop. Stop the stopwatch when the seeds hit the floor. Record the length of time it took for the seeds to hit the floor. Which type of seed fell faster – the long wing or the short wing?

Graph Results Have guests add their data to the results graph. Add a mark on the board above either the long wing or short wing column. The graph builds with each new guest’s data.

Discuss What Happened According to the graph, did the long wing or short wing seed fall faster? Is that what they predicted? Why do they think it turned out that way? Would it be better for a seed to fall fast or slower? What other types of seeds might fall faster or slower?

Early in the day, when only a few guests have added their data to the graph yet, you might want to share the laminated graph of a previous day’s results with them. Looking at a graph of a full day’s results will make it easier for guests to come to a conclusion.
When the magnets reach the top of the board, record the data on the sheet provided at the Zone. Then remove the magnets and start the graph over. Remember to record all of the data collected at the end of the day as well.

Keep in mind that the point of doing the investigation is not to just collect data, graph the results, and get an answer. The most important part is to discuss how doing investigations, or scientific research, can help save wildlife and that everyone can be a part of it. Move on to Step 3 to transition into that conversation.

Step 3: Make the Conservation Connection (Facilitator B)

Props:
- A variety of products from the tropical forest
- Saving Species storyboard pictures

Discuss Importance of the Investigation After completing the investigation, ask guests why it would be important to know how seeds travel.
- Trees and plants provide resources for many different plants and animals. They provide oxygen, food and shelter. The more we understand how an ecosystem works, the better able we will be to protect it.

Make the Saving Species Connection Each chalkboard is equipped with a panel across the bottom for pictures that serve as a “Saving Species” storyboard. Use these pictures to highlight Dr. Valerie Pence (CREW) and her work with the autumn buttercup.

Photos:
1. Dr. Valerie Pence, Director of Plant Division, CREW
   When people think of endangered species, plants rarely come to mind, but plants can be endangered, too. CREW’s Plant Division, led by Dr. Valerie Pence, develops tissue-culture and cryopreservation techniques for propagating and preserving endangered plant species native to the United States through the Endangered Plant Propagation Program. As a child growing up in Chicago, Dr. Valerie Pence didn’t really like biology class and had no interest in wildlife. It wasn’t until she took biology and botany courses in college that she discovered a passion for science and plants. Dr. Pence recently received the Center for Plant Conservation’s Star Award for her dedication to plant research and conservation.

2. Autumn buttercup & natural habitat
   One species that Dr. Pence works with is the autumn buttercup, a bright yellow wildflower native to Utah. Most of the buttercup’s natural habitat has been grazed and trampled by livestock. Only one known population remains on a preserve owned by The Nature Conservancy (TNC).

3. Buttercup plant growing in vitro
   Using seedlings from buttercups grown at The Arboretum at Flagstaff (TAF), Dr. Pence nurtures a small piece of plant tissue in the CREW plant lab to grow into a new plant.

4. Outplanting buttercups
The new plants are then sent to TAF and potted in soil. Once the plants are ready, they are outplanted on the TNC preserve to augment the wild population with the help of Utah Valley State College and U.S. Fish and Wildlife Service.

5. **Field of buttercups**  
   In 2007, more than 100 plants were outplanted, of which 20 have survived. Another 45 plants were added in 2010. Thanks to Dr. Pence and the collaborative efforts of partnering organizations, things are looking up for the Autumn buttercup.

**Suggest a Conservation Action**  
Ask guests if they’ve heard about our cell phone recycling program yet. If not, explain how recycling a cell phone can help save wildlife. If they have already heard about cell phone recycling, suggest a way to help conserve plants. For example, use eco-friendly herbicides instead or more toxic versions. Plant native plants instead of invasive species. Learn more about how plants benefit humans, such as providing clean air, reducing erosion, filtering and cleaning polluted water, etc. Plants are amazing!

**Optional Extras**  
Encourage visitors to complete additional activities in the Discovery Forest:

- Take the quiz on the computer to find out how much attention you pay to plants and participate in the Shaman Quest at the end of the quiz. The Shaman Quest involves following a series of rhyming clues in search of three different shaman figures hidden in the forest.
- Explain that all life depends on plants. Plants provide us with many things, including different foods, medicines, and products. Show visitors a variety of these products, which are stored in the cart. Challenge visitors to find specific plants in the forest that provide us with things such as chocolate (cacao), chewing gum (sapodilla), and wood (mahogany).