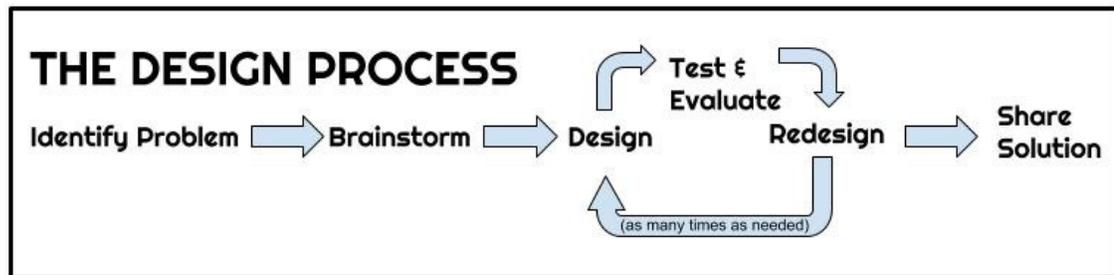




CREATING HAND POLLINATORS

Animals help plants reproduce by spreading their pollen and moving their seeds around. **Pollinators** are animals of all types that visit flowers and take away their pollen. Bees, butterflies, moths, wasps, flies, bats and birds are just a few different types of pollinators. Many of these animals are threatened or endangered partly due to loss of habitat and pesticide use. Sometimes when natural pollinators are hard to come by, gardeners will pollinate plants by hand (although bees can do it much more easily than we can).



THE GOAL: Design, create and test a hand pollinator to transfer “pollen” from one “flower” to another.

WHAT YOU NEED:

- At least 2 paper plates or sheets of paper with a large flower drawn on each one
- Powdery substance like pepper, baking soda, glitter, etc.
- A variety of building materials to design your hand pollinator. Possibilities: cotton balls, pom poms, balloons, foam sticks, erasers, paper towels, coffee filters, pipe cleaners, straws, craft sticks, string, aluminium foil, or wire
- Tape

THE PROBLEM:

You are a gardener in a greenhouse and you need to build a device that you can use to pollinate your flowers. You know that some of the insects outside are good at pollination, so you've decided to look at them to get ideas.

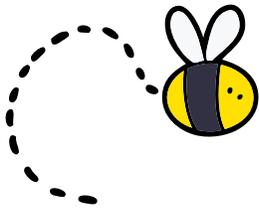
Build a device that will pick up and carry the pollen from one of your paper plate flowers to the other.





CREATING HAND POLLINATORS CONT.

BRAINSTORM



- Think about how different animals pollinate. Do they use their legs or another body part? How do they carry it without dropping it? How does the pollen get from one flower to another? Try researching different pollinators and looking at pictures.
- Look at all of the materials you've gathered. How can you use them to make a device that will carry pollen from one plant to another?
- Sketch a few designs. Engineers create blueprints before they start building to help them plan.

DESIGN & BUILD IT

- Build a model of the device you sketched.

TEST IT

- Take your two flower plates and set them next to each other.
- Place a small amount of the powder in the center of one flower. This will be your pollen.
- Gently press your hand pollinator into the pollen. Don't press too hard-- bees and butterflies are very light!
- Gently touch your hand pollinator to the center of the second flower. How much pollen was transported from one flower to the other?

READ ALL ABOUT IT!

- **Insect Pollinators**
by Jennifer Boothroyd
- **What Lily Gets from Bee and Other Pollination Facts** by Ellen Lawrence

REDESIGN & RETEST

- What improvements could you make to your design to transport even more pollen?
- Make changes to your design or create a new one, then test it again. Compare the results of the second test with the first one. Which transported the most pollen?



CREATING HAND POLLINATORS CONT.

SHARE YOUR RESULTS :

- Once scientists have developed a solution, they share what they've learned with others. Share your solution with friends and family. Tell them what you learned about pollination.
- Invite a friend to create their own hand pollinator and then compare your designs. What can you learn from each other?

You just used the Engineering Design Process. The Test, Evaluate, and Redesign portion of the Design Process can happen many, many times. Even when a product is completed and shared with the world, redesign and improvements continue to happen - think about how many times you've had to update your phone's operating system to improve its performance! Most things are never "finished" - there's usually room for change and improvement!

MORE TO EXPLORE

- Observe pollinators in your own backyard. Look closely at the flowers you see outside. Are there any bees, butterflies, or other insects around them? What do you notice about how they collect pollen?
- Create a pollinator garden by planting milkweed and other native plants that attract pollinators . You can get more ideas at blog.nwf.org/2015/06/10-ways-to-save-pollinators/.
- Learn more about honeybees and other insect pollinators at kids.nationalgeographic.com/animals/invertebrates/insects/honeybee/
- Visit your local library and check out Wings of Life by DisneyNature. This amazing movie is a celebration of life and takes a close look at butterflies, hummingbirds, bees, bats and flowers. A third of the world's food supply depends on these incredible and increasingly threatened creatures.





CREATING HAND POLLINATORS CONT.

DID YOU KNOW?

Bees use **static electricity** to assist with pollination! Bees have small hairs covering their body and legs. As they fly through the air, these hairs become charged with static electricity. As they land on a flower, the electric charge collects the pollen. When they land on a different flower, the electricity is discharged along with the pollen. Scientists have recently discovered that bees can actually identify types of flowers based on the flowers' electric field!

Learn more:

<https://www.nationalgeographic.com/science/phenomena/2013/02/21/bees-can-sense-the-electric-fields-of-flowers/>



STANDARDS

This activity aligns with the following Oklahoma Academic Standards:

- 2nd Grade Science 2-PS1-2 Matter and Its Interactions
- 2nd Grade Science 2-LS2-2 Ecosystems: Interactions, Energy, and Dynamics



Tulsa Regional
STEM Alliance