STEM- Distance Learning Activities- Weeks 7 & 8: May 11- 22
Ms. Acree's Class

Instructions (READ THESE FIRST): Follow the choice board here.

☐ The Start Here activity ☐ one option from the middle ☐ the Finish Here activity

Students should be able to complete these activities on their own, if you need help please reach out to Ms. Acree.

<table>
<tr><th>Part 1: Start Here</th><th>OPTION 1- Write a short story</th><th>OPTION 2- Create a video</th><th>OPTION 3- Draw or take a picture</th><td rowspan="4">FINISH HERE

End of Week Follow Up

Click Here to Answer the Weekly Follow Up Questions in the form on Teams.</td></tr>
<tr><td>1. Read the attached article about Pollinators OR watch the BrainPop Video "Pollinators"</td><td colspan="3">1. Take a look outside and find a pollinator.
2. Choose one option and show how the pollinator is pollinating the plant.</td></tr>
<tr><th>Part 2: Start Here</th><th>OPTION 1- Write a Short Story</th><th>OPTION 2- Create a Video</th><th>OPTION 3- Make a Poster (Large or regular size paper)</th></tr>
<tr><td>1. Take a look at the list of STEM Careers and pick one that interests you. If you have another one, or do not like any of these, find your own and send it to Ms. Acree for approval.
2. Read the description or about that career.
3. Read the descriptions about the 8 Science and Engineering Practices.</td><td colspan="3">Research your career using the following site or the attached document.
https://careerinstem.com/alphabetical/

With whichever you choose please include the following:
1. Identify the career you have selected
2. Describe what someone in this career does
3. Describe what about this career interests you.
4. If this were your job, describe 3 Science and Engineering Practices that you would do in this job and describe how you would do them.
• This should be accurate based on the Science and Engineering Practice you choose.</td></tr>
</table>

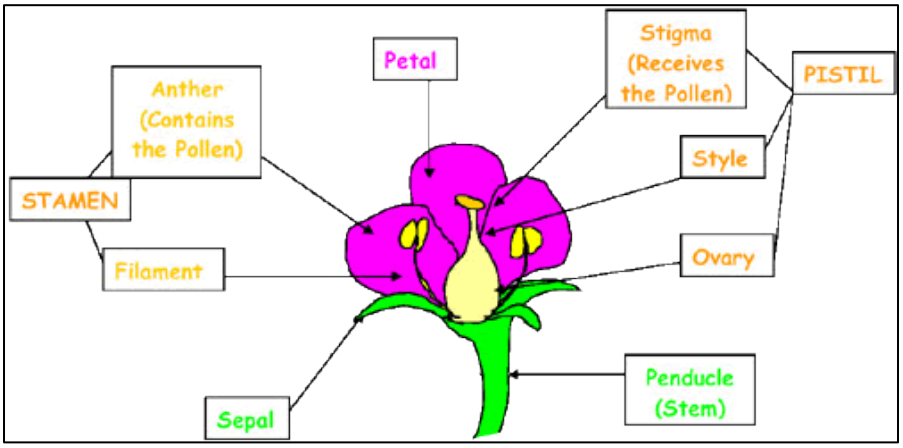
Office Hours: Mon, Wed, Fri: 12:00pm- 2:00 pm Tues, Thurs: 4:00 pm- 6:00 pm (I will be live in Teams during this time)

- If you message outside of these times, no worries, I will respond as soon as I see it but please be patient.
- The best way to reach me is via **email**, Microsoft **Teams**(students) or **Remind** (parents).
- If you cannot meet me during Office Hours and need help, please e-mail me at **acreeh@leonschools.net** and we can set up a specific time that works for you. I am available for phone calls at **(850)-629-8995** during office hours or a scheduled call.

Live Meetings: There will be an optional live meeting on **Wednesday at 11 am** on Teams for students to come ask questions or chat about the activities so far. There are also video links posted on Microsoft Teams and my website to help them with the activity for this week.

What is Pollination?

Pollination is the act of transferring pollen grains from the male anther of a flower to the female stigma. The goal of every living organism, including plants, is to create offspring for the next generation. One of the ways that plants can produce offspring is by making seeds. Seeds contain the genetic information to produce a new plant.



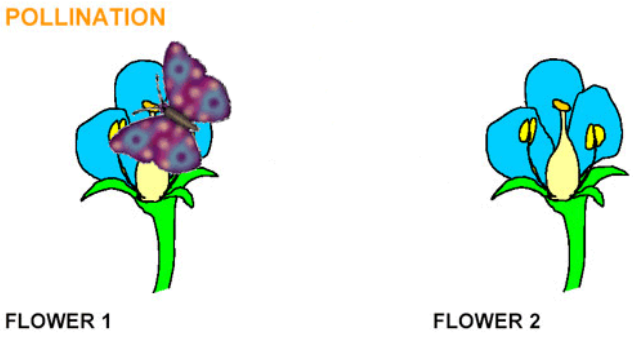
Flowers are the tools that plants use to make their seeds. The basic parts of the flower are shown in the diagram below.

Seeds can only be produced when pollen is transferred between flowers of the same **species**. A species is defined a population of individuals capable of interbreeding freely with one another but because of geographic, reproductive, or other barriers, they do not interbreed with members of other species.

This wasp is a specialist pollinator of Penstemon, which is the flower it is visiting, or rather sleeping in here. Photo by Dr. Jim Cane, USDA ARS Bee Biology and Systematics Laboratory, Logan, Utah.

How does pollen get from one flower get from one flower to another? Flowers must rely on vectors to move pollen. These vectors can include wind, water, birds, insects, butterflies, bats, and other animals that visit flowers. We call animals or insects that transfer pollen from plant to plant **"pollinators"**.

Pollination is usually the unintended consequence of an animal's activity on a flower. The pollinator is often eating or collecting pollen for its protein and other nutritional characteristics or it is sipping nectar from the flower when pollen grains attach themselves to the animal's body. When the animal visits another flower for the same reason, pollen can fall off onto the flower's stigma and may result in successful reproduction of the flower.



Referring to the animated image, pollen from the anthers of Flower 1 is deposited on the stigma of Flower 2. Once on the stigma, pollen may "germinate," which means that a "pollen tube" forms on the sticky surface of the stigma and grows down into the ovule of the plant.

This growth can result in:

- Successful fertilization of the flower and the growth of seeds and fruit
- A plant can be only partially fertilized, in which the fruit and/or seeds do not fully develop
- The plant can completely fail to be pollinated, and may not reproduce at all.

Plants can be: **Self-pollinating** - the plant can fertilize itself; or **Cross-pollinating** - the plant needs a vector (a pollinator or the wind) to get the pollen to another flower of the same species.

STEM Career Project

Pick a STEM career from the list below that sounds interesting, or if you have another in mind just ask Ms. Acree to approve it. Use the choice board to select how you will complete the project.

- **Biologist**- A professional who has specialized knowledge in the field of biology(the study of living things such as plants, animals, and bacteria), understanding the underlying mechanisms that govern the functioning of biological systems within fields such as health, technology and the environment.
- **Bioacoustic Researcher-** Bioacoustic researchers study the sounds produced by or that affect living beings. They study animal communication, the production of sound, how animals "hear " and the effects of man-made (anthropogenic) noise on animals.
- **Aerospace Engineer-** Aerospace engineers design, build and test aircraft, missiles and spacecraft. They carry out basic and applied research, test new equipment and materials, and recommend improvements and techniques. Aerospace engineers commonly work on national defense projects and may need security clearance or other high level permits.
- **Food scientist-** Food science is the basic science and applied science of food; its scope starts at overlap with agricultural science and nutrition and leads through the scientific aspects of food safety and food processing, informing the development of food technology.
- **Entomologist**- Did you know that insects outnumber all other life on Earth, combined? Therefore, there is a lot to study for an entomologist! Entomologists study insects: their relationships with other animals, their environments and with humans. Most entomologists specialize in a particular type of insect, such as pollinators, ants or spiders.
- **Chemical Engineer-** Chemical engineers solve problems that involve the production or use of chemicals (such as pesticides, medicines, food, etc.). They design and test processes, equipment, and chemicals for industrial produ
- **Nutritionist**- A nutritionist is a person who advises others on matters of food and nutrition and their impacts on health. Some people specialize in particular areas, such as sports nutrition, public health, or animal nutrition, among other disciplines.
- **Doctor/ Physician Assistant/ Pediatrician/ Surgeon/ Nurse/ Physical Therapist/ other jobs in the medical field**
- **Agriculture Consultant-** Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. We provide leadership on food, agriculture(growing and production of food), natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management.
- **Environmental Engineer-** Environmental engineering is the branch of engineering that is concerned with protecting people from the effects of adverse environmental effects, such as pollution, as well as improving environmental quality. Environmental engineers work to improve recycling, waste disposal, public health, and water and air pollution control, according to the U.S. Bureau of Labor Statistics.
- **Herpetologist**- Herpetologists are specialized zoologists. They study the behaviors, geographical distribution, physiology and development of reptiles and amphibians to better understand ecosystems. Many herpetologists conduct research frequently.
- **Forensic Scientist-** forensic science, also known as criminalistics, is the application of science to criminal and civil laws, mainly—on the criminal side—during criminal investigation, as governed by the legal standards of admissible evidence and criminal procedure.
- **Botanist**- Botanists study various aspects of plants. For example, they may study their physiological processes such as photosynthesis at the molecular level, the evolutionary history and relationships of plants, or their current relationships with their environments.

Science and Engineering Practices

Asking questions and defining problems

A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested.

Developing and using models

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations.

Planning and carrying out investigations

Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters.

Analyzing and interpreting data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results.

Using mathematics and computational thinking

In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships.

Constructing explanations and designing solutions

The end-products of science are explanations and the end-products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories.

Engaging in argument from evidence

Argumentation is the process by which evidence-based conclusions and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem.

Obtaining, evaluating, and communicating information

Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity.