Catoctin Furnace Historical Site

Collier's Log Cabin

Student Field Trip Activities
for
Kitchen Garden and Pollinator Garden

Developed by
Green-walled Garden Club
Frederick, MD

The following activities were developed by educators for the purpose of exploring the gardens and insects, including herbs and butterflies behind the Collier's Log Cabin, which is part of the Catoctin Furnace Historical Site, in Thurmont, MD.
The mini-lessons are based on Harvard University's Project Zero Thinking Routines *, specifically See, Think, Wonder, where students observe, interpret and ask questions and the MD STEM Standards of Practice.

Materials Include:

***See, Think Wonder" Routine and Description**
Teacher's Guide-a detailed step by step process
that teachers and parents can adapt for student needs, interests and time.

Student Handouts
Plant LIfe Cycle and Plants in the Garden Activities

❏ *See, Think, Wonder Worksheet*
❏ *Flowering Plant Cycle Worksheet*
❏ *Plant Cycle Resources*
❏ Plant Song
❏ Plant Books
❏ Other -Mini Lessons

❏ *Plants in the Garden- Herbs*

Butterfly Life Cycle Activities

❏ *See, Think, Wonder Worksheet*
❏ *Butterfly Life Cycle Worksheet*
❏ *Butterfly Body Parts Worksheet*

Butterfly Songs

Water Pump Activities

Teacher's Guide

Step by Step Activities
for
Kitchen and Pollinator Garden

Developed by the Green-walled Garden Club 2020

A THINKING ROUTINE FROM PROJECT ZERO, HARVARD GRADUATE SCHOOL OF EDUCATION

See, Think, Wonder

A routine for exploring works of art and other interesting things.

- What do you **see**?
- What do you **think** about that?
- What does it make you **wonder**?

Purpose: What kind of thinking does this routine encourage?
This routine encourages students to make careful observations and thoughtful interpretations. It helps stimulate curiosity and sets the stage for inquiry.

Application: When and where can I use it?
Use this routine when you want students to think carefully about why something looks the way it does or is the way it is. Use the routine at the beginning of a new unit to motivate student interest or try it with an object that connects to a topic during the unit of study. Consider using the routine with an interesting object near the end of a unit to encourage students to further apply their knowledge and ideas.

Launch: What are some tips for starting and using this routine?
Ask students to make an observations about an object—it could be an artwork, image, artifact, or topic—and follow up with what they think might be going on or what they think this observations might be. Encourage students to back up their interpretation with reasons. Ask students to think about what this makes them wonder about the object or topic.

The routine works best when a student responds by using the three stems together at the same time, i.e., "*I see..., I think..., I wonder... .*" However, you may find that students begin using one stem at a time, and that you need to scaffold each response with a follow-up question for the next stem. The routine works well in a group discussion but in some cases you may want to ask students to try the routine individually on paper or in their heads before sharing out as a class. Student responses to the routine can be written down and recorded so that a class chart of observations, interpretations, and wonderings are listed for all to see and return to during the course of study.

Share your experience with this thinking routine on social media using the hashtags **#PZThinkingRoutines** and **#SeeThinkWonder**.

PROJECT ZERO
HARVARD GRADUATE SCHOOL OF EDUCATION

VISIBLE THINKING

This thinking routine was developed as part of the Visible Thinking project at Project Zero, Harvard Graduate School of Education.

Explore more Thinking Routines at pz.harvard.edu/thinking-routines

SEE, THINK, WONDER RESPONSE SHEET

Name_____ Class_____

See	Think	Wonder

PLANT LIFE CYCLE

Developed by the Green-walled Garden Club 2020

Plant Life Cycle

ACTIVITY 1: See, Think, Wonder -Student Observation and Inquiry

MD State Maryland State STEM Standards of Practice

- **ENGAGE IN INQUIRY**
  - STEM proficient students will engage in inquiry to investigate global issues, challenges, and real world problems.
    - A. Ask questions to identify and define global issues, challenges, and real world problems.

Materials: Pencils, See, Think, Response Sheet, Clipboards or (Whiteboards and Whiteboard Markers)

Purpose -The Importance Of Plant Life To The People Who Lived In Catoctin Furnace

- Why was it important for the people who lived in the 1800's to know about plants?
- Why did they need to know how and when plants grew as well as what was their purpose at that time?
- Why do we need to know how plants grow today?
- Why do we need to know what is needed to make a plant grow?

Process: (Approximately 15 minutes)

Hand out Activity 1 See, Think, Wonder Sheet to each student or use one to record their ideas. Choose one way for the students to communicate their ideas.

- Students can verbalize what they see
- Students can write down what they see
- Students can draw what they see
- Students can work individually or in small groups to make a list
- Leader can record student comments

Do not judge their responses -just let them share their ideas

Step 1. Have students look at the yard/space behind the log cabin and then ask the following three questions allowing time to share responses with the group.

WHAT DO THEY SEE? - Allow approx 3 minutes

Possible responses may include:

- I see a house made of wood
- I see a pump
- I see flowers
- I see plants
- I see butterflies
- I see poles
- I see doors on the house
- I see logs

Next question

WHAT DO THEY THINK? Allow approx 3 minutes

Select a way for the students to communicate their ideas.

For this part of the activity- a follow up question from the leader may be warranted.

Follow up question- *What makes you say that?*

Possible responses may include:

- I think the house is old (What makes you say that?)
- I think the garden closest to the house is for food
- I think the garden along the fences is pretty- (What makes you say that)

Next question

WHAT DO THEY WONDER? Allow approx 3 minutes

Select a way for the students to communicate their ideas.

This should be in the form of a question.

- I wonder who lived in the house?
- I wonder why the kitchen garden is close to the house?
- I wonder what kind of vegetables they grew?
- I wonder what kind of plants they had at that time?
- I wonder if they had any animals?
- I wonder if the pump was there in the 1800's?

Summarize their ideas and share 1-3 facts about the yard. **Allow approx 5-7 minutes**

Examples:

1. The gardens directly behind the log cabin are called kitchen gardens. This is where the owners would grow their vegetables and herbs to use in cooking. This garden would be planted by the owner with seeds they saved from one year to the next. Why is it so close to the house?
2. The pump was how they got water - not only to water their gardens but also for their cooking and washing. The log cabin does not have a kitchen inside like our homes. What else is missing compared to where you live? (bathroom, washing machine, sinks, dishwasher etc)
3. The long garden along the fence shows you native plants that might have grown in the area in the 1800's. The plants in this garden are called pollinator plants so insects can feed and move the pollen to grow more plants somewhere else. Butterflies, bees and other insects get the pollen on their legs, tongues, antennae and wings and as they fly from one place to another they help the plants multiply and grow for the next season.
4. The people who lived in the log cabin needed to know when to plant seeds, how to grow the plant and when to harvest the plants as well as save or preserve the plant so they could have new ones the next year.

ACTIVITY 2: Create a model of the life cycle of a plant. Discuss how the plant grows and what it needs to grow.

MD State Maryland State STEM Standards of Practice

- **COLLABORATE AS A STEM TEAM**
  - STEM proficient students will collaborate as a STEM team to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
    - A. Identify, analyze, and perform a STEM specific subject matter expert (SME) role.
    - B. Share ideas and work effectively with a STEM focused multidisciplinary team to achieve a common goal.
    - C. Listen and be receptive to ideas of others

Materials: Group Activity-Life Cycle Circle (6 cards)and images of the following: Seed, Germination, Growth, Full Grown Plant, Flower/Bee/Pollination, Flower/Plant Spreading Seeds
Alternate- Flowering Plant Life Cycle Worksheet- (individual work)

Purpose: The Importance Of The Life Cycle Of A Plant To The People Who Lived In The 1800's At Catoctin Furnace And Now

- Why do we need to know how plants grow?
- Why do we need to know what is needed to make a plant grow?

Process: (Approximately 15 minutes)

Provide 3-5 minutes for the students to explore the kitchen garden and pollinator garden to see the plants closely. Ask them to note if plants are flowering, or going to seed.
Bring the group back together.
Hand out Activity 2 Life Cycle Circles to small groups of 3-5 students so they can work collaboratively in identifying the stages of a plant's growth. Hand out the 6 Cards representing the stages of plant life. Give the students 2-5 minutes to lay out the cards in the order they think is necessary for a plant to grow and multiply. (Or hand out individual worksheets for each student.)
Provide time for each group to share their order. After each group has presented, summarize the discussion by either affirming their solutions and/or asking questions such as:

- Do you know any insects that help with pollination?
- Do you know how an animal such as a bat or lizard might help with pollination?
- Can you identify any stages of the plant life cycle in either the kitchen garden or pollinator garden from your first observation? Have a few students share their insight with the group.

ACTIVITY 3 Plant a seed and develop a question about the growth of the seed (Allow 15 minutes)

MD State Maryland State STEM Standards of Practice
ENGAGE IN INQUIRY

- STEM proficient students will engage in inquiry to investigate global issues, challenges, and real world problems.
    - B. Conduct research to refine questions and develop new questions.

Materials: Cups, Hand Shovels/or Large Spoons, Dirt, Seeds, Marker, 3 x 5 Cards Or Whiteboards, Pencils

Purpose: The Importance of Nurturing a Plant Seed

- Why is it necessary to know how much light, water and dirt a plant will need to grow?

Process: *(Approximately 15 minutes)*
Demonstrate how to plant a seed.

1. Write name on cup
2. Fill the bottom of the cup with dirt
3. Place seed in cup
4. Cover the seed with more dirt
5. Water slightly
6. Model how to write a question related to the plant's growth. Examples might include:
    - *How much light will my plant need daily to grow? * How much water will my plant need to grow? *How often do I need to water my plant? *When should I move my plant to a bigger container?*

Hand out materials to students. Use a marker to write each student's name on the cup.
As students are waiting their turn to plant their seed, they may use the 3 x 5 cards or whiteboard to write their question.

Additional Suggestions for Discussion
Compare the life cycle of a butterfly to a plant.

- What are some of the similarities? What are some of the differences?
- Do all living things have life cycles?

PLANTS IN THE GARDEN- HERBS

Developed by the Green-walled Garden Club 2020

Plants in the Garden- Herbs

ACTIVITY 1 See, Think, Wonder -Student Observation and Inquiry

MD State Maryland State STEM Standards of Practice

- **ENGAGE IN LOGICAL REASONING**
  - STEM proficient students will engage in logical reasoning to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
    - A. Engage in critical thinking. (Observation, Reasoning, Analysis)
    - C. Apply science, technology, engineering, and mathematics content to construct creative and innovative ideas.

Materials: 5-10 containers of dried herbs or 3-5 fresh herbs finely cut on a paper plate or in a cup
Pencils and paper, clipboards or whiteboards and markers, world map, herb pamphlet

Purpose: **Explore how herbs came to North America, where they came from originally and how they were/are used.**

- Where did herbs come from originally and how did they get to the "New World"?
- How did people use herbs in their daily lives?
- How can we investigate herbs through smell and then make predictions on how they might be used?

Process: *(Approximately 15 minutes)*
This activity is based on class discussions for the WHAT DO YOU SEE? And WHAT DO YOU THINK? questions. It can be done through whole group or small group discussions.

WHAT DO THEY SEE?- Using a world map, have students locate North America.

- Provide the basic facts that in the 1400's -1700's most explorers and colonists came from Europe.
  - (Examples, Explorers: Christopher Columbus, Italian Explorer who sailed for the King and Queen of Spain) had 4 voyages across the Atlantic Ocean, John Cabot (Giovanni Caboto) an Italian Explorer who sailed for the King of England explored the Chesapeake Bay area.
  - Colonialism 1600-1800- Trade Routes were set up between North America, Europe and Africa and along with trade items, plant species and seeds were also shipped to be cataloged, planted and grown. (John Bartram was an early botanist who traveled all along the East Coast of North America collecting seeds and then sent them back to Europe) In reverse, many seeds and plants came from other parts of the world to North America.
  - Point out North America, Africa and Europe on the map.

WHAT DO THEY THINK? Now have students locate places where they think herbs might have come from originally and have them explain why they think they came from a particular area of the world. In this segment, students will draw on their personal background knowledge and may need assistance drawing out responses. Example: Do you know any herbs/spices your mom or grandmother use when she makes spaghetti sauce?

Possible responses might be:

- Lavender comes from France because I have seen pictures of it growing there.
- Basil comes from Italy because my mom uses it to make spaghetti.
- Spain because they sent explorers to the new world.

During this part of the activity, ask students what they think people used the plants for in everyday lives. Record the students' predictions down or have them write them out.

Possible responses might be:

- To make potions or medicines
- To add flavor to food
- To make drinks

WHAT DO THEY WONDER?

Provide students with paper and pen or white boards for recording their ideas.

Line up a selection of dried or fresh herbs. Have students go from cup to cup with paper/pen in hand, direct them to carefully observe the herbs and smell each one.

1) SEE-words that describe what they smell and see. (Ex: Smell: sweet, sour, flowery See: leaves, flowers, brown, green.

2) THINK- about what they are actually smelling. (Ex: A. I think I am smelling lavender because it is sweet. B.I think I am smelling something that would be used for medicine because it has an earthy smell.)

3) WONDER-For this activity, use Wonder in a slightly different way and ask students to reflect on any memory, feeling, or activity the aroma brings to mind and then have them develop questions based on their observations and background information. (Ex: I wonder if this is the same plant, my grandma put in her garden? I wonder if this is the same herb my mom uses in our ice tea?

Unveil what each herb is by either: 1) provide a synopsis of each one based on the herb pamphlet or have the students select one herb from the pamphlet and read about its original location, and purposes for the herb.

If time: Go back to map and locate the regions where the kitchen garden herbs came from and see if student predictions were correct.

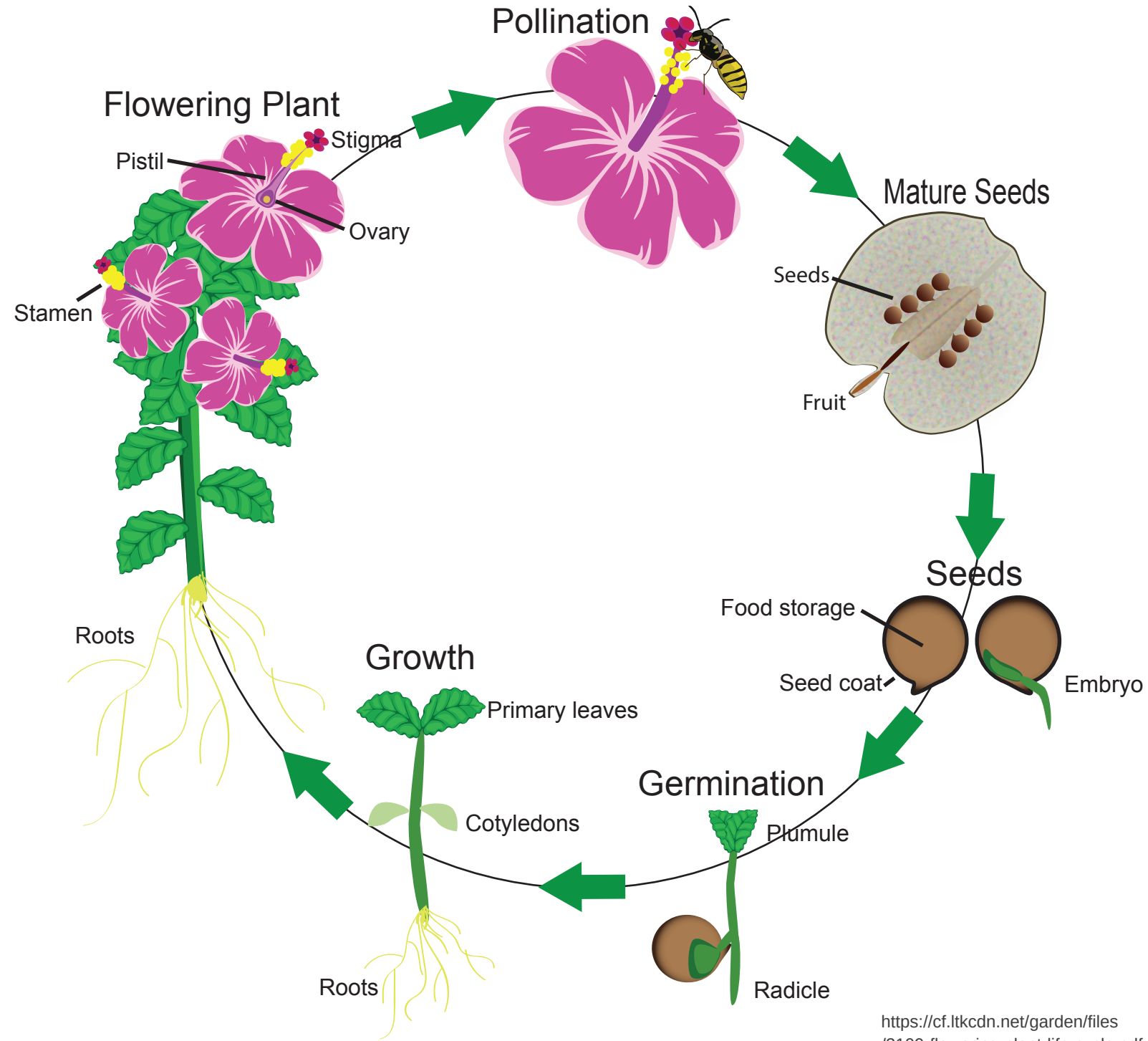
Have students pick a herb and have them make a "recipe" that will either have an application for medicinal or culinary purposes.

(Ex: A. Take 2 Tbls of sage and cut it finely into small pieces. Mix with oil and vinegar and spread over chicken and bake. B. Using sage, take several leaves and smash until it is like pulp, mix with water and put on a swollen wrist.

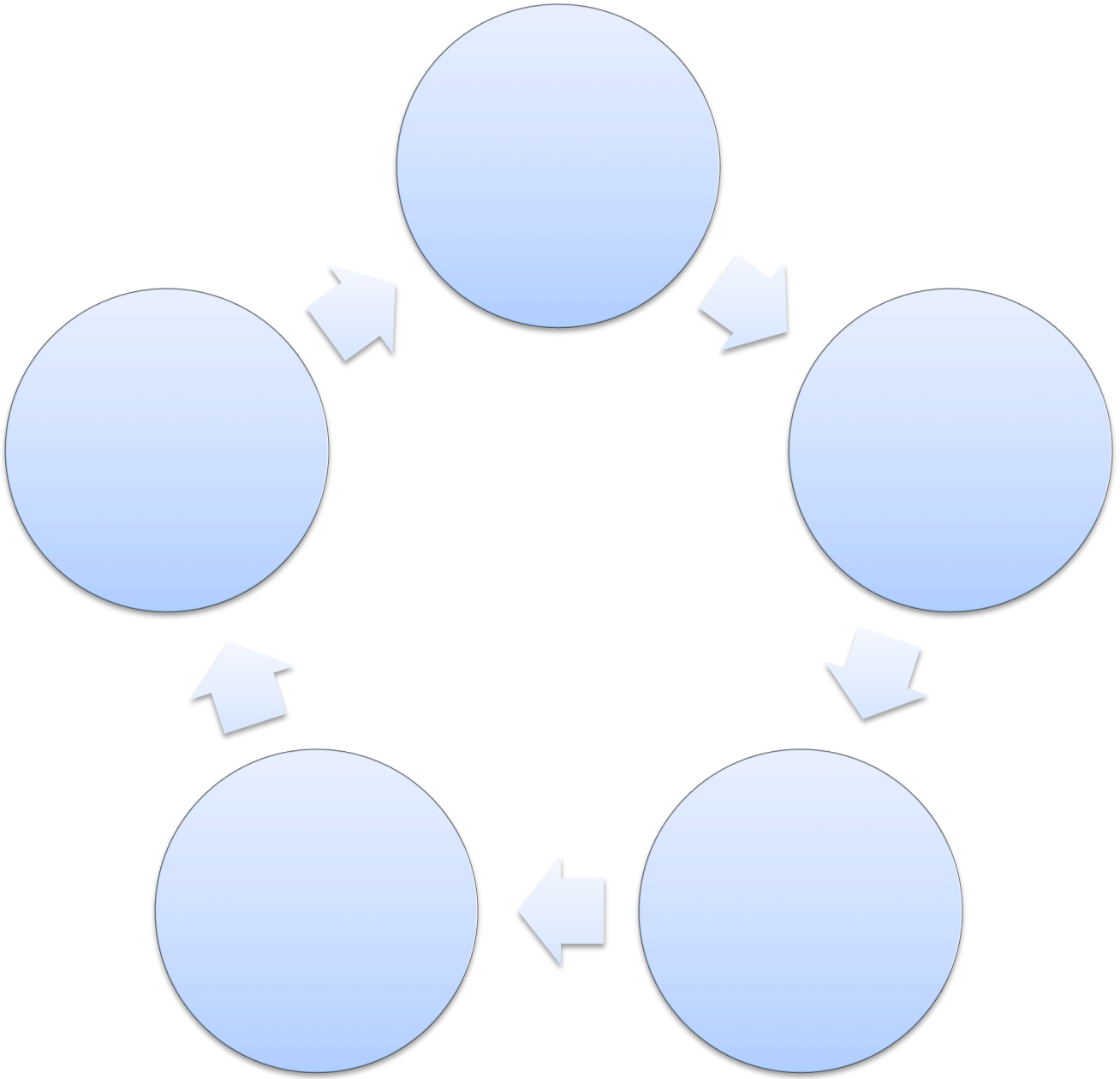
PLANT CYCLE
and HERB RESOURCES

Developed by the Green-walled Garden Club 2020

Flowering Plant Life Cycle



https://cf.ltkcdn.net/garden/files/3109-flowering-plant-life-cycle.pdf



WORD BANK

Pollination Seed Mature/ Spreading Seeds Full Grown Plant/Flower

Germination

Students love to make music and write songs. Creating a song either individually or in a small group is an excellent way for students to show they comprehend concepts.

The below song is an example of how to adapt a song to the tune of another. Students can also incorporate hip, hop, rap or other traditional musical techniques when they write their song.

PLANT SONG

"I'm A Little Seed"

To the tune of, "I'm A Little Teapot" Adapted by Rosemary Glenn

I'm a little **seed** oh, so small
Plant me quick and I'll grow tall

It may take a while for my **roots** to form
Just give me water and keep me warm

One day you will see me once again
When I peek out, you'll see my **stem**

I'll continue growing towards the sun
My **leaves** will sprout but I won't be done

I'll pop out a **flower** holding seeds
Please do plant they are not weeds!

Parts of a plant is this short song
Treat plants kindly so they'll grow strong!!

Texts and Video

Texts

Anthony, Joseph The Dandelion Seed Dawn Publications 1997

Carle, Eric The Tiny Seed Aladdin Picture Books 2001

Cole, Joanna, Deegan, Bruce The Magic School Bus Plants Seeds: A Book about How Living Things Grow Scholastic 1995

Ehlert, Lois Planting a Rainbow HMH Books for Young Readers 1992

Fredericks, Anthony On One Flower: Butterflies, Ticks and a Few More Icks* Dawn Publications 2006

*Lesson (Mini-Field Trip) page 4

Rattini, Baird Kristen Seed to Plant National Geographic Books for Young Readers 2014

Worth, Bonnie Oh Say Can You Seed?: All About Flowering Plants Random House for Young Readers 2001

Videos

Carle, Eric The Tiny Seed https://youtu.be/ls6wTeT2cKA

SciShow Kids *How Does a Seed Become a Plant?* https://youtu.be/tkFPyue5X3Q

OTHER

Mini-Field Trip Dawn Publications • www.dawnpub.com • (800) 545-7475

Introduction In the book On One Flower: Butterflies, Ticks and a Few More Icks, author Anthony Fredericks goes on a “field trip between covers” to a single goldenrod plant and reveals the remarkable variety of insects that may be found there. Many other plants besides the goldenrod are host to insects.

In this activity students will sharpen their powers of observation by closely inspecting a plant.

Key Concepts

- Plan and conduct a simple systematic observation or investigation.
- Use knowledge and evidence (data) to formulate an explanation.
- Communicate or analyze investigations and explanations that might be drawn or spoken as well as written.

Procedure for standards correlation please see our website.

1. Read On One Flower as a class to show how a single plant can be a host to a variety of insects.

2. Ask the students whether they have noticed bugs on plants. What kind of bugs? On what kind of plants?

3. Decide what outdoor plants to observe. Alert students to the fact that their presence may impact whether the bugs will be there or not; for example, butterflies or other flying insects may not approach a plant if humans are nearby, especially if they are moving. Also alert students that they will have to observe all parts of the plant very carefully.

4. Observe the plants for a predetermined period of time. Encourage students to make note of what they see, or draw what they see.

5. Reconvene and share findings. Try to identify as many of the insects as possible. Try to determine why the bugs are there. Is the plant itself a source of food or shelter? Are other insects on the plant as a source of food? Are there other reasons for the bugs to be there? (For example, a place for spiders to spin a web and catch insects, or a place to lay eggs.)

Activities based on the book On One Flower: Butterflies, Ticks and a Few More Icks - by Anthony Fredericks Nature Connections

• After students have read this book, invite them to discuss some of the similarities and/ or differences between the community of animals on the flower and the community in which they live. Students may be interested in creating a large poster which illustrates those differences/similarities.

• After reading the book, ask students to survey other youngsters in the school about their favorite insects. Which ones are the most “popular”? Which ones are the least “popular”?

Additional Resources

New York Botanical Gardens http://www.nybg.org/gardens/

Denver Botanical Gardens http://www.botanicgardens.org/

San Francisco Botanical Garden http://www.sfbotanicalgarden.org/

Desert Botanical Garden http://www.dbg.org/

United States Botanic Garden http://www.usbg.gov/

Materials Needed • On One Flower: Butterflies, Ticks and a Few More Icks - by Anthony Fredericks • Notebook and pen or pencil

BUTTERFLY LIFE CYCLE ACTIVITIES

Developed by the Green-walled Garden Club 2020

Butterfly Life Cycle

ACTIVITY 1: See, Think, Wonder -Student Observation and Inquiry

MD State Maryland State STEM Standards of Practice

- **ENGAGE IN INQUIRY**
  - STEM proficient students will engage in inquiry to investigate global issues, challenges, and real world problems.
    - A. Ask questions to identify and define global issues, challenges, and real world problems.

Materials Needed: Pencils, See, Think, Response Sheet, Clipboards or Whiteboards

Purpose -The Importance Of Butterflies To The People Who Lived In Catoctin Furnace

- Why was it important for the people who lived in the 1800's to know about butterflies?
- Why were butterflies important in the 1800's?
- Why do we need to know how certain plants attract butterflies today?
- Why do we need to know what is needed to have butterflies and plants survive?

Process: (Approximately 15 minutes)

Hand out Activity 1 See, Think, Wonder Response Sheet to each student or use one to record their ideas

Choose one way for the students to communicate their ideas.

- Students can verbalize what they see
- Students can write down what they see
- Students can draw what they see
- Students can work individually or in small groups to make a list
- Leader can record student comments

Do not judge their responses -just let them share their ideas

Step 1. Have students look at the yard/space behind the log cabin and then ask the following three questions allowing time to share responses with the group.

WHAT DO THEY SEE? - Allow approx 3 minutes

Possible responses may include:

- I see a house made of wood
- I see a pump
- I see flowers
- I see plants
- I see butterflies
- I see bees
- I see doors on the house
- I see logs

Next question

WHAT DO THEY THINK? Allow approx 3 minutes

Select a way for the students to communicate their ideas.
For this part of the activity- a follow up question from the leader may be warranted.
Follow up question- *What makes you say that?*
Possible responses may include:

- I think the house is old. (What makes you say that?)
- I think the garden needs water so that is why there is a pump.
- I think the garden along the fences is for butterflies. (What makes you say that?)
- I think the flowers attract the insects and butterflies.

Next question

WHAT DO THEY WONDER? Allow approx 3 minutes

Select a way for the students to communicate their ideas.
This should be in the form of a question.

- I wonder how many kids lived in the house?
- I wonder where they bought their groceries?
- I wonder what kind of vegetables they grew?
- I wonder what kind of butterflies they might have seen?
- I wonder if they caught the butterflies?
- I wonder if the pump was there in the 1800's?

Summarize their ideas and share 1-3 facts about the yard. **Allow approx 5-7 minutes**
Examples:

1. The gardens directly behind the log cabin are called kitchen gardens. This is where the owners would grow their vegetables and herbs to use in cooking- This garden would be planted by the owner with seeds they saved from one year to the next. Why is it so close to the house? Do you see any bees or butterflies in the kitchen garden?
2. The pump was how they got water - not only to water their gardens but also for their cooking and washing. The log cabin does not have a kitchen inside like our homes. What else might be missing compared to where you live? (bathroom, washing machine, sinks, dishwasher etc.)
3. The long garden along the fence shows you native plants that might have grown in the area in the 1800's. The plants in this garden are called pollinator plants so insects can feed and move the pollen to grow more plants somewhere else. Butterflies, bees and other insects get the pollen on their legs, tongues, antennae and wings and as they fly from one place to another they help the plants multiply and grow for the next season.

The people who lived in the log cabin needed to know when to plant seeds, how to grow and harvest the plants. How do you think their observations of the bees and butterflies might have helped them in making good decisions about growing plants?

ACTIVITY 2: Create a model of the life cycle of the butterfly. Discuss the different stages of the butterfly cycle and what the butterfly needs to grow.

MD State Maryland State STEM Standards of Practice

- **COLLABORATE AS A STEM TEAM**
  - STEM proficient students will collaborate as a STEM team to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
    - A. Identify, analyze, and perform a STEM specific subject matter expert (SME) role.
    - B. Share ideas and work effectively with a STEM focused multidisciplinary team to achieve a common goal.
    - C. Listen and be receptive to ideas of others.

Materials needed: Life Cycle Circle (5-7 cards) and Images of the Following: Egg, Larva, 2 Stages of the Pupa, Butterfly Emerging, Butterfly on Flower Showing Pollination. Hand lens to look for eggs and pollen on plants.

Purpose: The Importance Of The Life Cycle Of A Butterfly To The People Who Lived In The 1800's At Catoctin Furnace And Now

- Why do we need to know how a butterfly develops?
- Why do we need to know what a butterfly needs to complete its life cycle?

Process: (Approximately 15 minutes)
Provide 3-5 minutes for the students to explore the kitchen garden and pollinator garden to see the plants closely. Ask them to note if they see butterflies or bees, plants that are flowering (look for pollen), or different stages of the butterfly cycle.
Bring the group back together.

Hand out Activity 2 Life Cycle Circles to small groups of 3-5 students so they can work collaboratively in identifying the stages of the butterfly's life cycle. Hand out the 5-7 Cards representing the stages.

Give the students 2-5 minutes to lay out the cards in the order they think it is necessary for a butterfly to successfully develop and start their life cycle again.Provide time for each group to share their order. After each group has presented, summarize the discussion by either affirming their solutions and/or asking questions such as:

- Do you know any other insects that help with pollination? How?
- Do you know how an animal such as a bat or lizard might help with pollination?
  Were you able to identify any stages of the butterfly's life cycle in either the kitchen garden or pollinator garden from your earlier observation at the beginning of the activity? Have a few students share their insight with the group.

ACTIVITY 3 Be Able to Identify Butterfly Body Parts and Their Uses (Allow 15 minutes)

MD State Maryland State STEM Standards of Practice

- **ENGAGE IN INQUIRY**
  - STEM proficient students will engage in inquiry to investigate global issues, challenges, and real world problems.
    - B. Conduct research to refine questions and develop new questions.

Materials: Diagram Of A Monarch Butterfly And Reference Color Pictures, Color Pencils, Monarch Butterfly Worksheet (For Drawing And Labeling), Pencils

Purpose: The Importance of Understanding Parts of Butterflies and Their Uses

- Why is it necessary to know the parts of a butterfly? How are their body parts used to pollinate plants?

Process: *(Approximately 15 minutes)*
Demonstrate what you know about the butterfly.

1. Close your eyes and visualize a butterfly. What body parts do you see? (1-2 minutes)
2. Share with the group what you saw or know about the butterfly. (3-5 minutes)
3. Provide color pictures of Monarch butterflies as references. (2-3 minutes)
4. What new information have you discovered? (3-4 minutes)
   a. Butterfly Vocabulary: Wings-4-2 forewings, 2 hindwings, Scales cover the wings, body and legs are like tiny shingles on a roof, Head, Eyes, Proboscis-tube like appendage for sipping nectar or other liquids, Antenna are used for balance and smell, Leg, Thorax-the middle part of the body and used to anchor the legs and move the wings, Abdomen-contains the digestive system and heart.
5. Share in the group why these body parts are important and discuss their purpose. (2-3 minutes)

Hand out Monarch worksheets to students. Ask the students to draw a butterfly and identify and label the body parts using the provided vocabulary.
What if a butterfly could talk? Develop an interview question(s) to ask the butterfly. Students may use the questions to do further research on a butterfly.
Examples:

- How long do you live?
- Where do you go at night?
- Do you have a husband, wife or children?

Additional Suggestions for Discussion
Compare the life cycle of a butterfly to a plant.

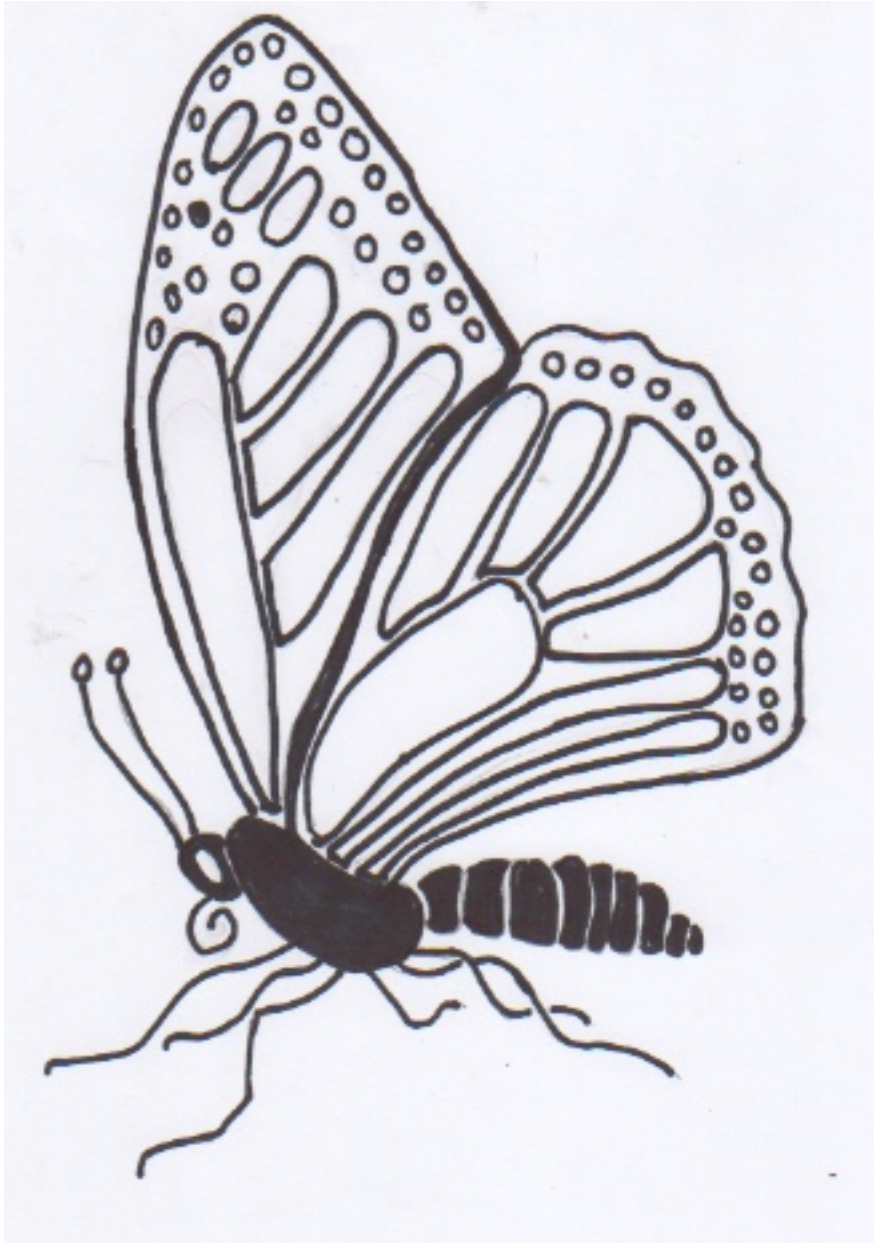
- ♦ What are some of the similarities? What are some of the differences?

Do all living things have life cycles?What is the Maryland State insect? What information can you discover about the insect and how will you share it with others?

Butterfly: A Life National Geographic https://youtu.be/kVm5k99PnBk

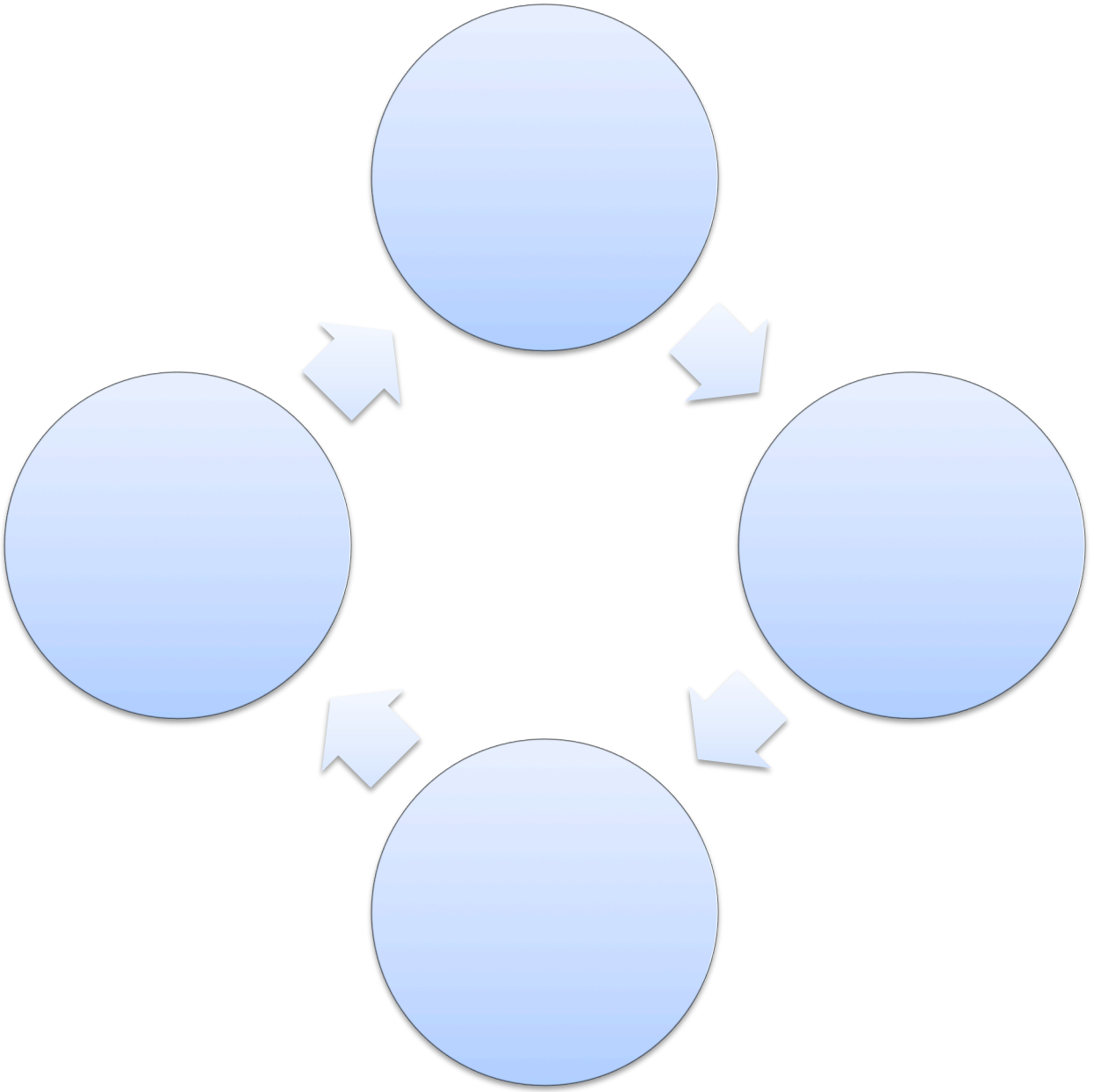
BUTTERFLY LIFE CYCLE RESOURCES

BUTTERFLY BODY PART IDENTIFICATION



WORD BANK

Head Eye Proboscis Abdomen Back Wing Wing Veins Legs
Thorax Front Wing Antennae Spiracles



Start

WORD BANK

Larva (Caterpillar) Egg Adult Butterfly Pupa (Chrysalis)

Students love to make music and write songs. Creating a song either individually or in a small group is an excellent way for students to show they comprehend concepts.

The below songs are examples of how to adapt a song to the tune of another. Students can also incorporate hip, hop, rap or other traditional musical techniques when they write their song.

BUTTERFLY SONGS

http://www.canteach.ca/

Caterpillars, Butterflies

The Cocoon

I found a cocoon

That a caterpillar made,

Fastened to a leaf

Hanging in the shade.

He barely had room

To wiggle or wag,

Like me zipped up

In my sleeping bag.

I looked each time

That I passed his way,

But he never budged

Until just today.

Something happened!

He wagged and wiggled

And then climbed out

And carefully jiggled

Small wet wings

That grew as they dried.

He'd turned to a butterfly

Inside!

Birth of a Butterfly

(can be sung to the tune of Hush Little Baby, Don't Say a Word)

A mama butterfly lays all her eggs,

Out pops a caterpillar, crawling on its legs.

The caterpillar first is rather thin,

But then it eats till it bursts through its skin.

After growing nice and big,

The caterpillar climbs on a leaf or twig.

It makes a shell where it hangs inside.

The shell then cracks, and the parts divide.

Inside the shell, a change was going on,

The form of the caterpillar now is gone.

When the shell opens, what comes out?

A beautiful butterfly fluttering about!

Butterfly Cycle

(to the tune of "Row, Row, Row Your Boat")

Hatch, hatch little egg,

I'm so very small.

Teeny tiny caterpillar,

You can't see me at all.

Crawl, caterpillar, crawl,

Munching on a leaf.

Crawling, munching, crawling, munching,

Eat and eat and eat.

Form, form chrysalis,

I'm a different shape;

Hanging by a silken thread

Until I can escape.

Rest, rest, chrysalis

While I change inside;

Now at last my time has come

To be a butterfly.

Stretch, stretch, pretty wings,

It's a special day;

Soon they will be strong enough

For me to fly away.

Fly, fly, butterfly,

Fly from flower to tree;

Find a place to lay my eggs

So they can grow like me.

Caterpillar Song

I started as a tiny egg

Upon a leaf of green

And now I stay upon the leaf

So I will not be seen

Soon I'll build a chrysalis

Upon a limb up high

I'll stay a while and then come out

And be a butterfly

The Butterfly Song

(to the tune of "Up on the Housetop")

First comes a butterfly and lays an egg,

Out comes a caterpillar with many legs,

Oh see the caterpillar spin and spin,

A little chrysalis to sleep in.

Oh, oh ,oh wait and see

oh oh oh wait and see

Out of the chrysalis,my oh my

out comes a pretty butterfly.

Fuzzy Wuzzy Caterpillar

Fuzzy wuzzy caterpillar

in the garden creeps.

He spins himself a blanket

and soon falls fast asleep.

Fuzzy wuzzy caterpillar

wakes up by and by

To find he has wings of beauty,

changed to a butterfly.

The Fuzzy Caterpillar

(to the tune of "The Eensy Weensy Spider")

The fuzzy caterpillar

Curled upon a leaf,

Spun her little chrysalis

And then fell asleep.

While she was sleeping,

She dreamed that she could fly,

And later when she woke up

She was a butterfly!

Fly Fly Butterfly (to the tune of "Skip To My Lou")

Fly fly butterfly,

Fly fly butterfly,

Fly fly butterfly,

Fly up in the sky so high.

WATER PUMP ACTIVITIES

Developed by the Green-walled Garden Club 2020

Water Pump

ACTIVITY 1: See, Think, Wonder -Student Observation and Inquiry

MD State Maryland State STEM Standards of Practice

- **INTERPRET AND COMMUNICATE INFORMATION FROM SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS**
  - STEM proficient students will interpret and communicate information from science, technology, engineering, and mathematics to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
    - A. Identify, analyze, and synthesize appropriate science, technology, engineering, and mathematics information (text, visual, audio, etc.).
    - B. Apply appropriate domain-specific vocabulary when communicating science, technology, engineering, and mathematics content.
    - E. Develop an evidence-based opinion or argument
    - F. Communicate effectively and precisely with others.

Materials: Pencils, See, Think, Response Sheet, Clipboards or (Whiteboards and Whiteboard Markers)

Purpose -The Importance of Understanding How a Water Pump Works

- Why was it important for the people in the 1800's to have a water source close to their home?
- How would the people who lived in the log cabin get their water and what would they use the water for in the cabin and outside?
- Why did they need to understand the mechanics of the water pump? Why do we need to know how the water pump works today?

Process: (Approximately 15 minutes)

Hand out Activity 1 See, Think, Wonder Sheet to each student or use one to record their ideas. Choose one way for the students to communicate their ideas.

- Students can verbalize what they see
- Students can write down what they see
- Students can draw what they see
- Students can work individually or in small groups to make a list
- Leader can record student comments

Do not judge their responses -just let them share their ideas

Step 1. Have students look at the water pump behind the log cabin and then ask the following three questions allowing time to share responses with the group.

WHAT DO THEY SEE? - Allow approx 3 minutes

Possible responses may include:

- I see a bucket
- I see a pump
- I see a handle
- I see a spout

Next question

WHAT DO THEY THINK? Allow approx 3 minutes

Select a way for the students to communicate their ideas.

For this part of the activity- a follow up question from the leader may be warranted.

Follow up question- *What makes you say that?*

Possible responses may include:

- I think the pump is big. (What makes you say that?)
- I think the pump would be hard to use.
- I think the pump would need two people to make it work- (What makes you say that?)

Next question

WHAT DO THEY WONDER? Allow approx 3 minutes

Select a way for the students to communicate their ideas.

This should be in the form of a question.

- I wonder who used the pump?
- I wonder why the pump is close to the house?
- I wonder if the pump we see is the original pump?
- I wonder if the water is cold or hot?
- I wonder if the pump is new?

Summarize their ideas and share 1-3 facts about the pump. **Allow approx 5-7 minutes**

Examples:

1 The pump was how the people in the cabin got water - not only to water their gardens but also for their cooking and washing. The log cabin does not have a kitchen inside like our homes. What else might be missing in the log cabin that uses water compared to where you live? (Shower, bathroom, washing machine, sinks, dishwasher etc)

2. See diagram and describe how it works.

The pump goes down several feet into the ground to a well or water source.

The pump is made up of several parts. By pushing the force rod (the handle) down, the piston rod is lifted and the lower check valve opens and suction brings water into the pump head and out of the water outlet. Lifting the hand up pushes the piston down and the check valve on the piston opens up and allows water to flow above the piston. Pushing the handle down again causes the piston to lift the water out of the outlet.

3. The pump was invaluable in the winter/summer when other water sources (creeks, lakes) might be frozen or dry. The pump helped the settlers save time and provide for a healthier cleaner life.

ACTIVITY 2: Create a diagram of a pump or a method to get water from Point A to Point B.

MD State Maryland State STEM Standards of Practice

- **COLLABORATE AS A STEM TEAM**
  - STEM proficient students will collaborate as a STEM team to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
    - A. Identify, analyze, and perform a STEM specific subject matter expert (SME) role.
    - B. Share ideas and work effectively with a STEM focused multidisciplinary team to achieve a common goal.
    - C. Listen and be receptive to ideas of others.

Materials: Pump Diagram, White Boards, Pump Parts with labels for Small Group Activity 3-5 groups

Purpose: The Importance Of The Pump To The People Who Lived In The 1800's At Catoctin Furnace And Now

- Why do we need to know how the pump works?
- How do you think the pump made life easier or harder for the people in the cabin?
- How would you design a method to move water from one place to another?

Process: (Approximately 15 minutes)

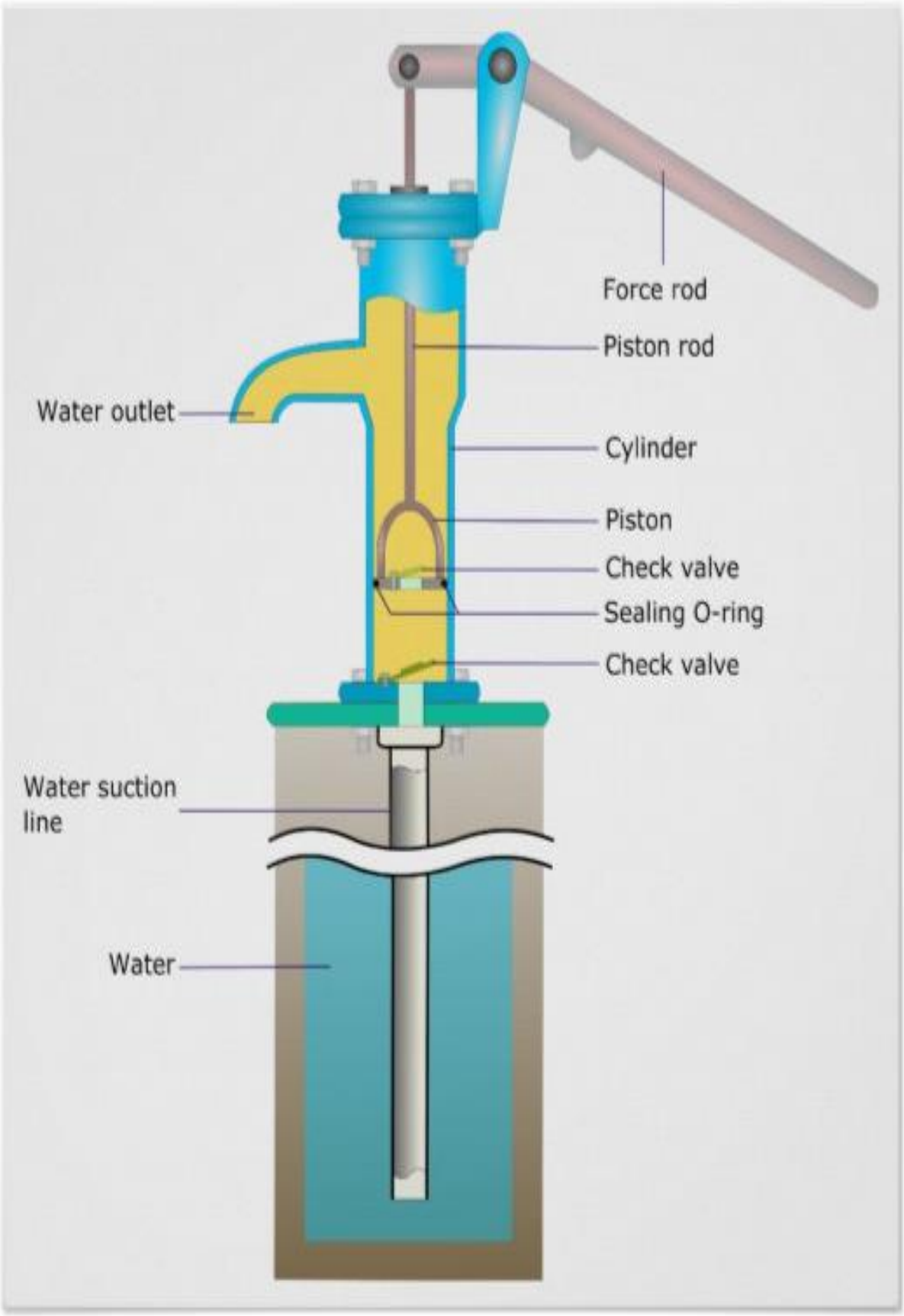
Provide 3-5 minutes for small groups to share ideas on how the pump works and might be assembled based on their observations of the water pump and the information provided by the teacher.

Have the students work in small groups to design a "water pump" or method to move water from Point A to Point B. Hand out the white boards. Provide time for each group to share their ideas with their teammates. WIthin the small group, each student will draw their part of the pumping method on the white board and connect their "part" to each partner in the small group. Have each group present what their "pump" does and how it works to get water from Point A to B. Summarize any discussion either commending their solutions and/or asking questions such as:

- Was your group able to provide an accurate diagram of a pump?
- Did you work collaboratively with your group? How?
- Did your group invent a new pump to get water to the garden and log cabin?
- Did you design a model that would change how the water could get to the site instead of a pump?

WATER PUMP RESOURCES

Well Water Hand Pump from the 1800's



- Pushing the handle (force rod) down lifts the piston and the lower check valve opens and suction brings water into the pump head.
- Lifting the handle up pushes the piston down and the check valve on the piston opens up and allows water to flow above the piston.
- Pushing the handle down again causes the piston to lift the water out of the outlet.