UNDERSTANDING LIFE SYSTEMS GROWTH AND CHANGES IN PLANTS

Grade 3

Ontario

WELCOME TO

UNDERSTANDING LIFE SYSTEMS GROWTH
AND CHANGES IN PLANTS

giving CREDIT

Thank you to all the amazing artists who create the beautiful design elements featured in this product.

Follow me on TPT

Given Feedback earns credits

FONTS USED

KG Fonts

AG Fonts By Amy Groesbeck — commercial use license

ka fonts

STOCK Photos

depositphotos

Storyblocks

Canva

CLIP ART

madly LEARNING

depositphotos

LET'S CONNECT

NEWSLETTER SUBSCRIBE

Terms of Use

What you can do:

- You own one license to use this product in one classroom.
- You can use these in your classroom over and over again.
- When people love the look of what you are using, you can tell them where you got this product and even help them out by buying an additional license for a discount.

What you can NOT do...

- Purchasing this file does not mean you own the content, and you may not claim them as your own. Madly Learning retains the copyright and ownership to all of the contents in this file.
- **You may NOT give, share, resell, or post any part of this file for others to use either in commercial or non-commercial uses.**
- You may not make derivatives, adaptations, remixes, or companion products for this unit or any other works that copy or draw inspiration from this unit.
- You may not use any part of this product for commercial use. This includes use on Outschool or any other commercial teaching site where you personally receive compensation for individual students.

INTRODUCTION

madly learning inquiry based units

Dear Teacher,

This unit has a lot of hands on experiments that will keep students excited and engaged while learning about flight. Wherever possible, I have tried to ensure that all of the experiments use common and safe materials to accomplish the learning goals. However, an important aspect of these experiments is the ability for students to reflect on their learning because some of the concepts are theoretical and some students may struggle with making these connections without your guidance. This is especially true with understanding concepts of flight that are hard for students to see due to size within the classroom.

This unit uses an inquiry based approach to learning. This means that the role of the teacher is ideally that of a guide to help students learn the concepts in the lessons contained herein. We know that good teaching provides our students with a variety of learning activities. Effective instruction must go beyond the passive consumption of read and respond worksheets or repetitive centres activities. This is the reason that you will find a limited amount of these tasks in Madly Learning units.

We know teachers have a wide variety of experiences with inquiry, and we have worked to make the teaching components flexible and adaptable to your needs as a teacher but also to the wide variety of needs of students in your classroom. Through every Madly Learning unit, we hope to bring you a wider variety fun and engaging lessons that fit it all together to make learning meaningful.

As always, if you have any questions, concerns, or comments you would like to share with me, I am always available to support you. Send me an email and I will get back to you promptly. I appreciate when buyers contact me directly about any issue prior to leaving feedback.

Enjoy the unit!
Sincerely,
Patti
@MadlyLearning
EMAIL : info@MadlyLearning.com

FOCUS ON inquiry

Inquiry is an approach to teaching that takes the teacher out of the role of lecturer and transitions the teacher into the guide on the side. By implementing an inquiry approach, you are giving up some of the control in your classroom and over the learning.

Getting Started:

Start your unit getting to know how much your students know and what they are interested in. This is the goal of lesson one. They will review the images of the Wonder Wall to activate prior knowledge and inspire thinking. Their thinking will elicit questions that will serve to guide your exploration through the remaining components of the unit. Capture student questions and post them on a chart as they share their ideas with the class.

At this point, students will ask questions—but don't give them answers; just write the questions down and ask a question back that makes them think more deeply about the topic they are curious about. Get an idea about what they are interested in and what they know. Once you have captured their questions, look at their list and group their questions into topics.

The photos were designed to foster student thinking related to the content of the curriculum. These will serve as questions that will lead into your lessons.

Make a list of themes that students want to know more about. These will generally follow the lessons as they are planned out in this unit, except now you have let them choose why they are learning about them.

FOCUS ON inquiry

The Lessons:

The lessons in this resource reflect the typical goals of an initial student inquiry.

You will work through these lessons by always referring to these as being a part of the student goals. They do not have to be done in exactly this order, and you can add in other information based on student interest. You will notice that many of the pages either activate prior knowledge or are a reflection about a hands-on learning activity to ensure that students are learning what they are supposed to learn from the activities. This is where your guidance becomes an important part of the learning process.

You are no longer just giving information. You are leading discussions through questioning techniques that help students to draw conclusions.

Conferencing and knowledge-building circles will be important activities for this to occur. Assess who is doing most of the talking? It should be the students doing the talking about their learning, not just listening.

This is the goal for learning. However this may be new to many of them as they learn to listen to each other instead of just you. So train them, train them, train them by gradually releasing the control of the conversation away from you and more to them.

Final Inquiry Project:

This is the application piece of all of their learning and should take up the most of your teaching and learning time. During this time, you are not teaching and lecturing. Instead, you are supporting, questioning, and conferencing with students.

FOCUS ON inquiry

If this is one of your first inquiry units, you can consider a guided inquiry approach where you walk them through each step and limit their choices. Alternatively, you can allow students to work as a group based on interest and use a guided reading for science model to help guide them through their inquiry.

Assessment

Assessment has three elements along the journey.

Diagnostic - *Assess students about their initial knowledge. This is not a formal assessment but will give you a baseline of student understanding. Quickly level student knowledge based on three levels of understanding: limited, developing, and good.*

Formative Assessment - *Through each lesson, there are guides for how to collect formative assessment of your students. Gather information for your assessment from a balance of your conversations, observations, and the products produced by students.*

Summative *- At the end of the unit, students will participate in a culminating activity of the inquiry project. This project will have them apply their learning from the smaller parts of the unit to complete this inquiry project. Allow for an open-ended approach to how students present their information. Your assessment will be of the knowledge and skills demonstrated, not on specific methods of how this is demonstrated.*

Inquiry is a journey, and wherever you are on your inquiry journey as a teacher is an okay place to be. Start with one inquiry task and with every new experience release a bit more control to students letting them lead. This happens over time, not overnight.

GRADE 3

table of contents

ONTARIO

Grade 3 unit checklist

Checklist of curriculum expectations covered by lesson

Curriculum Expectations	1	2	3	4	5	6	7	8	9	10	11	12
observe and compare the parts of a variety of plants	■	■		■	■	■	■	■	■	■	■	■
germinate seeds and record similarities and differences as seedlings develop	■		■	■	■	■	■	■	■	■	■	■
investigate ways in which a variety of plants adapt and/or react to their environment, including changes in their environment, using a variety of methods	■	■	■	■		■	■	■	■	■	■	■
use appropriate science and technology vocabulary, including *stem, leaf, root, pistil, stamen, flower, adaptation, and germination*, in oral and written communication	■	■	■		■	■	■	■	■	■	■	■
describe the basic needs of plants, including air, water, light, warmth, and space	■	■	■	■		■	■	■	■	■	■	■
identify the major parts of plants, including root, stem, flower, stamen, pistil, leaf, seed, and fruit, and describe how each contributes to the plant's survival within the plant's environment	■	■	■	■		■	■	■	■	■	■	■
describe the changes that different plants undergo in their life cycles	■	■	■	■	■		■	■	■	■	■	■
describe how most plants get energy to live directly from the sun	■	■	■	■	■	■	■	■	■		■	■
describe ways in which plants and animals depend on each other	■	■	■	■	■	■	■	■	■	■		■
describe the different ways in which plants are grown for food	■	■	■	■	■	■		■		■	■	■
identify examples of environmental conditions that may threaten plant and animal survival	■	■	■	■	■	■	■	■		■	■	
OTHER												
Follow safety procedures												
Communicate their understanding with others in a variety of ways												
- group discussions												
- student participation in small groups												
- student notebook and reflection pages												
- student/teacher conferences												

grade 3

LEARNING GOAL SUMMARY

Student Name: _____

Lesson	Learning Goal	1	2	3	4
1	We are gathering information and wonderings about plants and how plants grow.				
2	We are learning how to plant seeds and how seeds grow into plants.				
3	We are exploring different plants in the area we live in and how to identify a plant.				
4	We are learning what the different parts of a plant are and how they function.				
5	We are learning what plants need to grow.				
6	We are learning how plants follow a lifecycle and what happens at each step of a plants lifecycle.				
7	We are learning how plants take in water to stay alive.				
8	We are learning what types of plants are in our everyday lives.				
9	We are learning how we, humans, impact plants negatively.				
10	We are learning how plants eat via photosynthesis.				
11	We are investigating the ways animals depend on plants.				
12	We are learning how plants are important to humans and other living things.				

LESSON ONE

Wonder Wall and Diagnostic Assessment

3 L1

All pages through this resource are marked similar to above to show the Grade (3) and Lesson number (L1).

grade 3

LESSON ONE

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are gathering information and wonderings about plants and how plants grow.

Preparation

- Post Wonder Pictures in the class.
- Wonder Walk Pages

Print/Copy:
- Wonder Wall Cards
- Wonder Wall Walking Notes (one per student)
- Wonder Wall Questions (one per student)

Lesson Part A

- Students will begin by looking at the Wonder Pictures posted on the wonder wall. An Answer Page has been provided.
- Encourage students to think about what the images are, what they have to do with plants, and how they can help us learn more about the topic.
- Provide each student with a Wonder Wall Walking Notes and Wonder Wall Question Page. Here they will record things they observe, know, think, and wonder. They will also come up with questions they have (Example Questions have been provided).
- Students can do this independently or with a partner, depending on their readiness to work independently in partnerships, while you teach the other group.

Lesson Part B

- Students join the teacher and share their wonderings.
- A question answer page has been provided to promote discussion.
- Encourage students to share what they are wondering about the unit.
- Ask them what they want to learn and what about plants intrigues them.

Assessment

Assess students' prior knowledge of this topic, interest, and engagement in different pictures.

NOTES


1


2


3


4

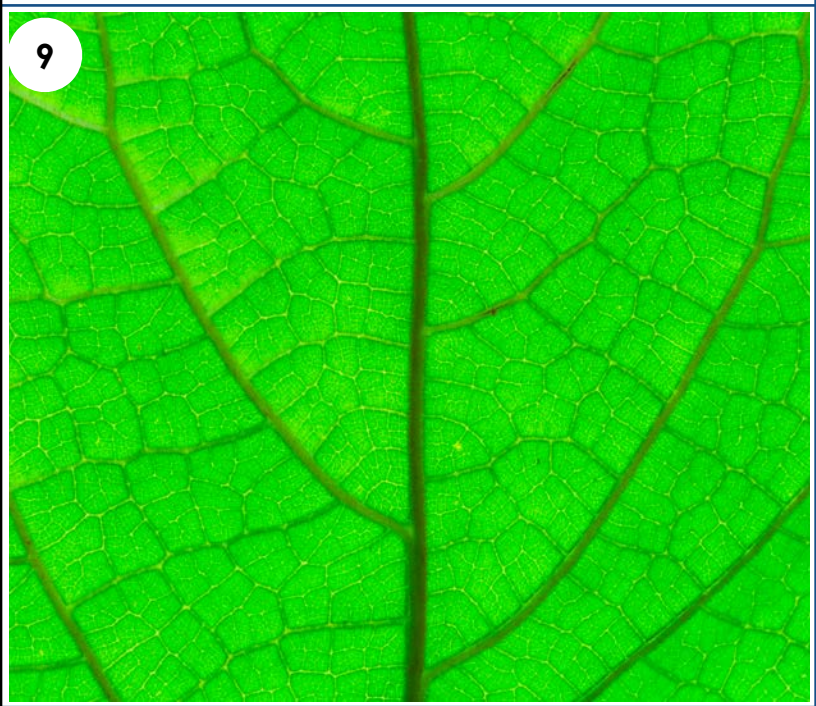

5


6

7

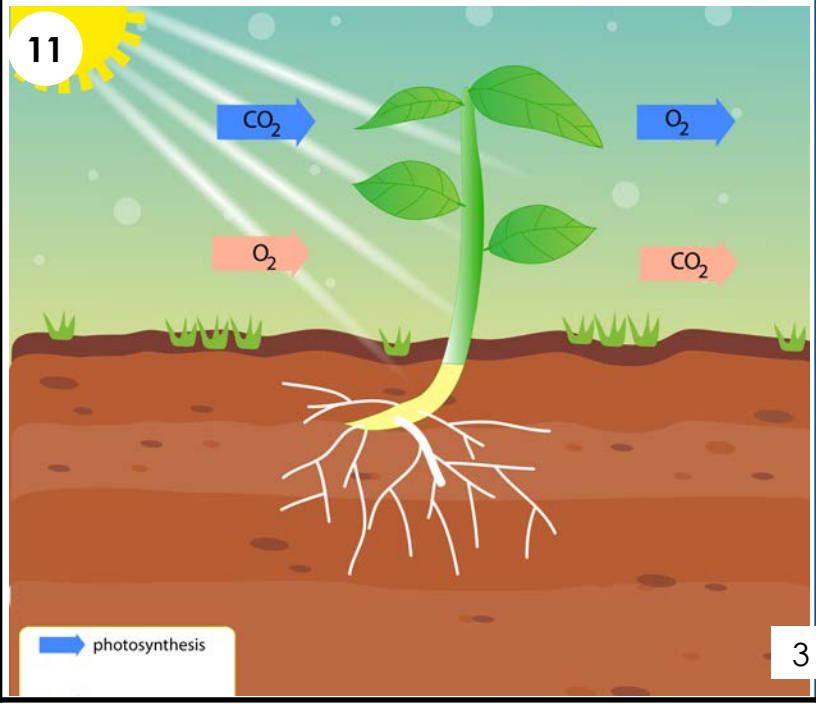
8

9



10

11



12

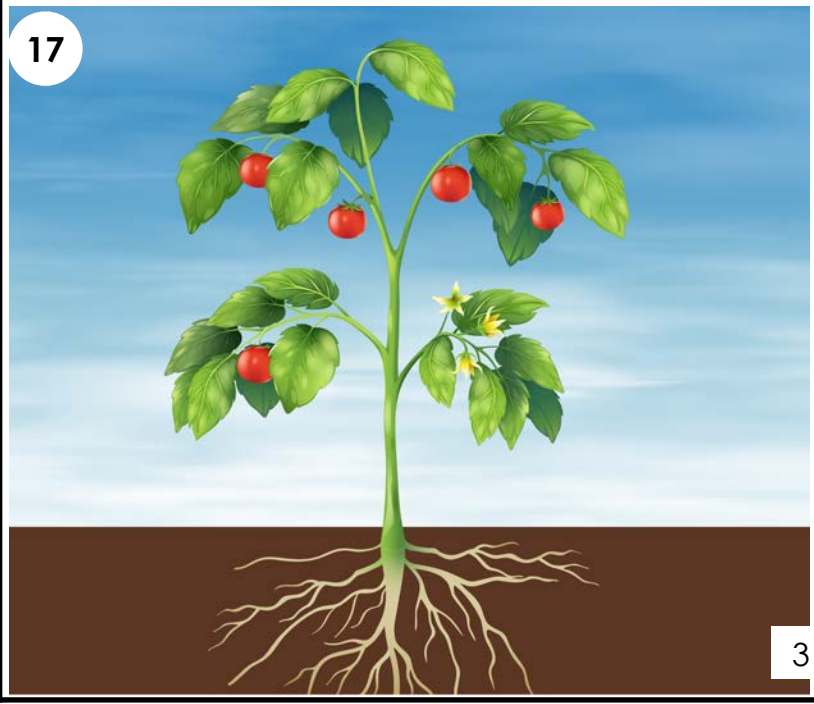
13

14

15

16

17



18

WONDER WALL ANSWER PAGE

1. plant water droplet
2. farmer field
3. greenhouse
4. human planting
5. wheat field
6. human hands with soil
7. harvesting carrots
8. bee and flower
9. micro leaf
10. stages of growth
11. photosynthesis
12. farmer harvesting
13. watering plants
14. plant on rock
15. greenhouse / note taking
16. tropical greenery
17. parts of a plant
18. plant and roots

WONDER WALL WALKING NOTES

i observe...

i know...

i think...

i wonder...

WONDER WALL QUESTIONS

Example Questions

WONDER WALL QUESTIONS

How do plants grow?

What do plants need to grow?

Do animals eat plants?

Are farmers important to growing plants?

What is a greenhouse?

How many days does it take to grow a plant?

LESSON TWO

INVESTIGATION OF PLANTS PART 1

grade 3

LESSON TWO

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how to plant seeds and how seeds grow into plants.

Preparation

- One clear plastic cup per student
- Grass seed
- Soil - about a half cup per student
- Popsicle stick (one per student)

Copy/Print:
- Scientific Method Page (for display)
- Lab Report (one per student)
- Investigations Page (one per student)

Lesson Part A

- To begin the plants unit, students will plant their own seeds.
- Gather the materials listed above.
- Distribute one plastic cup to each student.
- If students are in groups, place a large bowl of soil in the middle with a spoon.
- Tell students to take turns adding 2-3 scoops of soil to their cups (below half of the cup).
- Walk around to each student and have them take a pinch of grass seed to add to their soil (tell them to press it into the soil).
- Students can now add 1-2 spoonfuls of soil on top.
- Lastly, have students place a popsicle stick with their name on one side into the cup (this will be used to measure the growth).
- Place the cups in a window sill.
- Discuss with students how you will assist the grass in growing (water/sun).
- Assign one student per day to water the seeds (very little water needed).

Lesson Part B

- Review the Scientific Method Page with students to review how the scientific process works.
- Once students have planted their seeds and placed in the window, have them complete their Lab Report.
- Provide some guidance answers on the board, if needed.
- Question: *How does grass seed grow into grass?*
- Once they have completed their report, have students fill out their Investigation Page for day 1 (no grass yet).
- They will record their observations every other day (an odd day and an even day. Investigation page has been provided so that you can split the class in half if you have a larger class).

Assessment

Look at students hypothesis for understanding of how seeds grow into plants

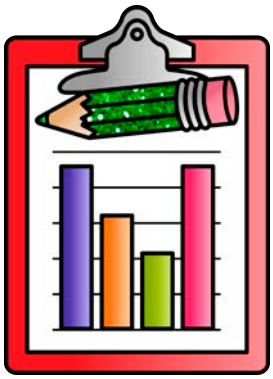
NOTES

SCIENTIFIC METHOD

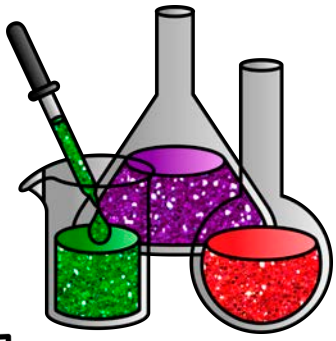
ASK A QUESTION

OBSERVE AND MAKE NOTES

MAKE A HYPOTHESIS OR PREDICTION



ANALYZE DATA (RESULTS)



DO AN EXPERIMENT

DRAW A CONCLUSION THAT RELATES TO YOUR QUESTION

EXPERIMENT LAB REPORT

Question

What do I want to find out?

Hypothesis

I am predicting that …

Observation #1

I see …

Observation#2

I hear…

Observation#3

I smell …

Results of data

My observations tell me …

Conclusion

The answer to my question is …

EXPERIMENT LAB REPORT

Question

Hypothesis

Observation #1	Observation#2	Observation#3

Results of data

Conclusion

SEED EXPERIMENT

investigation page

Record what is happening to the grass seed at each time interval.	
Time	**Observations**
Day 1	
Day 3	
Day 5	
Day 7	
Day 9	
Day 11	
Day 13	
Day 15	

SEED EXPERIMENT

investigation page

Record what is happening to the grass seed at each time interval.	
Time	**Observations**
Day 2	
Day 4	
Day 6	
Day 8	
Day 10	
Day 12	
Day 14	
Day 16	

LESSON THREE

CLASSIFICATION OF PLANTS

grade 3

LESSON THREE

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are exploring different plants in the area we live in and how to identify a plant.

Preparation

- Ensure you have a safe outside area for your nature walk

Print/Copy:
- What Plants Do You See? (one per student)
- What Is A Plant? (one per student)
- Example Words (one for the class)

Lesson Part A

- As a class, you will go on a nature walk/ scavenger hunt outside.
- You can do this two ways: walk as a class or let students explore the school yard.
- Give each students the page What Plants Do You See?
- As students walk around, they will check off any of the listed plants they see. There is also space to add plants that are not listed.
- Once inside, have students discuss the different plants they saw.

Lesson Part B

- Break students into small groups (2-3).
- Give each student the page What Is A Plant?
- As a group, students will work through the page to classify what a plant is.
- Before they begin, put some words on the board that they might need.
- Start by asking students words they might need to answer the questions.
- Some examples have been provided on the page Example Words.
- Give students the remainder of time to work on the sheet with their partners.

Assessment

While on your nature walk, ask students what types of plants they see to gauge their prior knowledge.

NOTES

If it is not possible to go outside for a walk, there are many YouTube nature walks you can find.

WHAT PLANTS DO YOU SEE?

as you walk around, check off all the plants you see! add new ones you see to the list.

- an evergreen tree
- a pine needle
- a yellow flower
- a seed
- a tree stump
- a log
- a clover
- green grass
- brown grass
- a thorn bush
- a red flower
- a pink flower
- two different colour leaves
- a cactus
- a bush
- roots of a plant
- a pinecone
- an acorn
- a Mushroom
- a vine
- a twig
- berries
- moss
- tree bark
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

WHAT IS A PLANT?

What makes a plant a plant?

What does a plant look like?

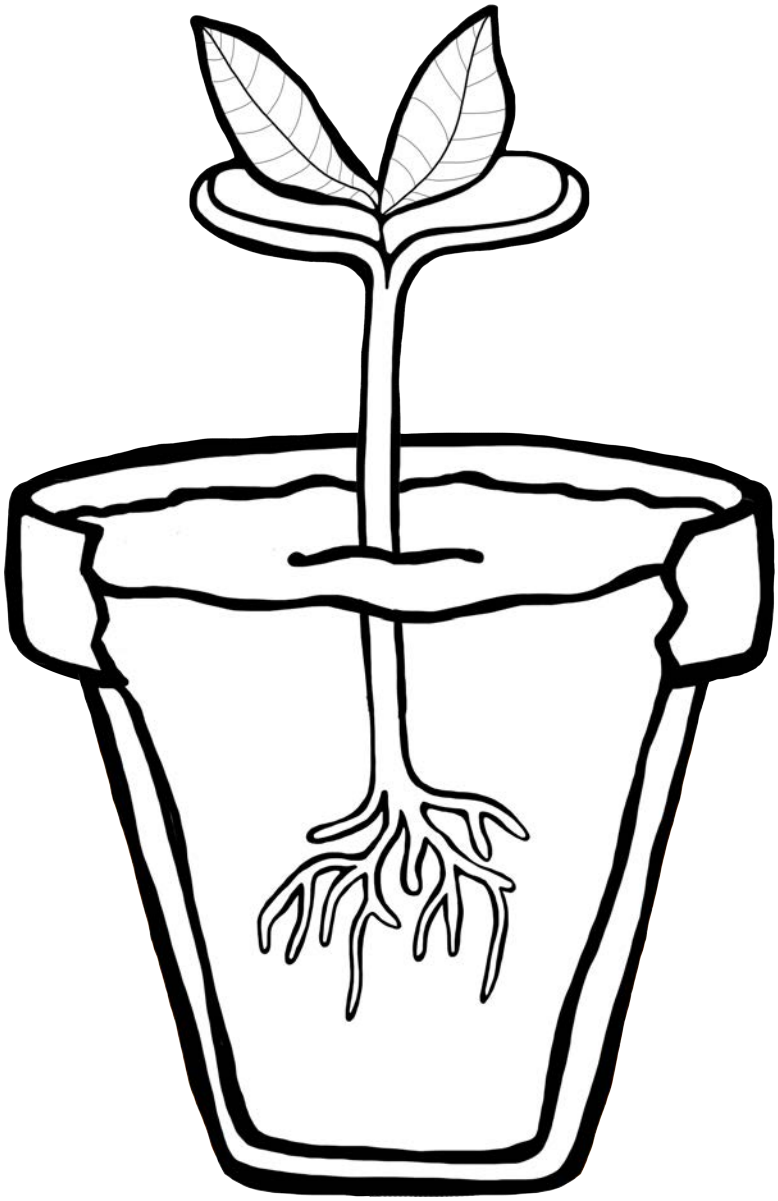
Draw a picture.

List places you can find plants:

How do we take care of plants? Are all they the same?

EXAMPLE WORDS

green
roots
stem
petal
soil
Earth
brown
water
sun
outdoors
pots
farms



LESSON FOUR

PARTS OF A PLANT

grade 3

LESSON FOUR

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning what the different parts of a plant are and how they function.

Preparation

- One piece of chart paper for teacher-directed lesson
- Glue and scissors (one per student)

Print/Copy:
- Parts Of A Plant (one per student)
- Parts Of A Plant Reading (one per student)
- Parts Of A Plant Answer Page (one per student)

Lesson Part A

- As a class, work to identify the parts of a plant.
- On a large piece of chart paper, draw a plant with leaves, stem, roots, flower, and fruit.
- Alternatively, ask students what each part of the plant looks like, then draw it.
- Ask students which parts they know already and label accordingly.
- Once completed, give each student a copy of Parts Of A Plant to complete (an Answer Key has been provided).
- This will be a reference page for students throughout the unit.

Lesson Part B

- Have students read the article, Parts Of A Plant, individually or with a partner.
- Encourage students to pay close attention to what each part of a plant does.
- Students record their thoughts on the Parts Of A Plant Answer Page.
- Students draw a picture of each part of a plant and write a jot note about what that part of the plant does.
- If time allows, go over answers with students to ensure understanding of each part of a plant.

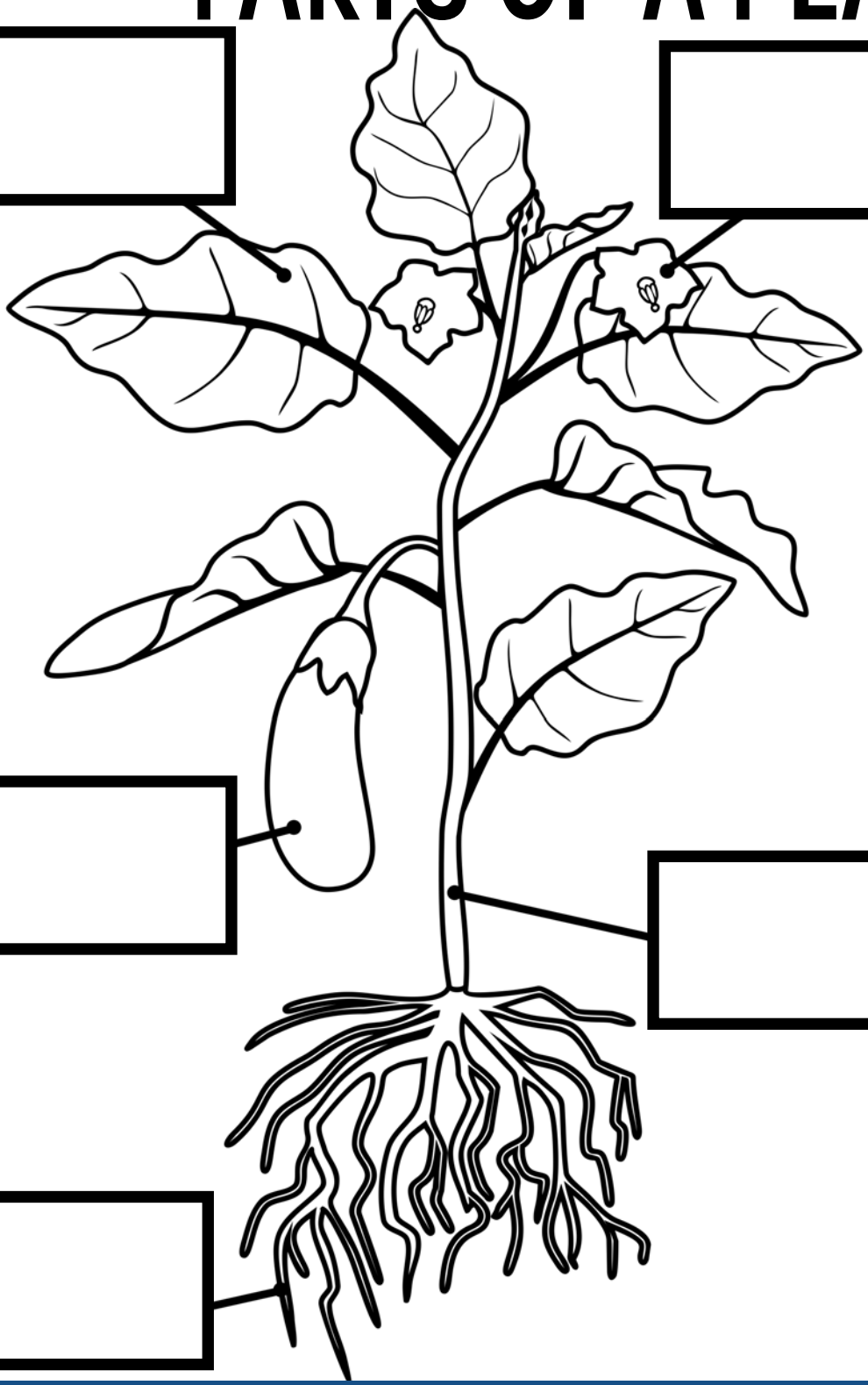
Assessment

Collect answer pages to review for understanding.

NOTES

Create a bulletin board to display for the remainder for the unit for students to reference.

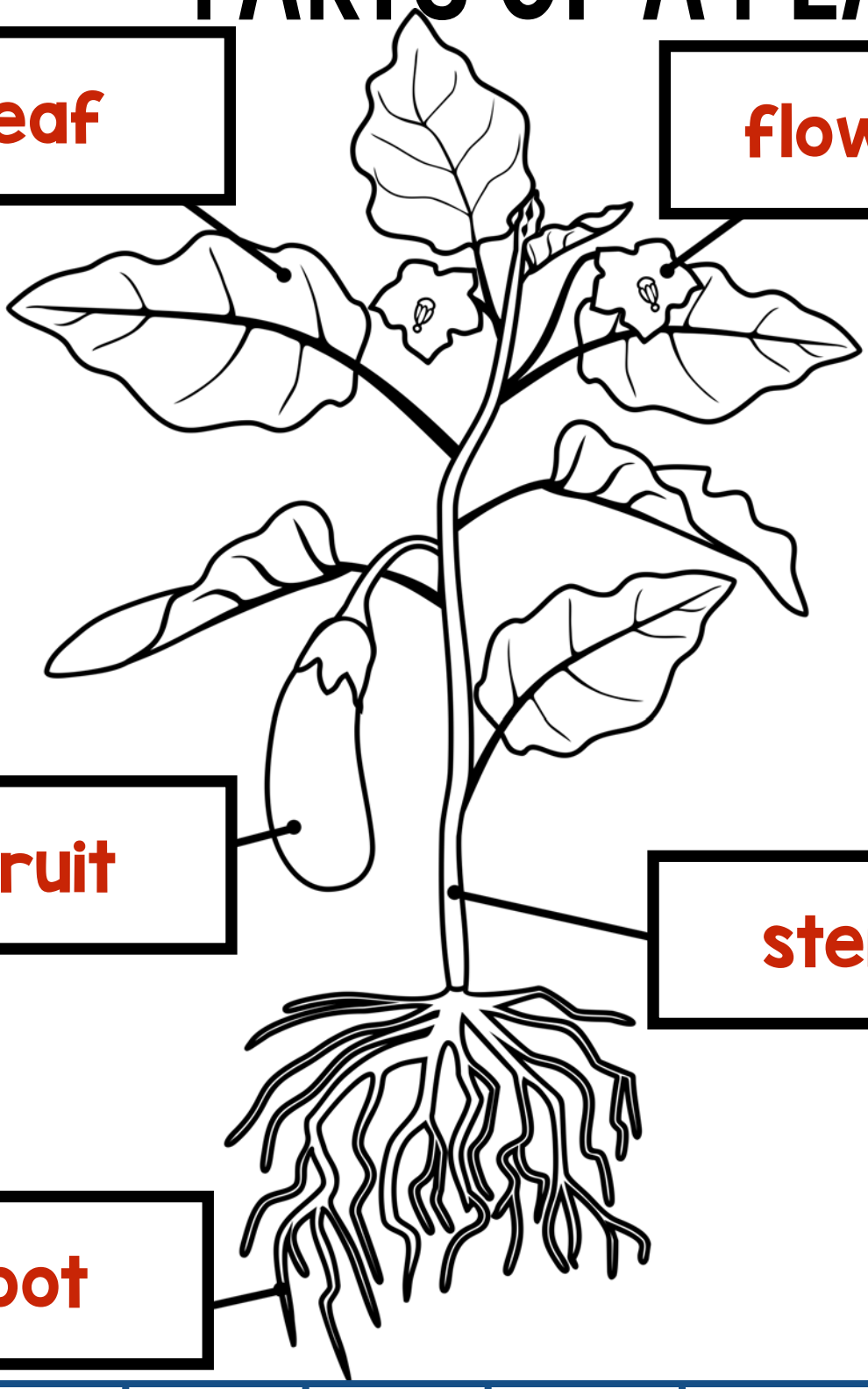
PARTS OF A PLANT



root	leaf	fruit	stem	flower

Answer Key

PARTS OF A PLANT



root	leaf	fruit	stem	flower

PARTS OF A PLANT

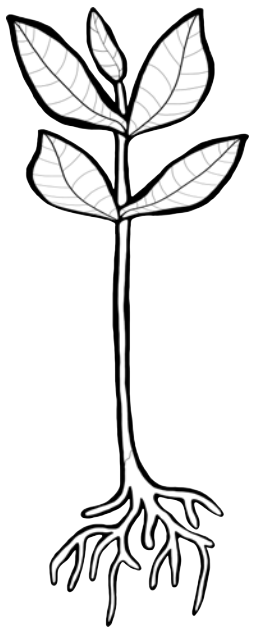
Plants are around us every day. We eat them. We smell them. We watch them grow. There are many kinds of plants, but their parts are the same. These parts help the plants grow to be healthy and strong.

The first part of a plant is the seed. Most plants start from tiny seeds. Once a seed is put into soil and mixed with water, it is fed with minerals. This causes the seed to burst open so it can start growing up and out of the dirt.

The first plant part to come out of the seed is the root. Roots grow down into the dirt. A plant takes in water and minerals from the soil through its roots.

A stem comes next and is the first part to grow out of the ground. It is the main part of a plant. Stems must be strong to support the plant's leaves and flowers. The stem is also important because it feeds the rest of the plant. It works like a straw to suck up the water and minerals from the roots.

Leaves are the next part of a plant. They are there to make food for the rest of the plant to eat. The leaves use light from the sun, water from the stem, and air to create sugar that feeds the plant to keep it healthy.



For plants without flowers, leaves grow over and over again. Plants with flowers, fruits, or vegetables make flowers next. Flowers grow at the end of stems. Some plants have only one flower on a single stem, like a tulip. Other plants grow many stems and produce lots of flowers, like marigolds. For plants that grow food, the flowers turn into fruits or veggies over time.

Even though most plants have the same basic parts, they are still very different. Plants come in many different sizes, colours, and textures. But every plant still needs roots, a stem, and leaves to help it grow big and strong.

PARTS OF A PLANT

answer page

Part of Plant	Draw a picture	What does it do?
seed		
roots		
stem		
Leaf		
flower		
fruit		

LESSON FIVE

WHAT DO PLANTS NEED?

grade 3

LESSON FIVE

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning what plants need to grow.

Preparation

- Glue/scissors (one per student)

Print/Copy:
- What Do Plants Need? (one per student)
- What Do Plants Need Images (one per student)
- What Do Plants Need Exit Slip (one per student)

Lesson Part A

- To begin, students look at what plants need and don't need to thrive.
- Break students into groups of 2-3.
- Give each student a copy of What Do Plants Need? and What Do Plants Need Images.
- Tell students to cut out all the images provided.
- They will then sort them under the appropriate title: "Need" and "Don't need".
- Ask students NOT to glue them, just place them under the appropriate title.
- Once students have placed them under the appropriate title, discuss and go over the sheet with students.
- Display the Answer Key for students to use as a guide to glue them in the appropriate places.

Lesson Part B

- Gather students in a common area, if possible.
- Using the Read Aloud Options Page, choose a book or two to read to the class. Youtube links are provided to readings if you don't have access to a physical copy.
- After each book, discuss the topics within the book and why they are important.
- Students can also do this independently if needed.
- There are also many options on EPIC!
- Have students complete the What Do Plants Need Exit Slip before concluding the lesson.

Assessment

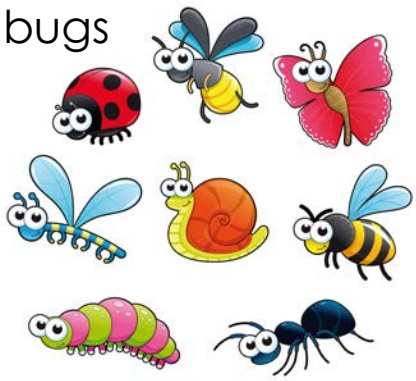
To consolidate the lesson, give students the Exit Slip provided and collect for assessment.

NOTES

WHAT DO PLANTS NEED?

Need
Don't Need

WHAT DO PLANTS NEED? images

 oxygen	humans 	
bugs 	 pot	 outdoors
minerals 	 sun	 water
 carbon dioxide	boots 	shovel 

Answer Key

WHAT DO PLANTS NEED?

Need

oxygen


sun


carbon dioxide

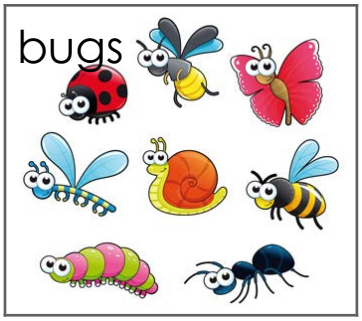

soil


water

minerals

Don't Need


boots


bugs


outdoors

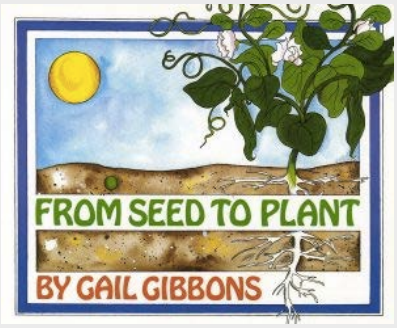

pot

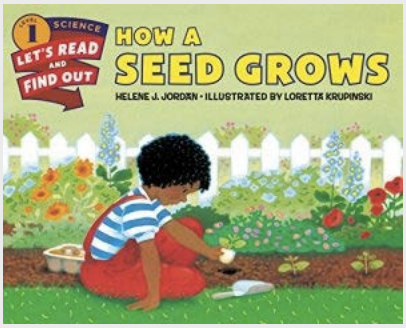

humans

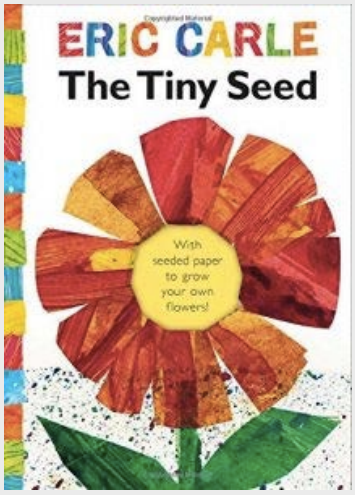

shovel

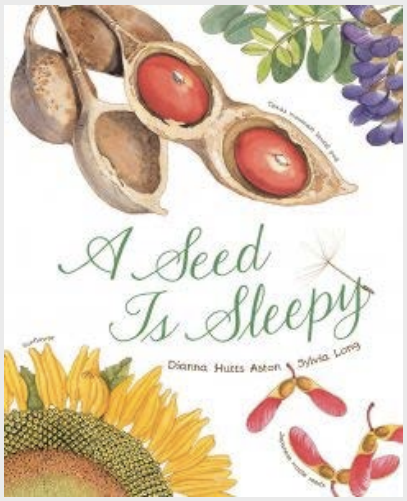
READ ALOUD OPTIONS

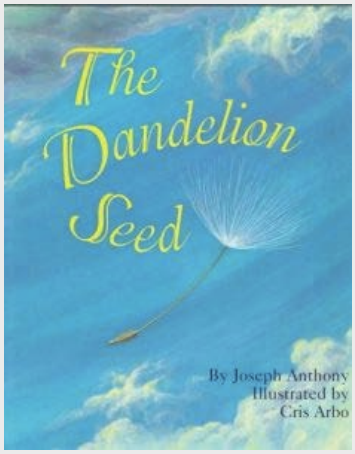
click any of the images below to be taken to a read aloud

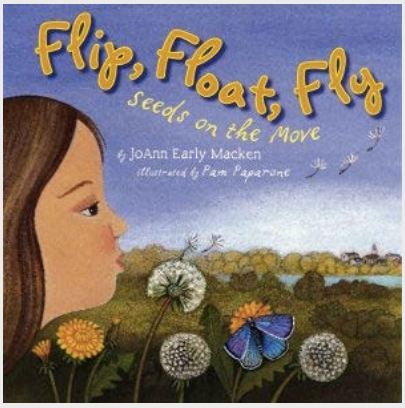


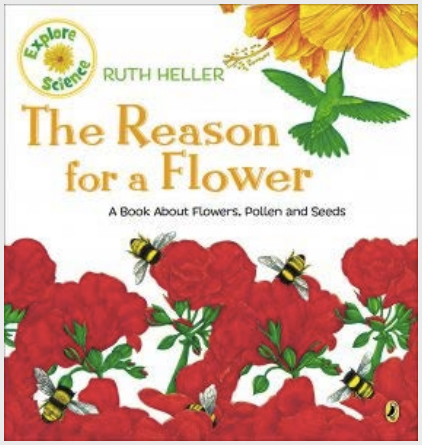


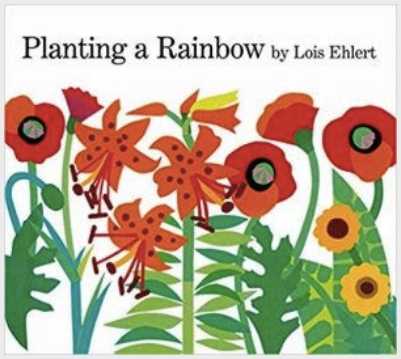










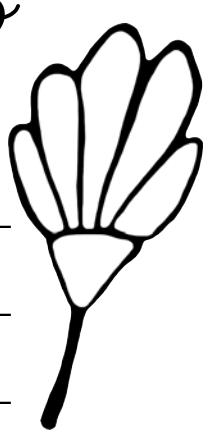


Name: _____ Date: _____

WHAT DO PLANTS NEED? exit slip

List three things plants need to grow and survive.

1. _____
2. _____
3. _____

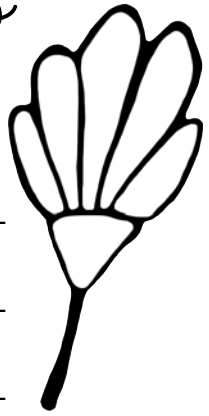


Name: _____ Date: _____

WHAT DO PLANTS NEED? exit slip

List three things plants need to grow and survive.

1. _____
2. _____
3. _____

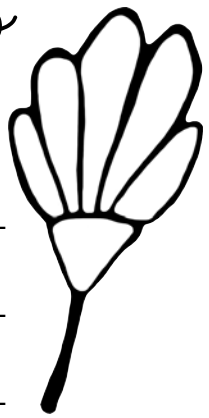


Name: _____ Date: _____

WHAT DO PLANTS NEED? exit slip

List three things plants need to grow and survive.

1. _____
2. _____
3. _____



LESSON SIX

PLANT LIFE CYCLE

grade 3

LESSON SIX

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how plants follow a life cycle and what happens at each step of a plants life cycle.

Preparation

- Glue and scissors (one per student)

Print/Copy:
- Life Cycle Of Plants (one per student)
- Growth Of Plants (one per student)

Lesson Part A

- Print and give each student a copy of the Life Cycle Of Plants article.
- As a class, read the article together.
- Have students read each paragraph aloud.
- While reading, stop and discuss what is being read to ensure student understanding.

Lesson Part B

- Once done reading, give each student a copy of Growth Of Plants.
- Pair students or they can work individually.
- Students cut out the 6 tags at the bottom of the page.
- Then use the reading to help them know where to place the stages of a plant's life into the appropriate box.
- Ensure students do not glue the tags down yet.
- Once students are done, display the Answer Key and have students glue their tags in the appropriate places

Assessment

Have students discuss the stages of the plant life cycle with an elbow partner.

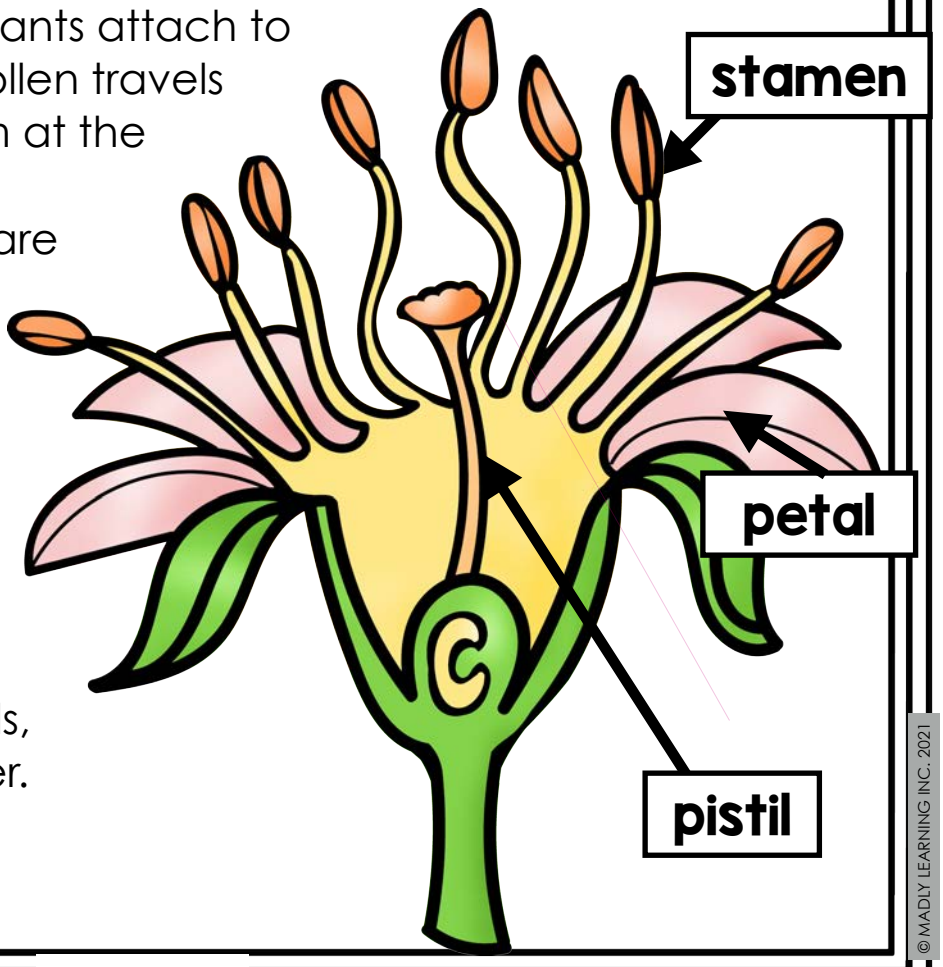
NOTES

LIFE CYCLE OF PLANTS

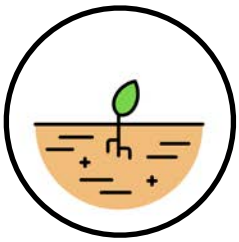
All plants grow and change. Growth and change is called a life cycle. First, the plant starts as a seed. The seed is covered with a hard shell. Once the seed is planted in the ground, the seed begins its journey to become a flower. Water is added to help the plant grow. This causes the seed to swell. Eventually, the seed breaks through the hard shell and germination begins. During germination, the roots grow down and the stem and leaves grow up.

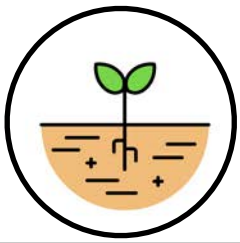
As the leaves grow through the ground, photosynthesis begins. Sunlight, carbon dioxide, and water allow the plant to grow. More leaves grow and flower buds begin to develop.

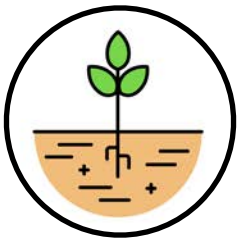
The plant begins to flower. There are many important parts of a flower. Flowers need to pollinate. Pollen is stored in the stamens. They attract insects, like bees. Bees transfer the pollen between plants. Pollen from other plants attach to the pistil. From here, the pollen travels down the pistil to the ovum at the bottom of the pistil. Seeds develop in the ovum and are pollinated by the pollen. If the plant is a fruit plant, the seed ripens into a fruit. When seeds are ready, they begin to spread out to start the cycle over again. New seeds leave their parent plant through other animals, insects, wind, or even water.

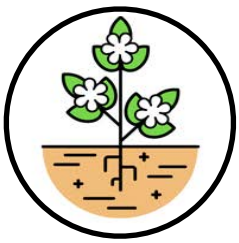


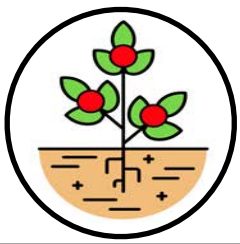
GROWTH OF PLANTS











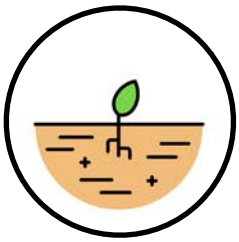
Cut out and glue into the correct boxes above.

With water, the seed swells until the shell breaks open. The stem and leaves sprout out of the ground and the roots grow down into the soil.	The plant starts life as a seed. A mini plant, called an embryo, is inside. This is protected by a hard shell or seed coat.	As the plant grows out of the soil, it begins photosynthesis and makes its own food. The root system expands.
More leaves grow and buds begin to form. These buds contain the flower before it blooms.	As the seeds develop, it is time for them to spread with the help of insects, humans, and animals.	The plant flowers. It uses bright colours and pretty scents to attract insects. They move the pollen from one flower to another. The pollen fertilizes new seeds.

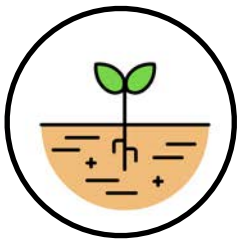
Answer Key

GROWTH OF PLANTS

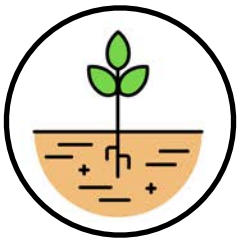
The plant starts life as a seed. A mini plant, called an embryo, is inside. This is protected by a hard shell or seed coat.



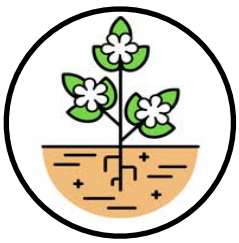
With water, the seed swells until the shell breaks open. The stem and leaves sprout out of the ground and the roots grow down into the soil.



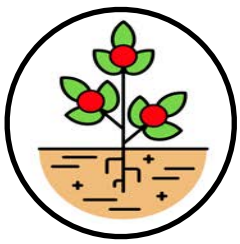
As the plant grows out of the soil, it begins photosynthesis and makes its own food. The root system expands.



More leaves grow and buds begin to form. These buds contain the flower before it blooms.



The plant flowers. It uses bright colours and pretty scents to attract insects. They move the pollen from one flower to another. The pollen fertilizes new seeds.



As the seeds develop, it is time for them to spread with the help of insects, humans, and animals.

Cut out and glue into the correct boxes above.

With water, the seed swells until the shell breaks open. The stem and leaves sprout out of the ground and the roots grow down into the soil.

The plant starts life as a seed. A mini plant, called an embryo, is inside. This is protected by a hard shell or seed coat.

As the plant grows out of the soil, it begins photosynthesis and makes its own food. The root system expands.

More leaves grow and buds begin to form. These buds contain the flower before it blooms.

As the seeds develop, it is time for them to spread with the help of insects, humans, and animals.

The plant flowers. It uses bright colours and pretty scents to attract insects. They move the pollen from one flower to another. The pollen fertilizes new seeds.

LESSON SEVEN

INVESTIGATION OF PLANTS PART 2

grade 3

LESSON SEVEN

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how plants take in water to stay alive

Preparation

Gather:
- Celery stalks
- Clear cups
- Food colouring
- Water
- Review the Scientific Method page with students, if necessary

Print/Copy:
- Experiment Lab Report (one per student)
- Celery Experiment Investigation Page (one per student)
- Growing Plants Reading (one per student)

Lesson Part A

- Explore how water travels through plants.
- Ensure you have the materials needed to start the experiment.
- Break students into partners or groups of 3
- Give each group one cup, half filled with water, and one piece of celery.
- Follow the experiment instructions on the Celery Experiment page provided.
- Record the experiment steps on the Experiment Lab Report page provided.
- Document the changes over a period of time on the Celery Experiment Investigation Page.

Lesson Part B

- Read the Growing Plants article.
- Investigate how to grow a plant from a seedling.
- This relates directly to the next lesson and experiment.

Assessment

While students are working on the celery experiment, ask them questions to gauge their understanding. For example: *How do you think the water is getting to the top?*

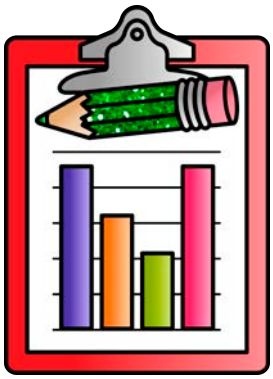
NOTES

SCIENTIFIC METHOD

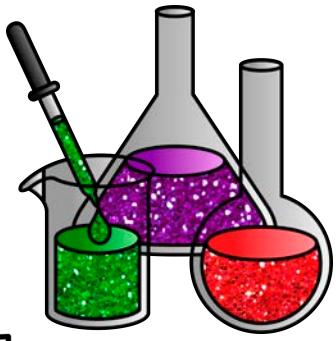
ASK A QUESTION

OBSERVE AND MAKE NOTES

MAKE A HYPOTHESIS OR PREDICTION



ANALYZE DATA (RESULTS)



DO AN EXPERIMENT

DRAW A CONCLUSION THAT RELATES TO YOUR QUESTION

CELERY EXPERIMENT

Supplies needed:

- celery stalks
- clear cups
- food colouring
- water

Instructions:

1. Fill the plastic cups a little more than half full with water.
2. Add several drops of food colouring to each cup (one colour per cup) and stir.
3. Cut the bottom ends off celery stalks.
4. Place one freshly cut celery stalk in each cup.
5. Invite students to make a hypothesis. What do they think will happen? Depending on their age, they can colour a picture or write what they think will happen.
6. Each student can watch what happens and write or colour their observations.

EXPERIMENT LAB REPORT

Question

What do I want to find out?

Hypothesis

I am predicting that …

Observation #1

I see …

Observation#2

I hear…

Observation#3

I smell …

Results of data

My observations tell me …

Conclusion

The answer to my question is …

EXPERIMENT LAB REPORT

Question

Hypothesis

Observation #1	Observation#2	Observation#3

Results of data

Conclusion

CELERY EXPERIMENT

investigation page

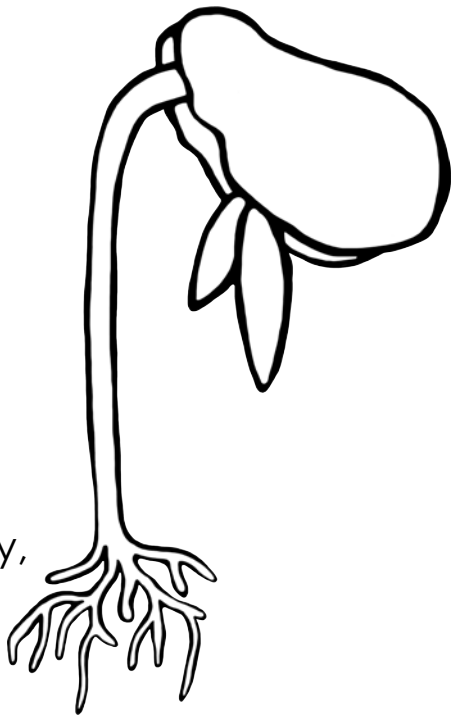
Record what is happening to the celery at each time interval.	
Time	**Observations**
5 Minutes	
1 Hour	
5 Hours	
1 Day	

GROWING PLANTS

It can be very interesting to watch a plant grow from a seed. The different stages of a plant's life cycle are fun to experience. Growing a plant is great for the world, too. The more plants we have, the healthier our planet will be.

The first step to growing a plant is choosing your seeds. You can get seeds from a garden store or from another plant. Some seeds work better if you start them in a little container inside. Others can be planted right in the ground, if it is the right season.

Either way, you need good soil. Put the seed into the dirt, not very far down at all. Cover it with soil and give it some water. You will want to make sure the seed is always moist. Be careful not to water it more than it needs, though. You also want to make sure that it gets indirect sunlight.



Most seeds sprout after a couple weeks. This is when you see sprouts poking up out of the soil. If your plant is indoors, move it to a place where there is lots of sunlight. Every day, you should rotate the plant so that all sides get light. Keep it watered just like you did before, too.

GROWING PLANTS

It is exciting when you see the first leaves of your baby plant. Keep it warm and watered until it is a bigger, stronger plant. If you used a container to grow the plant, you may need to move it outdoors. Read about your plant to know when to plant it outside. Some flowers and herbs stay small and can be kept indoors. You can trim them to keep them the right size.

Once you've seen the life cycle of a plant, you will probably want to grow more. Plants are great to have around. They provide fresh air, food, and some can even be used in medicines. If you take good care of plants while they grow, they will take care of you.

LESSON EIGHT

IMPORTANCE OF PLANTS

grade 3

LESSON EIGHT

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning what types of plants are in our everyday lives

Preparation

- Print and send home Healthy Lunches Note before lesson

Print/Copy:
- How Many Plants Are In My Lunch? (one per student)
- Providers Of Life Reading (one per student)
- Plants In My Life (one per student)

Lesson Part A

- Explore plants in their own lives by working with their lunches!
- Have students get their lunch bags out (a Note has been provided at the beginning of the unit to send home for this lesson).
- Explore the plants they find in their lunch box.
- Remind students what classifies as a plant (vegetables, fruit, etc.).
- Draw images of the plants on the How Many Plants Are In My Lunch? page and record the names.
- Once completed, have students get together with a partner to compare the different plants found in their lunches.

Lesson Part B

- Now that students have explored the plants in their own lives, read about the importance of plants.
- A reading, Providers Of Life, has been provided.
- Give each student a copy and allow them to read in partners, if possible.
- Once students are done with the reading, complete the flower petal activity called Plants In My Life.
- On each petal of the flower, record places in their lives they find plants (example: their homes/yards, their meals, the grocery stores, etc.).
- Once they have written their answers on the petals, cut them out and glue onto a piece of construction paper to create an interactive petal bulletin board.

Assessment

NOTES

STUDENT LUNCHES

Dear Parents and Caregivers,

This week in our science unit on plants we will be looking at our daily lunches. We will be exploring what plants and plant products make up the parts in our lunches.

During this investigation students may come home asking about the ingredients of the food that was in their lunch. Or they may share about the conversations they had about food. Naturally this discussion my look at similarities and differences between what is packed in others lunch boxes. While we will explore the differences between raw plants (apples, carrots) with processed plant products (bread, corn syrup) please know that the intent of this lesson is not to value one food over the other. The purpose of these discussions is to look at the role plants play in sustaining our daily lives.

If you have any questions or would like further information please contact me.

Your child's teacher,

HOW MANY PLANTS ARE IN MY LUNCH?

Plants in my lunch

PROVIDERS OF LIFE

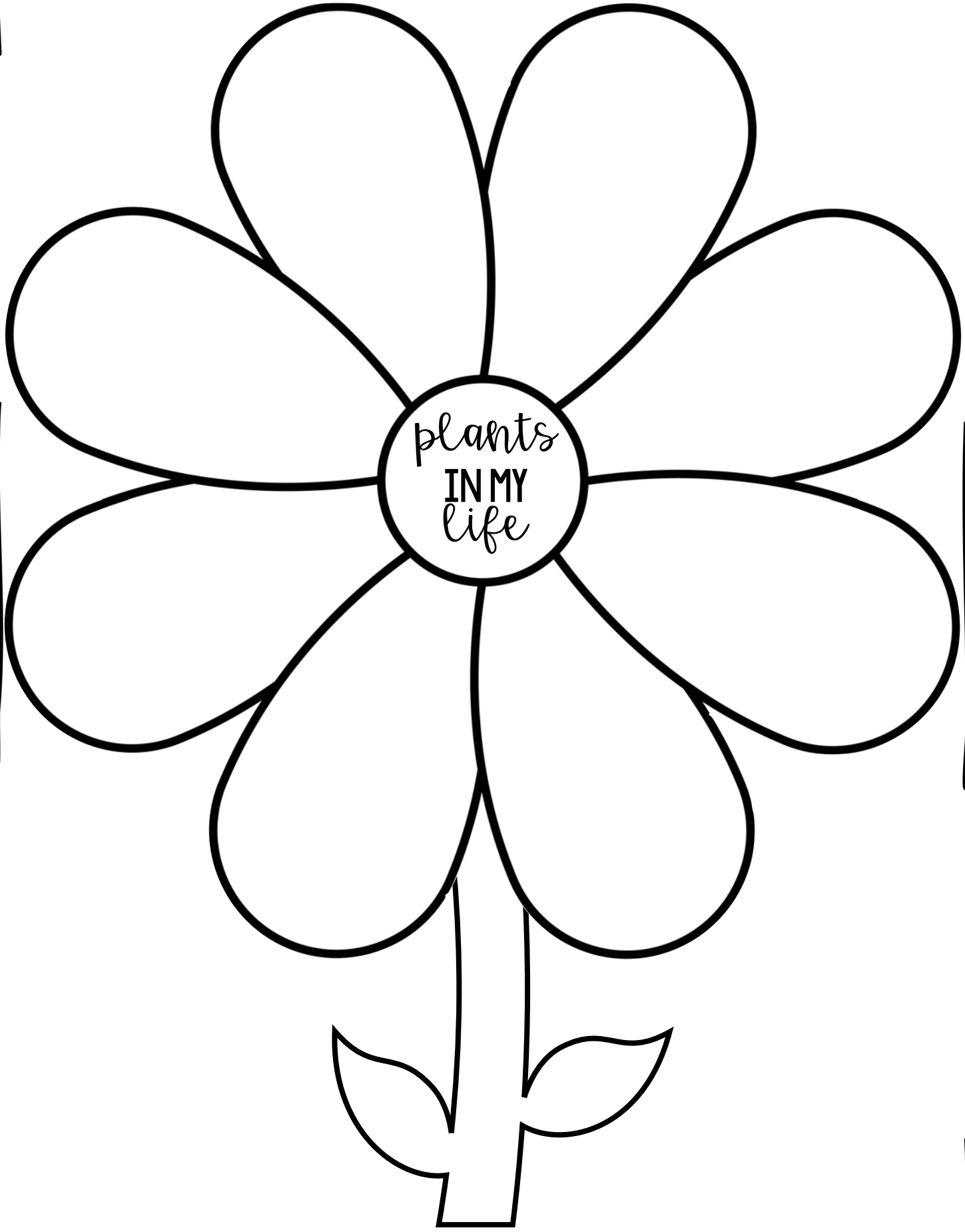
Do you know that plants are the main reason we can survive on Earth? It's true! Plants and trees on our planet are very important to all life. Plants provide air for humans and animals to breathe. That is a big job, but they do much more than that. We cannot live without plants and trees.

Besides air, plants give us food. Fruits and vegetables are good for our health. Both of these types of food come from plants. Without fruits and vegetables, we would not be healthy. Animals also rely on plants for food. Many species eat leaves, berries, and fruits from plants. Humans eat animals sometimes, too. So, without plants, we would have no food.

Plants also provide habitats. Trees and plants around the globe are homes for animals and insects. Plus, humans build houses from wood which comes from trees. Throughout history, other parts of plants have been used in building and crafting, too.

Another benefit of plants is that many medicines are made from them. These medicines are used to help sick people and animals. Plants even help to make the whole planet healthier. They help combat air pollution on Earth. When we cut down forests, it causes more pollution. Plants and trees are also needed to keep soil healthy. That way, we can grow good food.

It is so important for us to protect the plants and trees in the world. They give us everything we need to live. So, we need to give them our love and care, too. Without plants, the world would not be such a wonderful place that's so full of life.



Plants IN our lives

LESSON NINE

HUMAN IMPACTS ON PLANTS

grade 3

LESSON NINE

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how we as humans impact plants negatively.

Preparation

- Copy of the book ***The Lorax*** - or a Reading found on the Internet

Print/Copy:
- How Do Humans Affect Plants Reading (one per student)
- How Do Humans Affect Plants And How Can We Change Activity Page (one per student)

Lesson Part A

- To being the lesson, write the following question on the board: *How do humans affect plants?*
- Record answers that students provide.
- Gather students in a common area and read ***The Lorax***.
- Alternatives have been provided in the notes section.
- After reading, discuss with students the importance of trees in our world.
- Create a chart paper with student ideas.
- This lesson will be continued in lesson ten.

Lesson Part B

- Break students into partner groups.
- Together, read the provided reading How Do Humans Affect Plants Reading.
- Once they have finished reading the text, with partners to fill out the page How Do Humans Affect Plants And How Can We Change Activity Page
- List some of the ways humans affect plants described in the reading and how we can change that.
- If time permits, share student answers with another partner group.

Assessment

NOTES

Alternative texts: ***The Great Kapok Tree*** by Lynne Cherry, ***Maple*** by Lori Nicholas, ***Out of the Woods*** by Rebecca Bond.

HOW DO HUMANS AFFECT PLANTS?

Plants are very important to life on this planet. People need plants to survive. You may know that people eat many plants. They also eat vegetables and fruit that come from plants. However, there is an even more important reason we need plants.

Humans need oxygen to breathe. Most animals need oxygen, too. Where does oxygen come from? Plants! We could not breathe without plants, so we couldn't survive without them.

It's good that when we breathe, we also help plants. We breathe in the oxygen they make. Then, we breathe out carbon dioxide. Plants need carbon dioxide to make their own food. When they make their own food, they produce oxygen. It is a helpful cycle.

Sadly, people have had a negative impact on plants, too. Many plants are used for food and not replaced. Big plants like trees are cut down to build things. There are a lot fewer plants than there used to be. We need to plant seeds to make up for the ones we use or cut down.

Humans have also changed nature in other ways. We have put so many chemicals in the air. We have also put so much trash in the world. This has caused the climate to change. Since it is getting warmer on our planet, plants can't live like before. They aren't growing as well as before, and neither are animals. If we don't protect plants and animals, humans won't grow as well either.

We need plants in order to breathe and live. That's why we have to take good care of the plants on Earth.

HOW DO HUMANS AFFECT PLANTS?

and how can we change?

a way humans affect plants	what humans can do to change this

LESSON TEN

PHOTOSYNTHESIS

grade 3

LESSON TEN

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how plants eat through photosynthesis.

Preparation

- Have ***The Lorax*** available for students

Print/Copy:
- Photosynthesis Reading (one per class)
- Photosynthesis Questions (one per student)
- Protect Our Trees Poster Page (one per student)

Lesson Part A

- As a class, read the provided reading, Photosynthesis.
- It is important to read this as a group as it can be a hard concept for some students to understand.
- Encourage students to annotate the text as you read it together.
- After you have completed the reading, have students break into groups to work on the questions on the Photosynthesis Questions page.
- Once students have completed this, as a group ensure students have an understanding. An Answer Key has been provided.

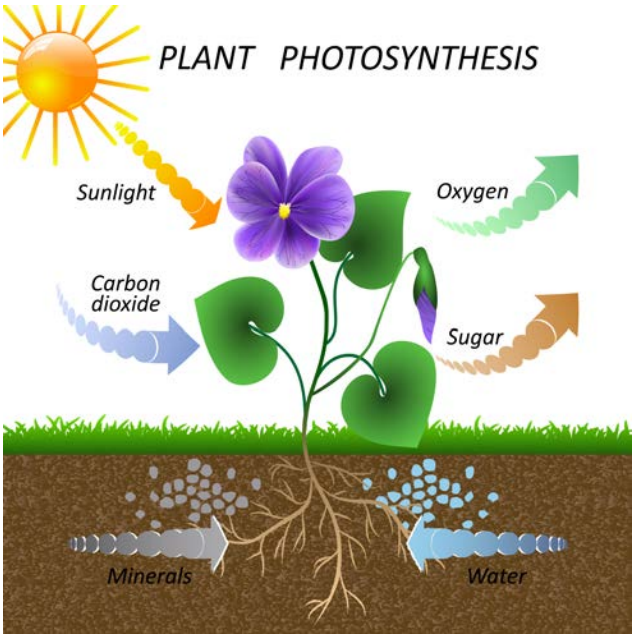
Lesson Part B

- Any students that need some extra time on the photosynthesis pages can continue.
- Students who are done will begin their Tree Posters.
- Remind students of the book you read last lesson, ***The Lorax***.
- Discuss the main idea of the text (saving trees).
- Explain to students they will create posters that promote the protection of trees.
- The posters will have a wide range of messages, images, and facts (let students take their creativity where they want to)!

Assessment

NOTES

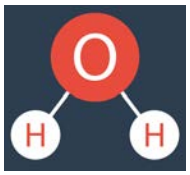
PHOTOSYNTHESIS how plants eat

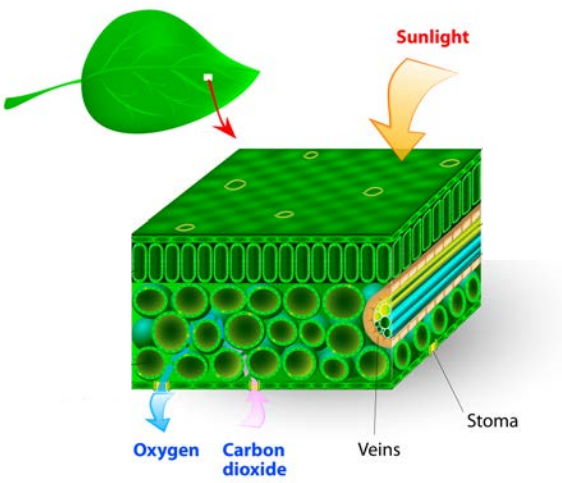


Light from the sun gives energy to the plant. This light energy is the plant's food. The plant also needs air. In the air, there is some carbon dioxide. The plant breathes in the carbon dioxide. The plant combines sunlight with carbon dioxide to convert the energy from the sunlight into food so it can grow. Plants also need water. When a plant has sunlight, carbon dioxide, and water it can make food for itself. When a plant changes sunlight, carbon dioxide, and water into food this is called *photosynthesis*.

How does photosynthesis work?

Carbon dioxide passes through tiny holes in the leaf. These holes are called stomata. Water, made of hydrogen and oxygen, is absorbed from the soil. Then, it is sent through the stem as it goes to the leaves. Inside the leaves is chlorophyll. Chlorophyll is green stuff inside the plant. It helps to grab the sunlight. Photosynthesis happens in the leaves. The energy stored in chlorophyll helps to split the water molecules apart. Since the plant does not need the oxygen, it is released back into the air. The leftover hydrogen and carbon dioxide combine into sugar. This sugar is what the plant feeds on. The sugar is then used all over the plant as it grows.





PHOTOSYNTHESIS QUESTIONS

1) Name the three things that a plant needs in order to make its food.
   - _____
   - _____
   - _____

2) What is chlorophyll?

_____
_____
_____

3) Explain how the sun helps a plant grow.

_____
_____
_____

4) How does a plant use carbon dioxide?

_____
_____
_____

5) Explain the process of photosynthesis.

_____
_____
_____
_____
_____

Answer Key

PHOTOSYNTHESIS QUESTIONS

1) Name the three things that a plant needs in order to make its food.
   - light
   - carbon dioxide
   - water

2) What is chlorophyll?
Chlorophyll is green stuff inside the plant. It helps to grab the sunlight.

3) Explain how the sun helps a plant grow.
Sunlight combines with carbon dioxide to convert the energy from the sunlight into food so it can grow.

4) How does a plant use carbon dioxide?
The plant breathes in the carbon dioxide. The leftover hydrogen and carbon dioxide from the air combine into sugar. This sugar is what the plant feeds on. The sugar is then used all over the plant as it grows.

5) Explain the process of photosynthesis.
The plant takes in carbon dioxide, sunlight, and water. It splits the water into hydrogen and releases the leftover oxygen. The hydrogen combines with the carbon dioxide to make sugar. The plant feeds on the sugar.

PROTECT OUR TREES!

LESSON ELEVEN

PLANTS AND ANIMALS

grade 3

LESSON ELEVEN

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are investigating the ways the animals depend on plants

Preparation

- String for lanyard photo cards
- Area for a game of tag

Print/Copy:
- Plants And Animals Reading (one per student)
- Print enough Animal/Plant cards for each student to have one picture (there will be doubles of plants)

Lesson Part A

- Break students into partner groups.
- Give each student a copy of the provided reading Plants And Animals - A Special Relationship.
- Have students read the article with their partner.
- Tell them it is very important to read closely because the information provided will help them in the game you will play next.

Lesson Part B

- Students will play an outdoor game similar to tag.
- Assign each student an animal OR a plant (Cards have been provided - create lanyards with string for students to wear).

Rules:

1. Students that are animals will hunt for their food (a plant).
2. Students that are plants do not want to be tagged by their animal eater.
3. When a student that is an animal tags their plant food, the plant food student becomes the animal and begins a hunt together for more food.
4. The game ends when all plants have been captured by the animals.

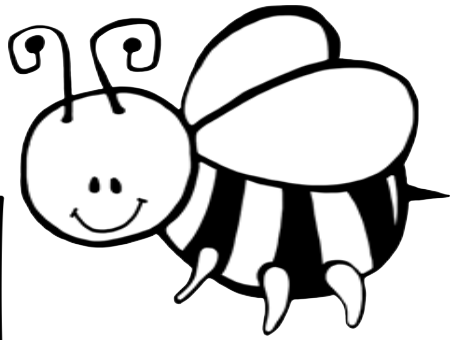
Assessment

At the end of the tag game, have students stand with the food (people) they caught and have a discussion with students.

NOTES

PLANTS AND ANIMALS

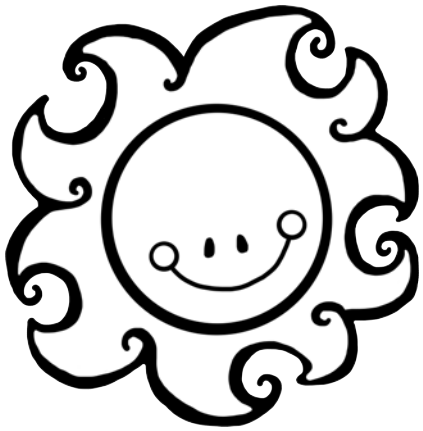
a special relationship



Animals and plants may seem different. Plants start their lives underground. Animals are born on land. But plants and animals need each other in lots of ways. In fact, they need each other to survive.

The relationship between plants and animals is *symbiotic*. This means they depend on each other, even though they are different. The relationship between plants and animals is clear in many ways. In others, it is almost hidden.

One way plants and animals need each other is with pollination. Many flowers need bees and hummingbirds to reproduce. These animals are called pollinators. The bees and hummingbirds then use the nectar from the flowers for food. In this case, plants and animals need each other equally. The flowers need the animals for pollination. The animals need the nectar for food.



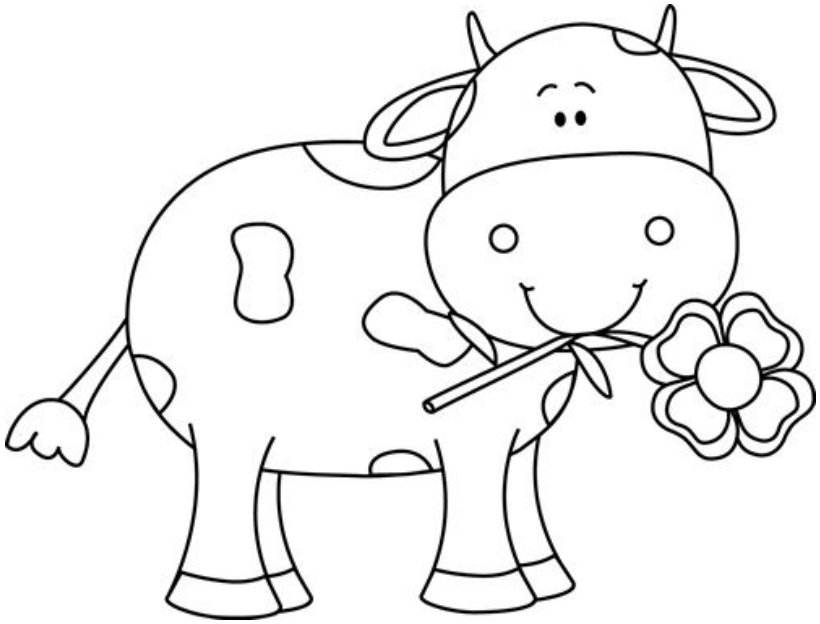
PLANTS AND ANIMALS

a special relationship

Flowers help other animals too. Flowers are a food source for deer, turtles, lizards, and more. These animals help the plant world too, but not until they die. When they decompose, they feed the soil with nutrients. These nutrients help new plants grow. That means many animals keep the plant world healthy.

Animals also need plants to give them homes. Birds use trees for nests. Leafy plants give insects a place to hide. Sloths spend their entire lives in forest treetops. Plants give many animals safe homes.

Plants also benefit our whole ecosystem. They make oxygen for animals and people to breathe. This means there would be no animal or human life without plants! That's why it is important to understand the relationship between plants, animals, and our whole world.



ANIMAL CARDS

antelope

beaver

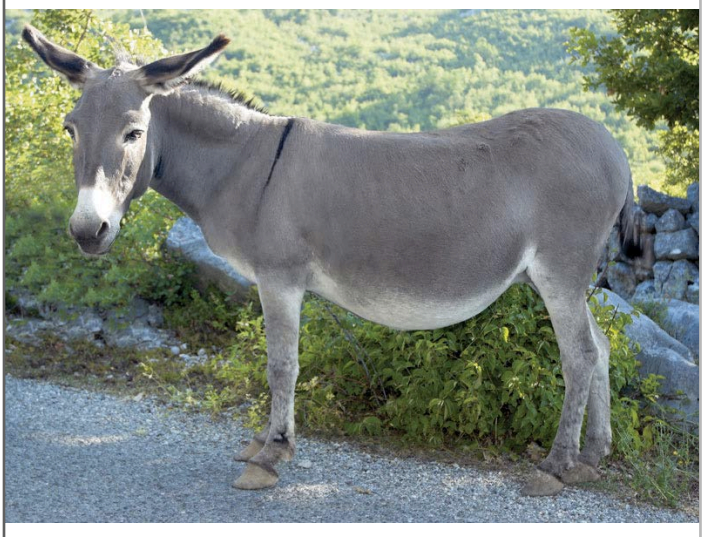
bison

camel

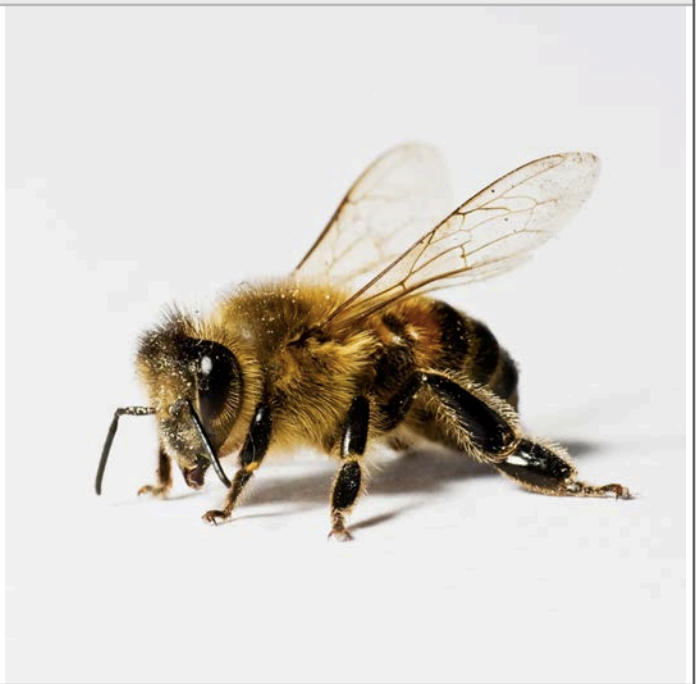
ANIMAL CARDS

cow

deer



donkey



bee

ANIMAL CARDS

	
giraffe	rabbit
	
horse	squirrel

ANIMAL CARDS

ant

caterpillar

goose

hummingbird

PLANT CARDS

print multiple copies

grass / leaves

trees / wood

nectar

seeds

LESSON TWELVE

INQUIRY PROJECT

grade 3

LESSON TWELVE

The format for these lessons is structured into two parts. One part is designed as a teacher directed lesson. The second part of the lesson is designed as an independent or small group learning activity. The teacher directed is noted in **PINK** and the small group/independent task is YELLOW

Learning Goal

We are learning how plants are important to humans and other living things.

Preparation

- Prepare Inquiry Booklets with students. This can be done in one of two ways.
  - Print out the pages double-sided on an 8.5 x 11 piece of paper and bind papers together in a booklet with the staples up the left side. **- OR -**
  - Using the settings of your printer, select only the pages of the inquiry booklet from the PDF to print. In the print dialogue box, select the option to print as a double-sided booklet.

Lesson Part A

- Depending on your students comfort with independent inquiry, you may choose to do either a modelled or guided inquiry.
- Go over the assignment details given on the Inquiry Project Sheet provided.
- Explain to students they will be choosing 2-3 stakeholders and 1 issue to research.
- Students will then explore the Topics they have chosen and how they relate/affect the stakeholder.
- Inquiry Booklets have been provided for student research.

Lesson Part B

Students:

- Choose 2-3 stakeholders from the choice board.
- Choose 1 issue from the Choice Board.
- Record what you wonder about your topic and what you already know.
- Begin researching on your topic (one reading per topic has been provided as a starting point if needed). Choose from:
  - Plants and Nursery Owners
  - Plants and Gardeners
  - Plants and School Aged Children
  - Plants and Vegetarians
  - Plants and Plant-Eating Animals
  - Plants and Home Builders

Assessment

An Assessment Rubric has been provided and should be given to all students.
Students will choose their delivery of their research and will be assessed based on the rubric criteria.

NOTES

- If your students are unfamiliar with the inquiry approach, FAQ's have been provided to help assist with introducing this project.
- Students will have two weeks to complete their inquiry project.
- If presenting, this will take an additional week. A Presentation Choice Board has been provided.

STUDENT INQUIRY PROJECT

The purpose of student inquiry is to allow students to explore concepts of flight that interests them, to learn more, to solve problems, look at an issue from different perspectives, and develop solutions.

There are many ways this can be done. Students will explore a specific stakeholder related to plants in our world. Encourage students to work beyond these topics for inquiry if they're ready and capable. Avoid placing limits on reasonable topics, providing narrow selection of topics, or discouraging student creativity. Instead encourage and support students in choosing topics that are interesting, relevant, and timely for them.

The steps of inquiry that students can follow include:

- choose one of the stakeholders listed
- choose a presentation option
- ask questions
- read the research pages and grow background knowledge
- apply learning
- evaluate learning and draw conclusions
- share their learning

An inquiry booklet has been included that that will help to scaffold student inquiry. As the teacher, it is important that you conference with students to ensure that they are moving through their inquiry journey appropriately. At times, you may need to stop a group of students for a guided inquiry lesson on topics such as brainstorming, how to research, and how to synthesize information. Lessons during your other areas of instruction, such as during your language arts time, will help to support students in understanding how to do many of these things successfully. A cross-curricular approach is very helpful when conducting inquiry projects.

By the end of the student inquiry research, students will share what they have learned. Teachers should again avoid restricting their students' creativity by planning how students will present this information.

FAQ

Question	Answer
What if my students are below grade level and struggle with research?	Research has been provided for this project on the following pages. Students that are below grade level may need to work with a partner or with the teacher for assistance.
Can I help my students with the project?	Yes! Teachers are encouraged to assist their students along the way. This might look like stopping for mini lessons on researching, taking notes, and synthesizing. This is a new learning experience for students.
How long will this project take students?	The research and creation should take approximately two weeks. Depending on the form students decide to present their information, you may need an extra week for presentations.
Can my students do a topic not listed?	Yes! This is encouraged. If students find a topic that relates they can get it approved by the teacher before they begin.
Do I need to do a pre-lesson before students start their research?	This depends on your students. If you have not taught researching, making notes, or finding sources, you might want to do a mini lesson on this before they begin. Remember to check in consistently with students to ensure they are on the right track.

INQUIRY PROJECT CHOICE BOARD

topics

Plants & Home Builders	Plants & Gardeners	Plants & Nursery Owners
Plants & Vegetarians	Plants & School-Aged Children	Plants & Plant eating animals

INQUIRY PROJECT CHOICE BOARD

presentation options

Poster Board	Slideshow	Picture Book
Comic	Lap Book	Oral Presentation
Model / Shoebox Diorama	Game Board	Poem

THE FOLLOWING PAGES ARE RESEARCH PAGES FOR STUDENTS TO REFERENCE

PLANTS AND NURSERY OWNERS

Most people think of babies when they hear the word *nursery*. But did you know there are nurseries for other things too? In fact, there are special nurseries that don't take care of people at all. They take care of plants!

Plant nurseries don't take care of people, but they do care for the young. **Plant nurseries** are special places where all kinds of young plants grow up. Nursery owners are in charge of making sure the plants have a good start.

Nursery owners care for young plants for different reasons. Some grow plants for people to buy. Others grow plants for farmers. Some grow trees and shrubs to go outside of homes and in parks.

Plant nurseries allow many new plants to grow at once. It is up to nursery owners to understand how to start the plants. They also need to know how to keep them healthy. They must also know how to move the plants. That way they can grow well in another spot. Then, they start the process all over.

First, nursery owners must decide what type of plants they want to grow. Based on that, they have to pick the best environment. Some nursery owners start plants in fields. Others plant seeds in containers. Some use greenhouses. A **greenhouse** is a glass building where plants can grow. Greenhouses warm up under the sun to keep the soil and plants warm. That means plants can grow even if it is too cold for them outside.

Nursery owners must make sure the nursery area is not close to pollution. Nurseries should not be next to places that give off smoke. They should not be next to places like factories. They also should not be next to dirt roads. The dust can settle on the plants. This keeps them from growing as well as they could. Nurseries should also be in places that get lots of sun.

PLANTS AND NURSERY OWNERS

Certain nurseries need different materials. For example, open fields may need fences to keep animals out. Even though greenhouses keep plants warm in the day, they can get cool at night. Because of this, heaters are often used in greenhouses. Nursery owners also need ways to water the plants. Nurseries should be located near a source of good water. Polluted water or water with too much salt is not good for plants.

Once the planting area is ready, nursery owners **sow seeds**. That means putting seeds into the soil. Before they do, nursery owners have to take a good look at the seeds. They have to make sure each one is healthy without any defects. Then they have to be careful about where they plant the seeds. Many nursery owners plant seeds in straight lines. Then they space out the seeds so each has the same amount of room to develop. That way, the seeds will grow into plants that are **uniform** or mostly the same. This is important for nurseries that sell plants to others. They want to be sure each plant is the same size and condition.

Once the seeds are in the ground, nursery owners have more to do. They have to make sure they grow into healthy plants. One way is by applying manure or fertilizer. **Manure** is waste from animals. **Fertilizer** is a natural or chemical substance that helps plants grow. Both manure and fertilizers make the soil better. They feed it with nutrients plants need to grow strong. Nursery owners must know the best kind of manure or fertilizer for certain plants. They also need to know the best time to use it. Some plants need it in the soil before seeds are sown. Others need it right after seeds go into the dirt.

PLANTS AND NURSERY OWNERS

Nursery owners must be careful in how they care for plants. They have to keep new plants safe from harsh weather. Some use shade nets to protect new plants from too much sun. **Shade nets** are large pieces of light fabric that can stretch over a section of land. This makes a shady area. It keeps plants from getting too much direct heat.

Nursery owners also need to make sure there are no weeds in the planting area. **Weeds** are unwanted plants. Weeds should be removed because they compete with the good plants. Nursery owners want the sun, water, and air to go to the plants they are growing, not to weeds.

Nursery owners watch the plants until they are ready to be moved. Many nursery owners move them into their own containers. For large plants like trees, they dig up the plant with a big part of the roots. Then they put a bag over the roots. This keeps them safe until the tree is replanted. Then nursery owners prepare to sell the plants or take them to their next spot for growth.

Lots of people buy plants from nurseries to put in their own home gardens. They buy flowers, vegetables, fruit trees, and shrubs from nurseries. They know the plants received good care from seed to young plant. That's why nurseries are so important. They must give new plants the very best care. That way plants can continue to grow strong in other places.

PLANTS AND GARDENERS

Plants are important. They feed people and animals on Earth. They provide clean air to breathe. Some are even used to make medicine. Many plants grow naturally. Others are planted by humans. But who tends to these plants? Who cares for them? That's a job for gardeners!

Gardeners are experts in helping plants grow. It is their job to know what plants need in order to survive. Gardeners need to know how to care for single plants and large groups of plants. They must also know signs of unhealthy plants to help them come back to life.

Some gardeners are paid to take care of plants. They go to special schools and train to work in parks, large public gardens, or nurseries. **Nurseries** are special places where many young plants sprout and begin to grow. But lots of other people are gardeners too. Some are children all the way up to adults. They take care of small gardens from their porches, yards, or window sills. If you want, you could be a gardener, too. Maybe you already are!

All plants are different. Some are tough and can grow anywhere. Others need just the right soil and temperature to bloom. It's the job of a gardener to know the areas where plants will do their best. This has to do with **climate**, or the weather patterns in a certain area. Many plants will not grow in dry areas that get little rain. There are other plants that won't do well if they get too much rain or cold air. Because of this, gardeners must know which plants will do well in certain climates.

PLANTS AND GARDENERS

Gardeners also need to know what plants need in order to grow strong. Plants are a lot like people. They each have different needs. Some plants like hot, sunny areas. Others like shady, cooler conditions. If a plant that loves the sun is put in a shady spot, it won't grow in the way it's meant to. The same will happen if a plant that likes the shade is put in a very sunny area. This means gardeners have to do a lot of research on the plants they want to grow. If they are working within a shady spot, they should look for plants that will do well with less sunlight. These plants are called **sciophytes**. Moss, evergreens, potatoes, and lettuces are a few plants that do well in shade. The opposite is true for sunny areas. Gardeners should avoid shade-loving plants. Instead, they should find **heliophytes**, or plants that grow well in full sun. Marigolds, tomatoes, and peppers are some popular sun-loving plants.

Gardeners have to know how to care for groups of plants, not just single plants. Some plants do just fine in a group. In fact, some plants do better if they are with others. These are called **companion plants**. For example, sunflowers and squash are companion plants. Many believe planting them together makes each of them bigger. However, some plants do not get along with others. For example, grapes do not grow well if they are near cabbages or radishes. The herb fennel is a plant that should be totally left alone. It does not grow well if it is around anything else. It's the job of a gardener to know how groups of plants work together. That way the entire garden can thrive.

Knowing signs of unhealthy plants is another part of the job. Gardeners have to carefully look at each plant in a garden. If a plant changes, gardeners need to investigate why. Plants with falling leaves, spots, wilting blossoms, or holes are signs of sickness. Many factors can cause plants to become unhealthy. Pollution, insects, or changes in soil can cause problems. Gardeners work a lot like doctors to treat the plants. First, they have to figure out the cause of the problem. Then, they find solutions to bring the plants back to good health. This could be moving the plant, adjusting its food or water, or trimming it back.

PLANTS AND GARDENERS

Gardeners also need to know what plants need in order to grow strong. Plants are a lot like people. They each have different needs. Some plants like hot, sunny areas. Others like shady, cooler conditions. If a plant that loves the sun is put in a shady spot, it won't grow in the way it's meant to. The same will happen if a plant that likes the shade is put in a very sunny area. This means gardeners have to do a lot of research on the plants they want to grow. If they are working within a shady spot, they should look for plants that will do well with less sunlight. These plants are called **sciophytes**. Moss, evergreens, potatoes, and lettuces are a few plants that do well in shade. The opposite is true for sunny areas. Gardeners should avoid shade-loving plants. Instead, they should find **heliophytes**, or plants that grow well in full sun. Marigolds, tomatoes, and peppers are some popular sun-loving plants.

Gardeners have to know how to care for groups of plants, not just single plants. Some plants do just fine in a group. In fact, some plants do better if they are with others. These are called **companion plants**. For example, sunflowers and squash are companion plants. Many believe planting them together makes each of them bigger. However, some plants do not get along with others. For example, grapes do not grow well if they are near cabbages or radishes. The herb fennel is a plant that should be totally left alone. It does not grow well if it is around anything else. It's the job of a gardener to know how groups of plants work together. That way the entire garden can thrive.

PLANTS AND GARDENERS

Knowing signs of unhealthy plants is another part of the job. Gardeners have to carefully look at each plant in a garden. If a plant changes, gardeners need to investigate why. Plants with falling leaves, spots, wilting blossoms, or holes are signs of sickness. Many factors can cause plants to become unhealthy. Pollution, insects, or changes in soil can cause problems. Gardeners work a lot like doctors to treat the plants. First, they have to figure out the cause of the problem. Then, they find solutions to bring the plants back to good health. This could be moving the plant, adjusting its food or water, or trimming it back.

Gardeners take care of gardens. But gardens take care of gardeners, too. Research shows that keeping a garden is good for a person's health. Gardening helps reduce stress and is also a good form of exercise. People who grow vegetables and fruits also feel good about providing healthy food to themselves and others. Many people also find gardening a lot of fun. They like learning about plants and the science of how they grow.

Gardeners have a lot of work to do. But it is important work. Gardeners help bring more beauty, food, and clean air to everyone on Earth. No matter the size, all gardens need people to keep them strong and healthy. Thank goodness for gardeners!

PLANTS AND SCHOOL-AGED CHILDREN

When people think of growing plants, they may think of older people. However, gardening is a wonderful hobby for people of all ages. That includes kids! In fact, children learn a lot when they care for plants. They learn about science. They develop life-long skills. They even help the environment. Here's how.

Spending time with plants is a great way to learn about science. Of course, gardening helps kids learn a lot about **botany**, the study of plants. But they can learn about other kind of science too. Gardeners learn about **meteorology**. This is the study of the weather. This is important because plants should not get too much rain. They also should not get too dry from **droughts**, or long periods without rain. Kid gardeners also learn a lot about **biology**, the study of living things. Lots of plants attract animals and insects that kids can observe. Growing plants also teaches kids about **nutrition**, the study of nutrients in food. When food is grown in a garden, kids can learn about the benefits of fruits and vegetables on the body. There is a lot of science that can be learned by growing plants!

Plants are also a great way for kids to learn life skills. For example, growing plants takes responsibility. There are many tasks to do each day for plants to grow strong. Many plants need water every day. Some need to be fed with special food. They may also need to be weeded. There is a lot to do to care for a plant. It takes responsibility to complete these tasks. Otherwise, the plant will not grow as well as it could.

Growing plants is also a way to develop a good attitude towards hard work. When kids see their plants bloom and grow, it feels good. Kids may then want to care for more plants! Plus, growing plants is a great way to see how hard work can pay off.

Growing plants is also a great way for kids to help the environment. Plants help the Earth in many ways. First, they make soil healthy. This is important because plants need soil. Soil is needed to grow everything, from flowers to the food.

PLANTS AND SCHOOL-AGED CHILDREN

When plants grow, they feed the soil. They also soak up water so the soil does not become swampy. Then when plants die, their dead parts go back into the soil and feed it. That helps more plants to grow. More plants means cleaner air.

Plants clean the air that humans and animals need. They do this through **photosynthesis**. In this process, green plants use water and carbon dioxide to make their own food. Then the plants release fresh oxygen into the air. In this way, plants create the air we need to survive. Plants also remove chemicals and bacteria that may be in the air. This makes a cleaner, healthier environment for all.

Growing plants is also a way for kids to reduce their carbon footprint. A **carbon footprint** is the amount of carbon dioxide that goes into the air from a person's energy needs. Many cars give off lots of carbon dioxide. Too much carbon dioxide is not good for people or the environment. That's why it is important that people try to lessen their carbon footprint. One way is by growing food. When people grow their own vegetables and fruits, they don't need to go to the grocery store as much. This means they put less bad carbon dioxide into the air from cars.

Another benefit of growing plants is that it is soothing. Kids often feel stress from school, friends, or just being overwhelmed. But spending time growing plants is a great way to help. Scientists have found that spending time in nature makes kids feel happier. It also helps them feel more relaxed. Growing plants is a great way to keep stress low and happiness high!

Are you ready to start growing plants? There is a lot you can do now! Spend time outside. Pull weeds, dig for worms, and water the plants you have now. You can visit gardens for ideas of plants you can grow at home. Think about fruits or vegetables you like to eat that you could plant. Then make a plan with your family. Decide on one or two plants you can take care of yourself. Then GROW from there! You'll get to see the fun of growing your own plants up close!

PLANTS AND VEGETARIANS

Plants are very important to life on this planet. Human beings and most animals need plants to live. Plants provide the air we breathe. They provide wood for houses. They even provide medicine to help people that are sick.

There is also another important need that plants fill. It is just as important as water. Plants can be food. We all need food to live, so we need plants. In fact, some animals only eat plants and nothing else. There are some people that only eat plants, too. These people are called vegetarians.

Being a vegetarian means that you do not eat meat or fish. Instead, you eat food that comes from plants. This food can be vegetables or fruits. Grains, too, come from plants. Vegetarians eat grains. They also eat nuts and beans. All of this food comes from plants, so plants are very important.

Some vegetarians eat eggs and drink milk. Eggs and milk come from animals, not plants. However, you can get eggs and milk without killing animals. Some healthy nutrients come from eggs and milk. They can replace the nutrients that come from meat.

Even so, some people do not eat eggs or drink milk. They do not want to have anything that comes from animals. These vegetarians are called vegans. Most vegans need to take special vitamins. They take these vitamins to get all of the nutrients they need.

But why don't vegans and vegetarians eat meat? There are a number of reasons. Some religions have rules that say people cannot eat meat. The oldest known vegetarians believed in one of these religions. People who don't eat meat because of their religion have certain beliefs.

PLANTS AND VEGETARIANS

For example, many Hindus do not eat meat. They want to live without hurting others. They believe that killing animals hurts them. Other religions say people cannot eat certain types of meat. This may include pork or beef. Pork comes from pigs. In history, pigs did not always eat clean food. People could get sick from eating pork, so some religions said not to do it. In other religions, animals are sacred to people.

There are many vegetarians who are not Hindu. They don't follow a religion that has rules against meat. However, they may believe the same things. They may also think that killing and eating animals isn't right. They want to protect the animals on this planet. This might be why they don't eat meat.

Another reason people don't eat meat is to help the Earth. It takes more land and water to raise animals for food. They need space to live and graze, which means they nibble on grass. All that land and water can be used to grow plants. Plus, the waste from animals raised for food pollutes our planet. The more plants we grow on farms, the more they clean the air. It is also healthier for the world when it can grow naturally.

Other vegetarians do not eat meat so they themselves can be healthier. Eating fruits and vegetables is very healthy to do. They have a lot of nutrients, which are good for the body. Meats have some nutrients, too, such as protein. When a person becomes a vegetarian, they still have to get protein. This means they have to think about what they eat. They have to choose food that has protein. When a person thinks more about what they eat, they are healthier.

Scientists know vegetarians are healthier. Eating a lot of meat can cause illnesses. Vegetarians do not get these illnesses as often as people who eat meat. That's because food from plants is good for us.

PLANTS AND VEGETARIANS

When you eat mostly food from plants, this is called a plant-based diet. More people are eating a plant-based diet every day. They want to be healthier. They may have more than one reason to be vegetarians. But their health is a big reason.

This is why we need to protect plants. We also need to make sure these plants are good to eat. This means we need to keep the soil clean. The air and water need to be clean as well. We have to stop putting bad chemicals in the Earth, air, and water. By keeping our world clean, we will be healthier.

We can also keep animals healthier. Many animals do not eat meat. They eat a plant-based diet just like vegetarians. These animals are called herbivores. Cows and deer are two types of herbivores.

Some people eat beef, which is meat from cows. Some people eat venison, which is meat from deer. That means, their food comes from animals that eat plants. Even people that eat meat need clean plants. They need to help protect nature, too.

If we protect nature, it will give us good food. People who eat plants will have healthy plants to eat. People who eat plants and meat also need the plants to be healthy. This is why it's important to keep plants clean and strong.

PLANTS AND PLANT-EATING ANIMALS

Lots of people like to eat plants. Vegetables and fruits are good for humans. They provide lots of vitamins. They taste good too! But did you know that not only people eat plants? Animals eat them, too. There are even some animals who ONLY eat plants. These animals are called **herbivores**.

Some animals are herbivores because they can't eat meat. Their bodies are not made to handle it. They are unlike animals that only eat meat, **carnivores**.

Carnivores have simple digestive systems. Herbivores do not. Food is much harder for herbivores to process. Because of this, herbivores take a long time to digest their food. The process starts with their teeth.

Herbivores have flat teeth. They are made to grind. Their teeth allow them to eat many parts of a plant. Herbivores don't just eat fruits or leaves. Some eat seeds, roots, bark, and even branches!

After they eat a plant, herbivores process cellulose. **Cellulose** is what makes up a plant's cell walls. It is hard for many animals to digest cellulose. But herbivores have special bacteria in their stomachs. This bacteria helps break down the cellulose.

All herbivores eat plants. However, not all herbivores are the same. There are many kinds. For example:

- Animals that eat fruit are **frugivores**. Many bats are frugivores.
- Animals that eat grass are **grazers**. Horses and sheep are grazing animals.
- Animals that eat leaves are **folivores**. Pandas, giraffes, and caterpillars are folivores.
- Animals that eat wood are **xylophages**. Termites are xylophages. Some think beavers are too. But beavers eat more than wood. They also eat leaves and roots.
- Other herbivores eat lots of different plants. Gorillas are an example. They eat leaves, stems, and fruit.

PLANTS AND PLANT-EATING ANIMALS

Some herbivores must change the plants they eat within a year. They are unlike carnivores. Carnivores only eat the meat they hunt. But herbivores rely on plants for their food. In areas of the world with different seasons, plants change. Some plants can only grow in warm weather. Others can only grow in cold weather. That means different plants are available at different times. Herbivores must get used to eating these changing plants. Deer are an example. They eat twigs and stems in the winter. In the summer, they eat fresh grass, flowers, and vegetables.

There are more herbivores than carnivores in the world. In some ways it is easier to be a herbivore than a meat-eater. One reason is because carnivores eat animals that are always moving. But herbivores don't have to chase their food. Plants grow up from the ground. They don't move from one spot.

Herbivores and plants work in a cycle. This cycle is part of the **predator-prey relationship**. This is when one kind of living thing eats another living thing to survive. When lots of plants are around, the number of herbivores goes up. But with more herbivores around, the number of plants goes down. That is because more animals are eating up the plants. But when the animals eat up most of the plants, their number goes down too. Then the cycle starts over. Lots of plants start to grow once more. That is because there are fewer animals eating them. But then the number of herbivores goes up because there is more food.

Even though herbivores eat plants, they actually make them stronger. When herbivores eat, they **prune**. This means they trim back parts of plants that are overgrown. This helps more sunlight get to the plant. More sunlight helps the plant grow stronger. Without enough sun, some plants could die. Herbivores also make more room for new seeds to grow. When seeds fall from a plant, they have room to take root in the ground.

PLANTS AND PLANT-EATING ANIMALS

Herbivores come in many sizes. The biggest herbivore is the African elephant. It weighs between 2,200 and 6,300 kilograms. This big animal needs lots of food. One elephant can eat 136 kilograms of plants in a day.

There are also tiny herbivores. The smallest is a beetle that is only 0.3 millimetres long. This insect eats mold and fungi. It lives near wet areas where its food grows. These beetles can be found by seaweed, dead logs, and wet leaves.

Herbivores come in many shapes and sizes. Some are large and some are small. Some eat many kinds of plants. Others eat only one. But all herbivores are important. Without them, many plants would become unhealthy. And without plants, most herbivores would not survive. They need each other. And we need them both for a healthy world!

PLANTS AND HOME BUILDERS

People use plants for many things. Food, medicine, and air are just some of the uses for plants. In fact, people could not survive without trees and plants. That's why we have to protect them. It's only fair, because they protect us, too.

How? Well, one way we use plants is to build homes. Since humans have been alive, we have looked to trees and plants for shelter. We have cut down trees to use the wood to build houses.

We have used straw and bamboo for building, too. In the past, people used the plants and trees that were around them. It was easier for them to move wood or plants to where they wanted to build. Now, we can use plants from all over the world to build. We should remember that every time we cut down a tree, we should plant a new one. We could plant more than one, actually, because humans have cut down millions of trees over the years.

Trees are cut down to use the wood from their trunks. That's because wooden houses are pretty common around the world. Wood is strong, so it is a good material for building houses. There are also a lot of different types of wood. This is great because different types of wood do better in different areas of the world.

For many years, we have gotten wood from tree trunks. Forests all over the planet have been cut down to make wood. While the wood was used to make our houses, we have cut down too many trees.

It is important to save forests to keep our planet healthy. Other materials can be used instead of so much wood. Glass, cement, and bricks are often used for building. However, these materials are all pretty heavy. Even when we use glass, cement, and bricks, we usually add in some wood to build our houses. So, wood is still a popular building material.

PLANTS AND HOME BUILDERS

Wood is not just used for the outsides of homes, either. Many people have wooden floors in their houses and wooden cabinets in their kitchens. They also use wood to build tables, chairs, and bookcases. People also use wood in fireplaces to heat their homes. Sometimes wood is even used for doors. There are so many uses for wood, and we use a lot of it. We need to make sure to plant more trees if we cut them down for wood.

Another thing we can do is use more sustainable materials in building. Sustainable materials are ones that can be renewed. Bamboo is a sustainable plant. It is easy to plant and grows quickly. People have recently been using more bamboo to build homes. These strong plants can also be used to make floors and fences. Bamboo is even used in fabric. It is more sustainable than both cotton and wood.

Of course we need strong materials like wood and bamboo for our houses. You might not realize that straw is strong, too. Yes, people have used straw bales for building for many years. Straw bales work well for walls. They can be used instead of wood. However, using straw bales means you will have thicker walls.

This is a good thing, though. Straw bale walls keep a house warm in the winter and cool in the summer. Another good thing about straw bales is that they are made from farm waste. This means that they are recycled plants and earth. Straw bales are very eco-friendly.

The strong materials keep us safe inside and hold up our roofs. There have been lots of different kinds of roofs. Some roof materials are made from plants. Straw can be used in roofs, just like for walls. Usually, the straw is mixed with other things to make them compact.

PLANTS AND HOME BUILDERS

Wood is not just used for the outsides of homes, either. Many people have wooden floors in their houses and wooden cabinets in their kitchens. They also use wood to build tables, chairs, and bookcases. People also use wood in fireplaces to heat their homes. Sometimes wood is even used for doors. There are so many uses for wood, and we use a lot of it. We need to make sure to plant more trees if we cut them down for wood.

Another thing we can do is use more sustainable materials in building. Sustainable materials are ones that can be renewed. Bamboo is a sustainable plant. It is easy to plant and grows quickly. People have recently been using more bamboo to build homes. These strong plants can also be used to make floors and fences. Bamboo is even used in fabric. It is more sustainable than both cotton and wood.

Of course we need strong materials like wood and bamboo for our houses. You might not realize that straw is strong, too. Yes, people have used straw bales for building for many years. Straw bales work well for walls. They can be used instead of wood. However, using straw bales means you will have thicker walls.

This is a good thing, though. Straw bale walls keep a house warm in the winter and cool in the summer. Another good thing about straw bales is that they are made from farm waste. This means that they are recycled plants and earth. Straw bales are very eco-friendly.

The strong materials keep us safe inside and hold up our roofs. There have been lots of different kinds of roofs. Some roof materials are made from plants. Straw can be used in roofs, just like for walls. Usually, the straw is mixed with other things to make them compact.

PLANTS AND HOME BUILDERS

When straw is mixed with clay, you get a material called adobe. When it is mixed with earth, it is called cob. These kinds of roofs can take a long time to build, but they are worth it. They last for a long time, too.

Did you know that some roofs even have moss or grass on them? They are called green roofs and have to be specially built. However, they are great for our planet. Roofs with moss or grass create more fresh air.

Roofs aren't the only parts of buildings that can have live plants. Treehouses have been around for many years. They are usually built on or around live trees. In recent years, there has been more building around live plants and trees. Some of these structures are not houses, but bigger buildings like museums.

When everyone works to be more eco-friendly, the planet is happier and healthier. Humans need to protect plants and trees. After all, we have a lot of thanks to give to plants. Our lives wouldn't be the same without them. In fact, we wouldn't even have lives. Thank you, plants!

INQUIRY PROJECT

***

MY INQUIRY PROJECT

NAME:

_____

My Topic

BRAINSTORMING

1

WHAT I WONDER ABOUT MY TOPIC

Record some questions you can ask about your topic. What questions will your research answer?

2

WHAT DO I KNOW ABOUT MY TOPIC

What background knowledge do you already know about your topic?

BRAINSTORMING

3

TIME TO RESEARCH

Using your questions to help guide your research, begin to learn more about your topic. Record your jot notes and organize what you find into separate categories.

BRAINSTORMING

3

TIME TO RESEARCH

Using your questions to help guide your research, begin to learn more about your topic. Record your jot notes and organize what you find into separate categories.

BRAINSTORMING

4

SUMMARIZE YOUR FINDINGS

Write a paragraph for each of your subtopics in your own words.

BRAINSTORMING

4

SUMMARIZE YOUR FINDINGS

Write a paragraph for each of your subtopics in your own words.

BRAINSTORMING

5

MAKE A PLAN

How will you share what you learned with others in a creative way?

- ☐ poster
- ☐ video
- ☐ pamphlet
- ☐ museum exhibit
- ☐ podcast
- ☐ speech
- ☐ song
- ☐ model

6

SOURCES

RECORD THE SOURCES YOU USED FOR YOUR RESEARCH BELOW

ASSESSMENT PAGES

STUDENT INQUIRY PROJECT
assessment

CRITERIA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Knowledge and Understanding:	Student has a limited understanding of key concepts learned and with significant support.	Student has a basic understanding of key concepts learned and uses them appropriately some of the time.	Student has a solid understanding of key concepts learned and uses them appropriately most of the time.	Student has a deep understanding of key concepts learned and uses them appropriately all of the time.
Thinking: • research skills • analyze and synthesize information • make connections and inferences	Student requires a high degree of support to research and struggles to analyze and synthesize what they read to answer inquiry questions.	Student demonstrates basic research skills and with some support can analyze and then synthesize what they read to answer questions.	Student demonstrates good research skills by analyzing and synthesizing what they read to answer inquiry questions.	Student demonstrates excellent research skills by analyzing and synthesizing what they read to answer inquiry questions.
Communication: • appropriate terminology/vocabulary • communicate and collaborate with others	Student rarely uses subject specific vocabulary correctly. Student rarely communicates and collaborates with others to share ideas and insights.	Student uses a few subject specific vocabulary correctly. Student communicates and collaborates some of the time with others to share ideas and insights.	Student uses some subject specific vocabulary correctly. Student communicates and collaborate effectively with others to share ideas and insights.	Students uses most subject specific vocabulary correctly. Student communicates and collaborates effectively with others to share ideas and insights.
Application: • make connections between research and real life	Student struggles to use the information from their research to identify a problem and possible solutions.	Student partially uses the information from their research to identify a problem and possible solutions.	Student sufficiently uses the information from their research to identify a problem and possible solutions.	Student comprehensively uses the information from their research to identify a problem and possible solutions.

STUDENT INQUIRY PROJECT
assessment

CRITERIA	Notes
Knowledge and Understanding:	
Thinking: • research skills • analyze and synthesize information • make connections and inferences	
Communication: • appropriate terminology/ vocabulary • communicate and collaborate with others	
Application: • make connections between research and real life	
CRITERIA	