

Colwood Elementary Garden Curriculum

“Nature does not hurry, yet everything is accomplished.”

- *Lao Tzu*

Garden Sign Up

March				
Monday	Tuesday	Wednesday	Thursday	Friday
		6 Mills 1:30-2:30	7	8 Hitchen 1:30-2:30
11	12	13 Mills 1:30-2:30	14	15 Hitchen 1:30-2:30
April				
Monday	Tuesday	Wednesday	Thursday	Friday
		3 Sahota 8:40-9:20 Mills 1:30-2:30	4	5 Hitchen 1:30-2:30
8 Sahota 1:00-1:45 Martin & Mills 1:30-2:30	9 Sahota 8:40-9:20 Martin 1:30-2:30	10 Sahota 8:40-9:20 Mills 1:30-2:30	11	12 Hitchen 1:30-2:30
15 Martin & Mills 1:30-2:30	16 Martin 1:30-2:30	17 Sahota 8:40-9:20 Mills 1:30-2:30	18 Sahota 10:45-11:35	19
22 Ramsbottom 12:45-1:30 Martin & Mills 1:30-2:30	23 Martin 1:30-2:30	24 Sahota 8:40-9:20 Mills 1:30-2:30	25 Sahota 10:45-11:35	26 Ramsbottom 12:45-1:30 Hitchen 1:30-2:30

Garden Sign Up

May				
Monday	Tuesday	Wednesday	Thursday	Friday
29 Martin & Mills 1:30-2:30	30 Martin 1:30-2:30	1 Div 9 8:40-9:20 Mills 1:30-2:30	2 Div 10 10:45-11:35	3
6 Martin & Mills 1:30-2:30	7 Martin 1:30-2:30	8 Div 9 8:40-9:20 Mills 1:30-2:30	9 Div 10 10:45-11:35	10
13 Martin & Mills 1:30-2:30	14 Martin 1:30-2:30	15 Div 9 8:40-9:20 Mills 1:30-2:30	16 Div 10 10:45-11:35	17
20 Martin & Mills 1:30-2:30	21 Martin 1:30-2:30	22 Div 9 8:40-9:20 Mills 1:30-2:30	23 Div 10 10:45-11:35	24
27 Martin & Mills 1:30-2:30	28 Martin 1:30-2:30	29 Div 9 8:40-9:20 Mills 1:30-2:30	30 Div 10 10:45-11:35	31

June				
Monday	Tuesday	Wednesday	Thursday	Friday
3 Martin & Mills 1:30-2:30	4 Martin 1:30-2:30	5 Div 9 8:40-9:20 Mills 1:30-2:30	6 Div 10 10:45-11:35	7
10 Martin & Mills 1:30-2:30	11 Martin 1:30-2:30	12 Div 9 8:40-9:20 Mills 1:30-2:30	13 Div 10 10:45-11:35	14
17 Martin & Mills 1:30-2:30	18 Martin 1:30-2:30	19 Div 9 8:40-9:20 Mills 1:30-2:30	20 Div 10 10:45-11:35	21
24 Martin & Mills 1:30-2:30	25 Martin 1:30-2:30	26 Div 9 8:40-9:20 Mills 1:30-2:30	27 Div 10 10:45-11:35	28

Elder Earl Claxton Jr.

Sign up coming soon

Inquiry Questions: How do we interact with the garden?

Science	Language	Math	Social Studies
<u>Big Ideas:</u> Understand -Living things; life-cycles, diverse, groups, ecosystems -Water; cycle, wind, water, ice change land	<u>Big Ideas:</u> Understand -Curiosity and wonder lead us to new discoveries about ourselves and the world around us -Story/text connect us to self, family, community, world	<u>Big Ideas:</u> Understand -financial literacy -Measurement -graphing -Patterns	<u>Big Ideas:</u> Understand -rights and responsibilities as global citizens -local actions have global consequences and global actions have local consequences -Indigenous; culture
<u>Curricular Competencies:</u> Do Demonstrate curiosity about the natural world Identify questions about familiar objects and events that can be investigated scientifically Make observations about living and non-living things in the local environment Express and reflect on personal or shared experiences of <u>place</u> ***Pretty much every curricular competency in Science!!	<u>Curricular Competencies:</u> Do Plan and create a variety of <u>communication forms</u> for different purposes and audiences Explore and appreciate aspects of First Peoples <u>oral traditions</u> Use oral storytelling processes	<u>Curricular Competencies:</u> Do Connect mathematical concepts to each other and to <u>other areas and personal interests</u> <u>Incorporate</u> First Peoples worldviews and perspectives to <u>make connections</u> to mathematical concepts Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial, and symbolic forms	<u>Curricular Competencies:</u> Do Use Social Studies inquiry processes and skills to ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions Sequence objects, images, or events, and explain why some aspects change and others stay the same (continuity and change)

Indigenous Perspectives:

Food, plant uses, Elder Earl, oral language, [SENĆOTEN Language](#)

Activities:

– many, see lots of pages and links

Ongoing Demonstration of Student Learning:

(to be used as forms of assessment)

Inquiry Learning wall

Books:

Culminating Demonstration of Learning:

(i.e., performance tasks, exhibitions, reports, portfolios, presentations, etc)

- Learning booklet
- Student led conferences

Guests:

(Parents, Family, Elders)

Parent volunteers in forest and garden
Elder Earl

Differentiation of Learning:

- Tech
- Reading
- Hands on
- Inquiry

Teacher Documentation of Learning Process:

(Forms of assessment)

Spaces EDU
Photos
Sharing on Learning wall
Anecdotal notes

Field Trips:

(School yard, forest, on bus)

Charlies Trail
Bug museum

Jump Links to Pages in this Resource

[Fungi](#)

[Spiders](#)

[Indigenous Plant Garden](#)

[Camas](#)

[Inquiry Booklet](#)

[Soil](#)

[Ladybugs](#)

[Predator Vs Prey](#)

[Bees](#)

[Plants](#)

[Butterfly](#)

[Worms](#)

[Job Cards](#)

[Hummingbirds](#)

[Birds](#)

[Animal Tracks](#)

[Take home slip for Garden Harvest Party](#)

[Do the Rot Thing](#)
[Teacher Resource](#)

[Vegetable Resources](#)

[Westshore Staff and Student Ideas](#)

[Pollinator and Tea Garden Resources](#)

[Garden Club Resources](#)

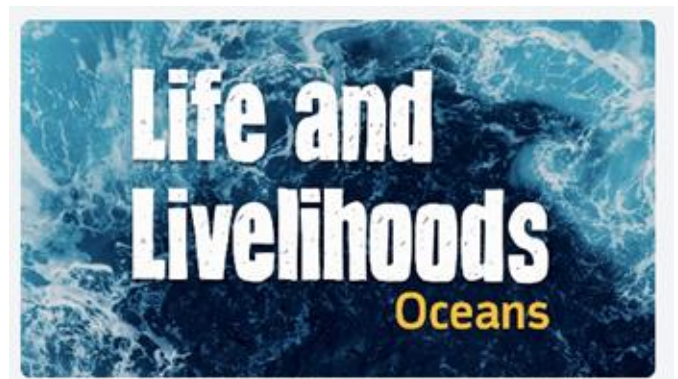
[Water Cycle](#)

[Praying Mantis Resources](#)

[Ice Breaker Games](#)

[Seeds](#)

Live it Series
to explore for
STEM, Art,
Slideshows,
Deep Dives,
Game,
Reading



Name:

The Garden Ecosystem

Name:

The Garden Ecosystem

K-6 Garden

Curriculum Connections for BC

<https://www.littlegreenthumbs.org/wp-content/uploads/2022/11/British-Columbia-LGT-Outcomes.pdf>

TONS AND TONS OF ACTIVITIES/
LESSONS

<https://www.littlegreenthumbs.org/resources/>



Planting the Seeds

- Lesson 1: Plants, Planet, People
- Lesson 2: Plant Needs
- Lesson 3: Plant Adaptations



Intro to Climate Change

- Lesson 4: Plants, Us and Climate Change
- Lesson 5: Plant Needs & Climate Change



Connecting Climate Solutions

- Lesson 6: Soil & Climate Change
- Lesson 7: Food Waste & Climate Change
- Lesson 8: Climate Change & You

<https://www.littlegreenthumbs.org/plants-people-and-climate-change-2/>

Lessons and Handouts

<https://www.littlegreenthumbs.org/wp-content/uploads/2021/12/All-Lessons.pdf>

- Keep a garden journal to record observations and experiences in the garden.
- Act out a story about the garden.
- Collect seed catalogues and have students find specific information about your garden plants.
- Set up a reading nook near the garden and give students time to relax and read.
- Brainstorm different adjectives to explain your garden, or describe your vegetables using all of the senses: taste, sight, sound, smell, feel.
- Write step-by-step instructions for your everyday garden tasks - and learn to follow written directions too!
- Prepare a presentation for other classes or parents.



BRING LANGUAGE ARTS TO LIFE IN YOUR GARDEN

Read, Write, Reflect!

A classroom garden provides inspiration for learners who may struggle in a traditional classroom setting. Reading or hearing garden stories becomes less abstract as students translate their learning to real life experience.

- Try SOIL painting. Paint using different soils as the medium.
- Design colourful plant markers for all of your garden plants.
- Write a song about the garden, or learn the Little Green Thumbs song!
- Draw the garden from week to week, observing any changes.
- Use garden leaves to make crayon rubbings or fossils in clay.
- Try vegetable painting using vegetable mash or juice as the medium.
- Explore tim-lapse photography in your garden.
- Paint your Little Green Thumbs garden, or have students draw their dream garden!
- Try making a seed mosaic.



BRING ART TO LIFE IN YOUR GARDEN.

Draw, Sing, Imagine!

Your classroom garden can serve as a muse for creativity, expression and a spark of imagination! Art is an excellent means through which to explore and express ideas, helping students gain the skills of reflective learners.

- Study the parts of plants and plant cycles.
- Compare and classify different garden seeds.
- Explore soil properties - texture, colour, particle size and more.
- Make a hypothesis & decide on a variable. Experiment! Compare results from a control and test group.
- Cultivate sustainability champions! Learn how to enrich the soil, conserve water, minimize insect and disease problems, and recycle nutrients through composting.
- Observe the eco-system of your classroom garden and learn about the relationships between living (plants and animals) and nonliving (soil and water) elements.

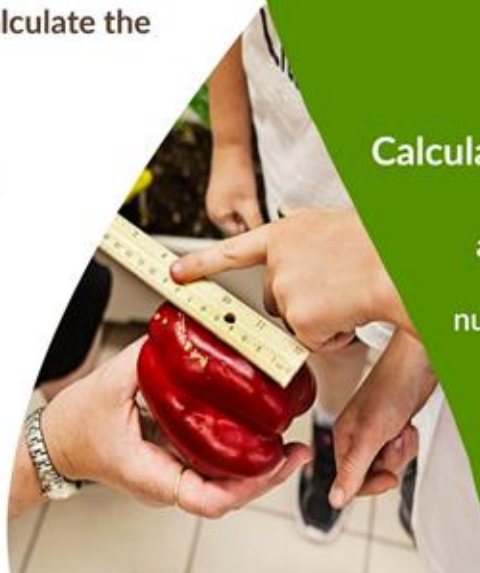


BRING SCIENCE TO LIFE IN YOUR CLASSROOM GARDEN.

Observe & Experiment!

A classroom garden is a living laboratory, a perfect tool for connecting Science curriculum to hands-on activities. Discover opportunities to experiment and observe while you investigate plant growth and life cycles, soil, weather, ecosystems and more!

- Estimate the number of seeds in a tomato, then slice it open and count! Calculate the difference.
- Measure the height of all plants in your garden and determine the mean, median, and mode.
- Try a scavenger hunt for geometric shapes!
- Measure the volume of soil needed to fill your garden boxes, and then calculate the amount of nutrients to add!
- Plant a number of seeds. Count the number of seedlings as they sprout. Calculate the germination rate by dividing the number of seedlings by number of seeds planted and multiply by 100.



BRING MATH TO LIFE IN YOUR CLASSROOM GARDEN.

Calculate, Compare, Measure!

Many opportunities exist in a classroom garden to gather information - plant growth, number of leaves, petals, fruits or height measurements. Translate your information to charts, graphs, and reports and make learning come alive!

What we should plant in the spring of 2024

- **Medicinal Plants:** yarrow, calendula, angelica, catnip, coneflower, mint, comfrey, cornflower,
- **Indigenous plants:** Nootka Rose, snow berries, salmon berries, trailing blackberry, salal,
- **Vegetables:** snow peas, snap peas, tomatoes, carrots, fava beans, sunflowers, lettuce, potatoes, squash (trailing arch), radishes, arugula
- **Pollinator flowers:** daisies, wildflower seeds, nasturtiums, borage

Garden Year Plan

Source: *The School Garden Curriculum*

By Kaci Rae Christopher

[BLM and Additional Resources for this Garden Unit](#)

Fungi Study

TOPICS	FALL in the GARDEN
THEME/ TOPIC/ INQUIRY QUESTION	How do we interact with the garden? Guiding Principles: Use Small and slow solutions. Creatively use and respond to change. ROYAL: Empathy and consideration when interacting with plants. How can Students behaviour impact the creatures in the garden?
I CAN...	Work as a team (communication competency) Physical education, health, science, Indigenous values
GARDEN ETIQUETTE	Always pick food with two hands, one to hold the plant. Do not pull with one hand. Deer Ears: quiet voices (whisper what you found to a friend) Owl Eyes: focus their gaze (zoom in) Fox Feet: careful steps (who lives beneath our feet?)
BOOK THEMES	• Diversity of life • Comparing ecosystems and habitats • Long term or seasonal land changes • Pollinators
SOCIAL/ <u>SCIENCE</u>	Nature Journal Activities: Observe/sketch/Identify/classify/analyze data • Owl Eyes (zooming in body action: use hands as binoculars) - Everyone finds the same type of leaf or seed- Students sketch the artifact (acorn) - Compare the difference and similarities at the end, label the sketch • Fox Feet (Gentle feet body action: do some light steps) - Lids to plastic petri dishes. Place on the ground and sketch what you see inside that circle add detail (use loops or magnifying glasses) then colour and label. • Deer Ears (Quiet Voices body action: cup hands above your head) - Sit Spot: How many things can you hear in a 5 min. Sketch the things you hear. Compare with friends at the end. • Seed Saving Sketch: - Collect two seeds from two different plants. Sketch and label two seeds. Similarities and differences. Venn Diagram? Chestnut compared to poppy seed

Cross Curricular Ideas

TOPICS	FALL in the GARDEN
SCIENCE CONT.	Nature Journal Activities: ● Safari: using Deer ears, Fox Feet, and Owl Eyes go around the garden looking for signs of animals (egg masses, spider webs, holes in nibbled leaves, bird poop) sketch one thing and label it. Pollinators Activities: ● Mason Bee Hive Investigation: Label/design a bee hotel ADST. What do bees like in their homes? Hibernation? (Ask PAC for help rebuilding the mason bee hives at the garden, Wild Schools) ● Bee/ Hummingbird Anatomy : SENCOTEN names for animals ● See Saving: - <i>Vocabulary: Dormant</i>-something that is alive but is not actively growing "A Seed is Sleepy" book - Brainstorm all the seeds that have been gathered. Which have husks or seedpods? - Plant garlic around October 31st (buy straw to mulch, seed garlic) Mulching Activities: <i>Tucking in the garden for the winter, putting the beds to bed</i> ● Collect leaves from the deciduous trees outside our classroom ● Sieve compost #1 and top dress all the beds then put leaves over top ● Early finishers can draw a diagram of the mulching process in the Nature Journal (first, next, then)
MATH	Activities ● Graphing data: - growth of plants, surveys (cut graph paper to fit nature journals) - Seasonal temperature changes ● Measurement: - Non standard and standard units of measurement. ● Patterns (Spirals in Sunflowers, snail shells, colours in fall leaves)
HEALTH	Activities: ● Composting: Produce no waste, Composts in our classroom (ask PAC for compost spinners) ● SEL: Mindfulness (label 5 things you can touch, 4 see, 3 hear, 2, smell, 1 taste) Collect kale, Thyme, chives, mint
INDIGENOUS WAYS OF KNOWING	Activities: ● Nature Journal: Sketch a mint leaf, then go back to plant and sketch entire stalk, then go back and sketch a cluster of mint stalks. (Zoom out activity) Resource: Leslie Tierra et al. A Kid's Herb Book

TOPICS	FALL in the GARDEN
DECOMPOSERS	Fungi Activity: • Safety with mushrooms: What concerns do we have about mushrooms. Image of Death Cap mushroom. Students do not pick any mushrooms. • Nature Journal : practice drawing a mushroom from three different angles. Label it colour. • Bring in a mushroom from the store to taste test. • What do fungi feed on? What role do spores play in mushroom's life cycle? • Resource: <i>Fantastic Fungi on NETFLIX</i> • Spore Print: Whole Class- Teacher has one mushroom cut in half. One piece on a white paper one on black paper. Cover mushrooms with a cup so spores don't escape. Leave mushrooms for 24 hours. Cover in Clear Tack to protect the spore print. Resource: <i>Go Science Girl "Mushroom Spore Prints"</i> Mushroom spore print activity
Soil Scientist	Inquiry Questions: How does a soil scientist behave? What behaviours will students exhibit when interacting with the living things in the school garden? How will they treat the tools they use? What are brown and green materials in the garden? (Soil Resource Below) How do brown material (straw or leaves) help the garden soil and ecosystem? (they help aerate the soil so that decomposers and roots can move freely) How do green materials (fruit, veggie scraps) help the garden soil and ecosystem? (they provide the nutrients for worms and plants to use as energy) (See Soil Resources below) Garden Activity: <i>Mulching and Compost</i> - Investigate: look in the garden beds for evidence of past mulching. What materials did they find and how well decomposed were they? - With a magnifying glass students will observe a section of garden bed and take note/record what is living and non-living in their section.

Pollinators and Cycles

TOPICS	WINTER in the GARDEN
Becoming junior Entomologists: Insect and Spider Study	Guiding Principles: Use Small and slow solutions. Creatively use and respond to change. Observe and don't disrupt. ROYAL: Empathy and consideration when interacting with plants. How can Students behaviour impact the creatures in the garden?
I CAN...	Identify various insects and spider in our garden Work as a team (communication competency) Describe the difference between predators and prey
GARDEN ETIQUETTE	Always handle creatures gently and do not over handle any animals. ** If handling a moist creature (worms, frogs) make sure to have wet hands. ** How to react to unfamiliar insects and spiders: calmly move their bodies away from the creature. Do not act from a place of fear Deer Ears: quiet voices (whisper what you found to a friend) Owl Eyes: focus their gaze (zoom in) Fox Feet: careful steps (who lives beneath our feet?)
CURRICULAR CONNECTIONS	BIG IDEA: Living things have life cycles adapted to their environment. - Similarities and differences between offspring and parent. - Sort and classify data and information using drawings, pictographs and provided tables. - Ask questions and make predictions about familiar objects
ACTIVITIES	Praying Mantis Activities: Learning about beneficial predators <i>Inquiry Questions a garden food webs</i> Vocabulary: <i>beneficial, non-beneficial, Predator and Prey</i> Inquiry Questions: <i>What spiders, insects, bugs, and birds have the students seen hunting in the garden?</i> <i>Is it better to have more predators or prey in the garden?</i> Materials: <i>chart paper, Predator and prey images (see predator vs. prey resources below), tape, push pins</i>

Bug Studies cont.

TOPICS	WINTER in the GARDEN
PRAYING MANTIS STUDY CONT.	Predator vs. Prey Activities: <i>Bug Collection: Continuously collect dead bugs in a glass jar to observe. Talk about what they eat.</i> <i>Food Web Classification: Ss examine different types of predators and preys on a Food Web. Stick them onto the food web on chart paper. Ask inquiry questions while discussing. (see predator vs. prey resources below)</i> <i>Predator vs. Prey Game (see predator vs. prey resources below)</i> <i>Growing Praying Mantis eggs How to buy Praying Mantis Eggs in Victoria</i>
RESOURCES	Praying mantis vs. Cricket vs. Chameleon Video
GARDEN SPIDER STUDY: HOW THEY HUNT AND THEIR ANATOMY	Scientists value and identify predatory spider Vocabulary: Thorax (Cephalo), Fangs, Abdomen. Exoskeleton, Spinnerets and local, common spiders (see spider resources below) Inquiry Questions: Why are these spiders so important to the garden? What do they eat? What are the features and colours of each variety that can help students identify them in the garden? Materials: Spider Anatomy Image (see below) Common spiders images (see spider resources below), Eric Carle <i>The Very Busy Spider</i>, Twine Activities: The Very Busy Spider: Analyze the spider webs. How do spiders build their webs? How spiders build their webs (starts at 29 secs) Design their own spiders web and then build it using twine. Label and Colour Spider Anatomy (see spider resources below)
RESOURCES	BBC Earth Spiders With 3 Super Powers Youtube video The School Garden Curriculum Spider Appendix Research website Facts about spiders

Bugs and Pollinator Studies cont.

TOPICS	WINTER in the GARDEN
INDIGENOUS WAYS OF KNOWING	STEM ACTIVITY: Bird Feeders 1. Make a Bird Feeder: Materials- Pine Cones, Lard, Bird Seed, sunflowers in the greenhouse 2. Apple and sunflower bird feeder : poke holes in old apples and stuff sunflowers in
WORM STUDY	Inquiry Questions: What does nutrient rich soil look like? (compared lasagna bed and compost heap) Discuss green and brown matter and the ratio of 1:2 (1 part green to 2 parts brown) How do scientists explore soil? Different colours of soil (Soil book resource I have) Soil investigation worksheet(See Worm Study Resources Below) STEM Activity: Make a worm bin: (Live It Earth has STEM activity and worm resources below) Soil Scientist Activities: ● Soil sample look under a microscope: - Compare the nutrient rich soil and the non rich. Draw what they see as different. ● <u>Hands on Soil experiments</u> ● Percolation Test: Materials: Student books, Whiteboard and pen, 2 paper cups (poke holes in bottom), two types of soil (compost and lasagna soil in garden), Two plastic cups to catch the water that drips through the holes. Activity: Fill the paper cups with the two soils. Gently pour water through. (see Worm Resources for BLM) Use a stopwatch to measure how fast the water runs through. Record time on a white board. Inquiry Questions: Why would gardeners and scientists want to know how water moves through soil? What prediction (hypothesis) do students have about how fast water will move through fine and large particles? How does water move across or into soil on a rainy day?

Seed and Worm Studies

TOPICS	WINTER in the GARDEN
WORM STUDY CONT.	soil activities PDF
SEED STUDY	Parts of a Seed Activity Materials: broad bean seed that has sprouted, seed handout (see seed resources below), scissors, student workbook. glue Vocabulary: Seed Coat, cotyledon, radicle, dicot seed Activity: - Individually Students colour and cut out parts of seed handout (see seed resource below) - Radicle and epicotyl (#1) on top of cotyledon(#2) on top of seed coat - Glue together and fold like a card.

TOPICS	SPRING in the GARDEN
CITIZEN SCIENTISTS	Objective: Use scientific observations to discover which pollinators visit certain flowers in our garden. Inquiry Questions: What does it mean to be a citizen and a scientist? How does a scientist take a survey? What behaviours can students use to make quality observations in the garden? What environmental factors, such as weather and seasons, could affect pollinators activity? What student activity or behaviours could also impact pollinator activity?
SOIL SCIENTIST	Decomposers, Consumers, and Producers Activity: -Decomposers (fungi) Consumers (slugs) producers (plants) - Ss brainstorm what roles the decomposers, consumers, and producers play in the garden ecosystem. (see worksheets below) - Sketch one of each Decomposer, Consumer, Producer in their nature journal Resources: STEM activities about soil How to make a class compost What makes a habitat a home? Valuing the Garden Ecosystem Game (see soil resources below) Materials: Yarn and cut up ecosystem cards Activity: - Each student is given a garden ecosystem card. Each card is connected to the other organism or item on the ecosystem cards. - Class sits in a circle, keep their card secret until their clue is read - Read each clue aloud and have the class deduce the answer. When the clue is answered the person with that card will hold up their card and then take a piece of yarn Inquiry Questions: - What do they notice about the ecosystem as the game goes on and the web of yarn becomes more intricately linked - When the web is complete introduce environmental changes and allow the web to become uneven. Example; if pesticides are sprayed on the garden and the insects die, then what will happen to the web elements that rely on the insects?

Insects and Pollinators

TOPICS	SPRING in the GARDEN
PRAYING MANTIS OBSERVATIONS	Inquiry Questions about Praying Mantis: What questions do Ss have about the shape, structure, texture, and formation of the egg sac? How many praying mantis eggs are in it? What scientific questions do students have about the egg sac and the life cycle of a praying mantis? What Changes to the students hope to see with the egg sac over the next few weeks? What conditions will the eggs need to experience in order to emerge?
LADYBUG OBSERVATIONS	*Order ladybugs from Buckerfields buckerfields contact info to order ladybugs Inquiry Questions about Ladybugs: (see ladybug resources below) Ladybug Images Are Ladybugs a predator or a prey? (both) some birds eat ladybugs and they eat aphids. How are they beneficial to our garden? What plants will attract ladybugs?
PLANT YARROW	Yarrow is a wonderful pollinator plant as well as habitat for ladybugs during the summer. Planting it alongside aphid loving plants (Kale). Save seeds in the fall to plant more next year.
BEE STUDY	Inquiry Questions: What kind of bees have we see in our garden? What do they look like and how do they behave? In-class Activity: Myths and Facts about Pollinators Compare and Contrast between wasps and bees (images below) Different types of bees. What makes these bees memorable? How should they interact with the pollinators? Garden Activity: Bee Tracker Track how many bees they find. (see chart below) Tally them, collect all the data. Graph. * students go to different parts of the garden so the likelihood of recounted the same bee decreases. What areas had the most bee sightings

TOPICS	SPRING in the GARDEN
BEE STUDY CONT.	Books: Big Book of Bugs: Yuval BEES Getting to know our Native Northwest Bees by Hillary Sarnina
BUTTERFLY VS, MOTH STUDY	Moth: fringed antennae, are nocturnal (not all), and have wings that lay flat when they are at rest. Butterfly: Diurnal, smooth antennae, wings fold up when they are at rest. Both: Have a long tongue (proboscis) they they use like a straw to consume nectar. (see butterfly resource below) Facts about how to tell the difference between butterfly and moths Butterfly vs. Moth 10 min video
HOW TO SEE LIKE A POLLINATOR	STEM Activity: kaleidoscope binoculars Inquiry Questions: Which flowers attract certain butterflies? What are differences between how human and insect see? Brainstorm the various qualities and techniques that flowers use to attract pollinators. Materials: Toilet paper rolls Contact Paper White Tissue Paper Activity: -Place small pieces of white tissue paper onto contact paper and attach to end of toilet paper roll (make 2) - This activity mimics the two large compound eyes that honeybees have with their thousand of facets (see bee resources below) In the Garden: - Take the binoculars and look at solid blocks of colour and mixed colours. Encourage them to think like a pollinator by analyzing the difference between looking at large blocks of colours and scattered or mixed colours. - What do you think is easier for students to see colour, when it is blocked together or when it is scattered? - What can we do to make it easier for pollinators to find flowers in our garden? Websites: - Pollinator Flowers - Gardens for Pollinators - David Suzuki How to Attract Pollinators - Bee Facts

TOPICS	SPRING in the GARDEN
HONEYBEE STUDY	Honey Activity: - Taste different kinds of honey, Ask families if they could each send a tsp. Of honey for us to sample. - Talk about the different forms that honey can come in (solid, on the comb, liquid, see Bee Resources below) - Read the Big Book of Bees: talk about queen, worker, drones, how they gather pollen) - Buy bee stuff (maybe PAC will pay?)
WATER IN THE GARDEN	STEM Activity: Create a Watering Basin Materials: - Bowls, basins, shallow cups (terracotta drain trays underneath planters) - Marbles, river rocks, pebbles - Paint and sealant but only the outside of the basin o the inside.
LOCAL POLLINATOR RESOURCES	local beekeepers of Victoria (I have emailed asking about beekeepers who speak to schools) capital region beekeepers STEM Activity: How to make a bug trap Make seed paper (I have the paper screens)
COMPOST ACTIVITIES	See Soil Activities below

TOPICS	SUMMER in the GARDEN
HARVESTING ACTIVITIES	
SEED SAVING ACTIVITIES	

What materials to bring
from Colwood over to
the garden?

Wagon full of school resources between Div
5 & 6's class

Notes from Megan Zeni Live It Podcast Episode

Westshore Wednesdays

- Start at shed after recess → Get Garden Wagon
 - i. Tools
 - ii. Gloves
 - iii. Watering Cans
 - iv. Pencils
 - v. Clipboards
 - vi. Magnifying glasses
- Ongoing communication for other classes .."to do" in the garden list.
- **Build choice activities for the garden**
- **"Learning to-go kits"— kids choose what they'd like to do**
 - Look closely: magnifying
 - Reading books
 - Learning pamphlets (ladybug, spiders etc)
 - Ring Cards
 - Measuring tool box? Measuring pages
 - Weeding
 - Bug hunts
 - Colour hunts
 - Sketching in Nature Journals

Westshore Garden Ideas from Westshore Staff and students

Westshore Garden

2022/23 School Year

GARDEN DESIGN

Develop all Beds along fence between tutorial and main Westshore building into lower maintenance Indigenous plant garden.

Turn two crumbling raised beds next to compost into a holding space for potted plants.

FALL/WINTER ACTIVITIES

Seed Saving: Harvest dry seeds. Look for seed that is almost rock hard, and difficult to dent with your fingernail. Collect seed in paper bags and label if known.

Winter Garden Bed Prep: Remove dead and dying plants and weeds from garden beds and mulch bare soil with a layer of compost (up to 2 inches thick) followed by leaves (up to 6 inches thick).

Transplanting Native Plants: Move all plants from large garden that will be removed.

Plant Garlic: Clear beds and spread 2 inches of compost on top. Plant garlic in rows that are 10-12 inches apart, with garlic bulbs planted 5-6 inches apart in these rows.

Transplanting Strawberries: Move all strawberries out of ground into raised beds and parent/staff home gardens.

Cut back dead raspbergh8790o-980

SPRING ACTIVITIES

Plant Vegetables and Flowers: Starting in February you can plant peas and continue through the spring with all veggie crops either from seed or transplant.

Weeding: All garden beds will need care.

Mason Bee Release: Get some cocoons and put up with nesting boxes.

Planning

Matthew Kemshaw support

Attached is an activity I developed last year. There is a list of a bunch of the Indigenous plants in the garden on page 3. Of course there is also all the raspberries, apples, strawberries and vegetables.

Starting seeds in February is decent timing for some things. Here is a school garden crop planning guide from Farm to School BC - they're recommending planting a lot of stuff quite a bit later than I do. I plant peas in mid Feb, and all the greens outside starting March 1. You can start peppers, basil, herbs indoors right now up to March under lights.

<https://matthewkemshaw.wordpress.com/school-gardens/>

<https://farmtoschoolbc.ca/school-gardens/>

<https://farmtoschoolbc.ca/wp-content/uploads/sites/3/2022/03/Coastal-BC-Crop-Planning-Chart.pdf>

<https://farmtoschoolbc.ca/grants/>

Lessons document

https://farmtoschool.phabc.org/wp-content/uploads/sites/3/2017/09/SPEC_July18_lesson_book.pdf

Lessons

- Worms
- Compost
- Photosynthesis
- Leaves
- Shapes
- Flowers
- Pollinators
- Insects
- Metamorphosis
- Garden design

Westshore Indigenous Plant Garden Plant Selection Assignment

ABOUT THE GARDEN

We are working to develop an Indigenous plant garden to replace a couple of rows in our big vegetable garden. We are doing this for several reasons, including:

To add more plant and animal diversity to our garden, to make it more interesting for people and better habitat for animals;

To plant more perennial plants in the garden, which will require less annual maintenance;

To include more Indigenous plants in the garden, which can be integrated into learning in a variety of courses;

To create a small sanctuary space in the garden with larger shrubs, where students and staff can go to relax.

We have come up with a physical design for the space, and put down some gravel to define the pathways. There are essentially three garden areas in this design:

1. Food Plants
2. Medicine Plants
3. Art and Technology Plants

YOUR ASSIGNMENT

This assignment is to learn about the plants that would grow well in the four garden areas we have built (see complete list of plants on following page) and select the three that you are most interested in planting in each area of the garden (3 plants for 4 garden areas = 12 plants total).

Use the worksheet on the back of this page to record the plants you have selected.

In addition to the books and cards that have been provided for research, you may also wish to look at the following websites for information about these plants:

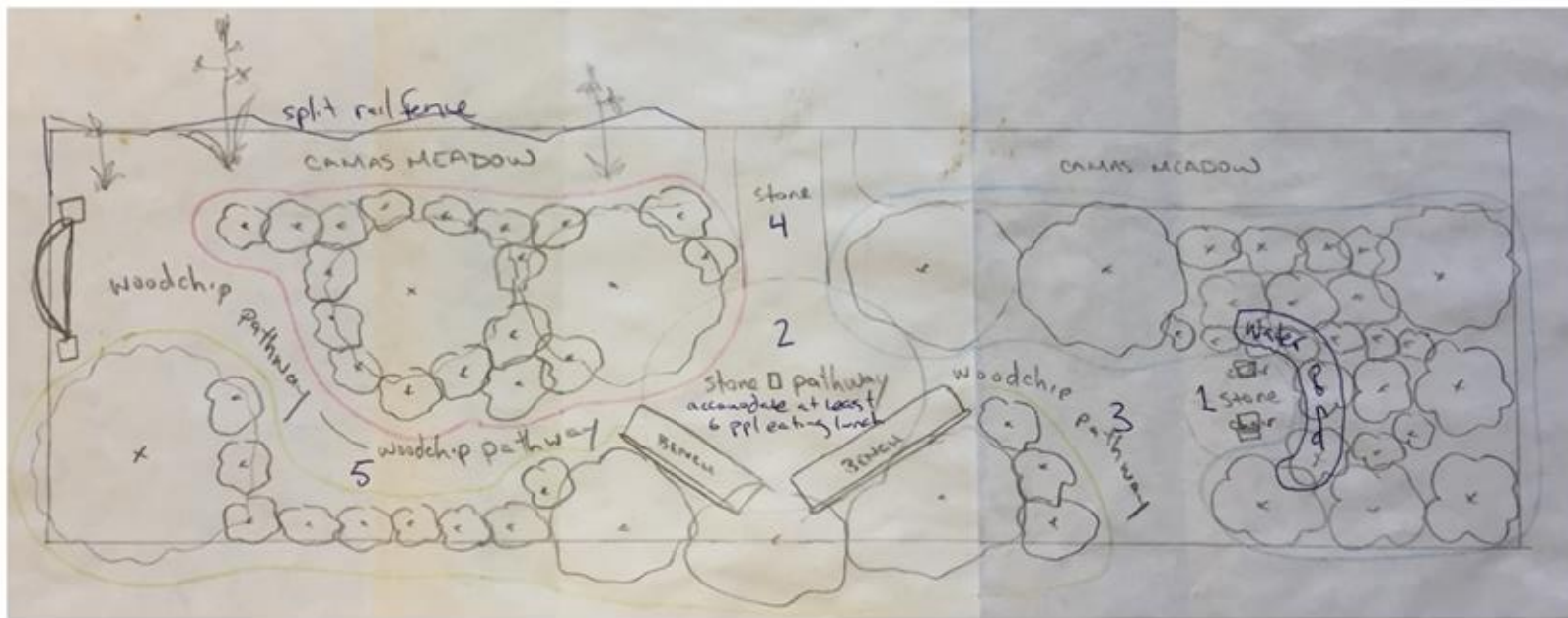
Plants for a Future – www.pfaf.org

E-Flora BC – www.eflora.bc.ca

Satinflower Nursery – www.satinflower.ca

On the following pages you will find a list of many of the plants that would be suitable for each of the four garden areas, as well as a base map plan of the Indigenous plant garden.

Indigenous Plant Garden Base Map
(Developed with input from Westshore staff and students)



Indigenous Plant Garden

Shared resources

Other plants that Elder Earl would like to try planting in SNIDÇEŁ: all the berry plants, trees (SKONEŁĆ/Alder), DKÁ,İŁĆ/Salal, KEXMIN/Indian Consumption Plant?, SO, EK/Cow Parsnip?, Vanilla Leaf?, Springbank Clover (?), SENI,İŁĆ/Oregon Grape, Pearly Everlasting (Tea)

	CLASSROOM	PLANT - Students will grow these plants in their classroom	ANIMAL - Elder Earl will share stories about these animals	13 MOONS - (tied into each of his visits)
1	Sweet Pea	TESIP/Licorice Ferns - tea garden	Eagle	
2	Lavender	(Hul'q'umi'num) quwuts/Coastal Sage - tea garden (or) TEXTEX/Stinging Nettles -tea garden	Deer	
3	Sunflower	TI,İŁĆ/Yerba Beuna - tea garden	Clam (*Johnny Claxton & clam digging)	
4	Bluebell	TelikEŁP/Yarrow (white) - tea garden	Robin	
5	Alpha	SKELÁLNEW/Trailing Blackberry - tea garden	Crab	
6	Beta	TI,İŁĆ/Labrador Tea - tea garden	Raven	
7	Gamma	DIL,EKİİŁĆ/Wild Strawberry - tea garden	Salmon People	
8	Delta	KÁTEXEŁĆ/Oceanspray - SNIDÇEŁ	Mosquito	
9	Kappa	DEKENİİŁĆ/Thimbleberry - SNIDÇEŁ	Seagull	
10	Lambda	ELILE,İİŁĆ/Salmonberry - SNIDÇEŁ	Swainson's Thrush	
11	Sigma	KŁO,EL/Camas & CEN,İİŁĆ/Garry Oak - SNIDÇEŁ	Orca	
12	Omega	SXESEMIİİŁĆ/Soapberry - SNIDÇEŁ (or) STÁ,KEN/Cattails - SNIDÇEŁ	Wolf	

Indigenous Plant Planning

Division	Plant	Notes
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Additional:

- Camas *transplanted by Div 5 & 6*
- Oregon Grape *already planted*
- Flowering Red Currant *already planted*
- Snowberry *already planted*

Colwood's Indigenous Plant Guide

Plant name:

SENĆOŦEN:

SENĆOŦEN phonetic spelling:

The traditional use is:

Sketch Picture

Photo

FOOD PLANTS

- Barestem Desert Parsely / Wild Celery / Indian Consumption Plant
- Stinging Nettle
- Thimbleberry
- Miners Lettuce
- Oregon Grape
- Nodding Onion
- Wild Strawberry
- Trailing Blackberry
- Blackcap Raspberry
- Nootka Rose
- Camas
- Salmonberry
- Salal
- Saskatoon Berry
- Red Flowering Current
- Evergreen Huckleberry

MEDICINE PLANTS

- Barestem Desert Parsely / Wild Celery / Indian Consumption Plant
- Yarrow
- Field Mint
- Self-heal
- Licorice Fern
- Willow
- Black Hawthorn
- Nootka Rose
- Dull Oregon Grape
- Yerba Buena
- Common Plantain

ART & TECHNOLOGY PLANTS

- Oceanspray
- Red Osier Dogwood
- Mock Orange
- Fireweed
- Stinging Nettle
- Willow
- Oregon Grape

***Please feel free to add other plants suggested by elders.

Camas



- Bulbs used and eaten like potatoes
- Part of a healthy diet
- When cooked, soft like garlic



Useful things to know:

- 7 years to bloom
- Blooms to make more seed and spread
- Takes 3 hours of steaming in a pitcook
- It is part of a Garry Oak ecosystem

Cedar

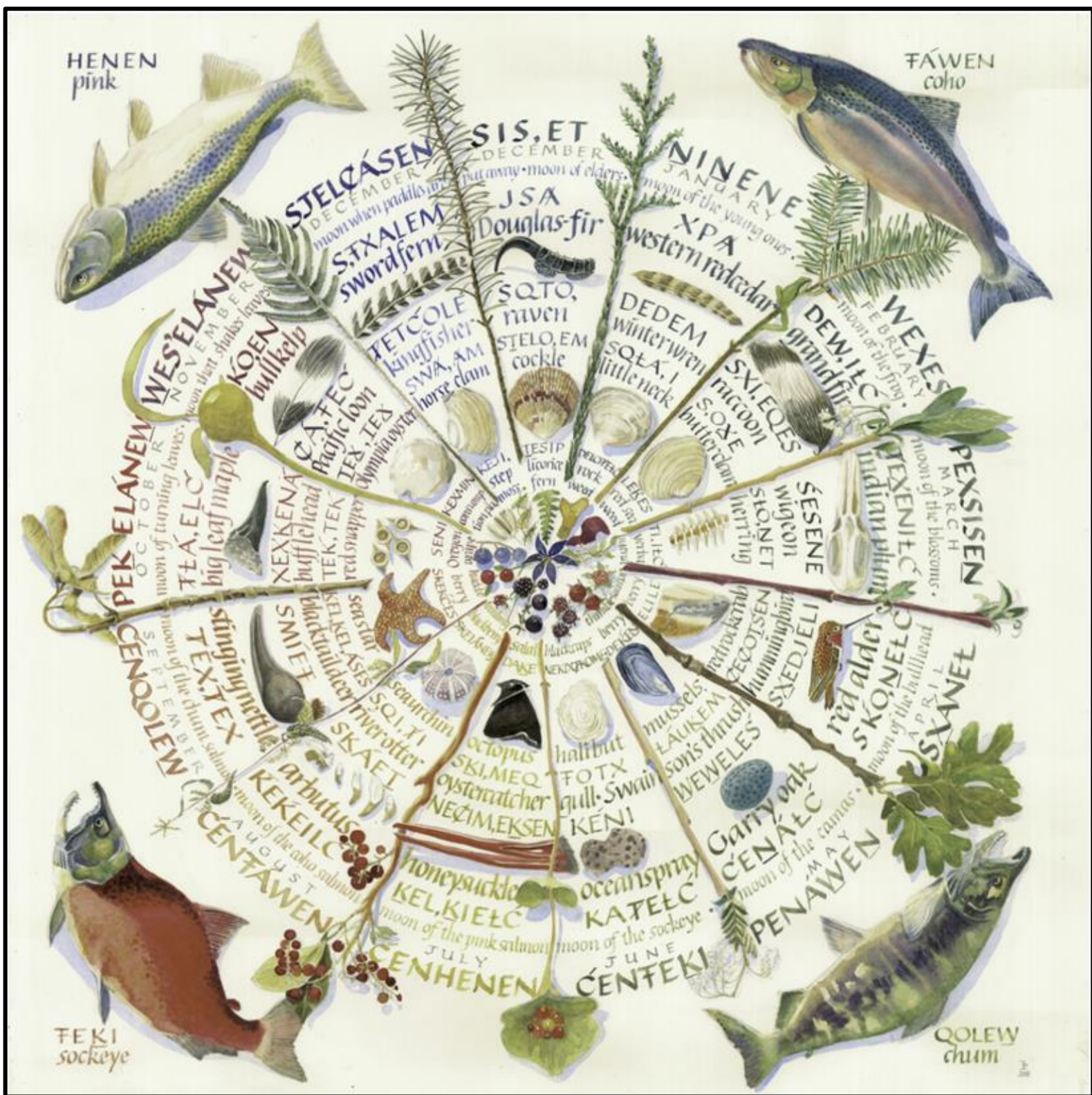


- Most powerful plant
- Used to carve
- Totem poles, hats, clothing
- Masks for clans
- Bark- used for shade, clothing
- They are having a hard time with climate change
- Important to plant trees
- Woodpeckers love cedar
- Takes about 1 summer to carve an average canoe
 - Moved to longhouses in winter time
- Cedar stripping doesn't hurt, grows back



Cedar Stripping Video

13 Moons- Seasonal Round



Tea Garden and Pollinator Resources

A Witch's Garden



Calendula



Sage



Rosemary



Clary Sage



Mint



Thyme



Basil



Mugwort



Lavender



Verbena



Chamomile



Bay leaf



< 11 Plants for Wellness ...



Senna

A relief to be around.
Relieves occasional constipation.*



Dandelion

Resilient, tough. Stimulates the liver.*

Peppermint

Cool, uplifting.
Alleviates digestive discomfort.*



Slippery Elm

Smooth, silky.
Supports throat health.*



Licorice

Harmonizing, unmistakable.
Promotes respiratory health.*

Ginger

Warming, spicy.
Promotes healthy digestion.*



Nettle

Prickly yet nurturing.
Supports joint health.*



Chamomile

Lovely, gentle. Calms the nervous system, soothes digestion.*

Echinacea

Stimulating, supportive.
Boosts the immune system.*



Passionflower

Peaceful, calm. Helps you relax.*



Fennel

Pleasant, gentle.
Soothes and supports digestion.*





12 HERBS FOR A TEA GARDEN

@AdrianneHunt.herbalist

www.hensandgrit.com



Passion Flower is tranquilizing, settles edgy nerves, calms extreme anxiety, relieves muscle tension and may lower blood pressure.



Tulsi (Holy Basil) regulates blood pressure, protects aging hearts, stabilizes blood sugar, enhances memory and concentration



Lemon Balm lifts the spirit, promotes longevity, eases anxiety, and improves sleep



Chamomile improves digestion, reduces stomach cramping, flatulence, lowers stress levels, and gently calms nerves.



Calendula stimulates lymphatics, reduces inflammation, soothes intestinal lining and mucus membranes



Bergamot natural antidepressant, improves digestion



Hibiscus lowers blood pressure, satisfies thirst, aids digestion



Lemon verbena reduces inflammation, soothes nerves, calms stomach



Hyssop improves circulation and promotes a healthy immune system



Lavender reduces stress, soothes anxiety, reduces muscular tension and improves sleep



Jasmine boosts immune system and protects the skin from free radical damage



Rose petals & Hips are high in vitamin C, improve immune system, ease heartache



Pollinator Flowers

- **Lavenders:** Bumblebees, carpenter bees, digger bees and large and small leafcutting bees collect the nectar of this evergreen shrub.
- **Pacific or coast rhododendron:** Larval host for brown elfin and gray hairstreak butterflies. Hummingbirds, bees and Western tiger swallowtails collect the nectar of this evergreen shrub. Native to the Pacific Northwest.
- **Blueblossom:** Larval host for pale swallowtail, California tortoiseshell and echo blue butterflies. Bumblebees, carpenter bees, honey bees, digger bees and a variety of small native bees collect the nectar of this evergreen shrub.
- **Ocean spray:** Larval host for spring azure, brown elfin and Lorquin's admiral butterflies. Bumblebees and a variety of small native bees collect the nectar of this deciduous shrub.
- **Serviceberry:** Hummingbirds, bees and butterflies collect the nectar of this deciduous shrub. Larval host for Weiddermeyer's admiral butterflies. Native to the Pacific Northwest.
- **Russian sage:** Honey bees, small carpenter bees and leafcutting bees collect the nectar of this perennial garden plant. The nectar also attracts hummingbirds.
- **Red-flowering currant:** Important nectar source for early-season butterflies. Nectar also attracts hummingbirds. Perennial that is a native to the Pacific Northwest.
- **Zinnias:** A wide array of hummingbirds, butterflies and bees collect the nectar. Annual garden plant.
- **Sunflower:** Longhorn bees, sweat bees, leafcutting bees and bumblebees collect the pollen and nectar of this annual.
- **Salal:** Larval host for spring azure butterflies. Bees collect the nectar on this groundcover. Native to the Pacific Northwest.
- **Catmint:** Honey bees, bumblebees, carder bees and mason bees collect nectar and pollen from this perennial.
- **Milkweed:** Monarch butterflies collect nectar and pollen and lay their eggs on this perennial wildflower. Nectar also attracts hummingbirds. Native to the Pacific Northwest.

Garden Club Resources

What was growing our 2022/2023 year

Broccolini

rainbow chard

Beans

snap peas

beets

lettuce

Indigenous plant garden (snow berries, flowering red currant, camas, oregon berry, Oso berries)

Strawberries

Raspberries x2

Blueberries X2

Apple tree

Fig tree

Asian pear

Oak tree

Potatoes

Kale

Rhubarb

Herbs

Mint

Chives

Sign Ideas







MINI GARDEN FOR CHILDREN

0:00

1:45





Today is ...



RESPECT GARDEN

open-mindedness

BE SAFE

Teamwork
&
Collaboration

ALWAYS
WALK

USE
PATHWAYS

ASK BEFORE
PICKING

BE RESPECTFUL

DUCKS

INSECTS

CHICKENS

EACH OTHER:

• hands to yourself • one voice in circle • appropriate language

BE RESPONSIBLE

THE RIGHT TOOL for the RIGHT JOB
CLEAN and PUT BACK TOOLS WHERE YOU FOUND THEM

BE AN ALLY

COMPOSTING

lostandfarmed.com

basics

green
NITROGEN



FRUIT SCRAPS



VEGETABLE SCRAPS



COFFEE GROUNDS



MANURE



WEEDS + PLANT CLIPPINGS

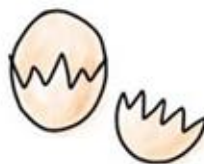
brown
CARBON



DRY LEAVES



NEWSPAPER



EGG SHELLS



BROWN PAPER BAGS



WOOD SHAVINGS

& STRAW
WOOD ASH

absolutely NO

- synthetic materials
- wood/sawdust/ash from treated wood
- meat and manure from animals that eat meat





Future goal



**PAINTING WITH
DANDELIONS**
fun nature craft for kids!



Vegetable Resources



SPRING CROPS

[illegible]

Indoor Sow

Notes

[illegible]

Le



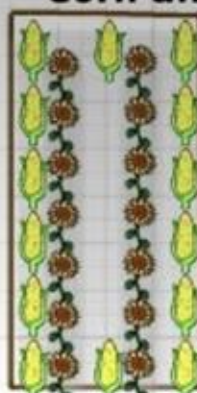
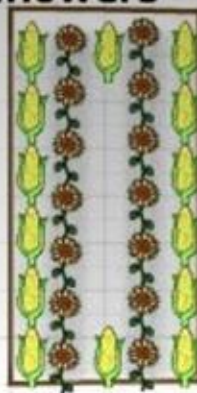
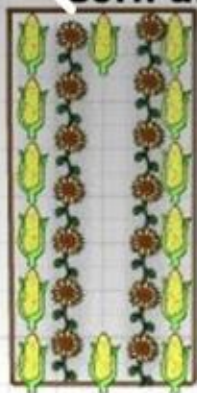


GROWING CALENDAR

PLANT	START INDOORS	TRANSPLANT OUTDOORS
Basil	April 15	May 20
Tomatoes	April 15	May 20
Broccoli	March 15	May 1
Cauliflower	March 15	May 1
Peppers	May 1	June 20
Parsley	March 1	May 1
Cabbage	March 15	May 1
Pumpkin	May 1	May 20
Beets	**	April 15
Kale	March 1	April 15
Celery	Feb 15	March 15
Cucumber	May 1	June 15
Onions	Feb 15	April 1
Lettuce	March 1	April 1
Melon	April 15	June 1
Spinach	**	March 15
B. Sprouts	March 15	May 1
Corn	April 15	May 15
Peas	March 15	May 1
Potatoes	**	April 15

← Corn and Sunflowers

Corn and Sunflowers...



Tomato
Green Bean

Zucchini
watermelon

Potato

Zinnia



Cosmo

Marigold

Marigold

cucumber

Pepper/ Onion

Winter Squash
Marigold

Cosmo

Cosmo
Peas



Tomato
Marigold

Carrot
Watermelon

Cucumber

Tomato

Pea

Marigold

Pea
Zinnia

Winter Squash



4 YEAR CROP ROTATION*

by homesteadandchill.com

LEGUMES

Add nitrogen to soil

- Green beans
- Soy beans
- Fava beans
- Chickpeas
- Peas
- Lupin
- Alfalfa
- Peanuts

ROOT VEGGIES

Light feeders, like more potassium and phosphorus than nitrogen

- Carrot
- Radish
- Onion
- Garlic
- Leeks
- Parsnip
- Turnip
- Beet

GREENS/BRASSICAS

Require ample nitrogen

- Lettuce
- Spinach
- Cabbage
- Brussels
- Bok Choy
- Kale
- Broccoli
- Cauli
- Herbs
- Collards

FRUITING VEG

Need ample phosphorus (plus some nitrogen)

- Tomato
- Squash
- Melons
- Peppers
- Eggplant
- Cucumber
- Potatoes
- Corn

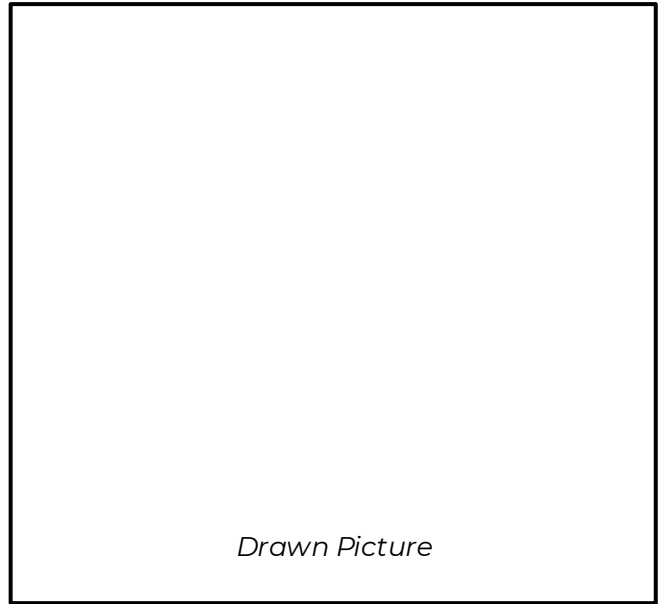
*Cycle may be completed in shorter timeframe in mild climates that can grow over winter.

HOW OFTEN DO YOU NEED TO WATER YOUR GARDEN?

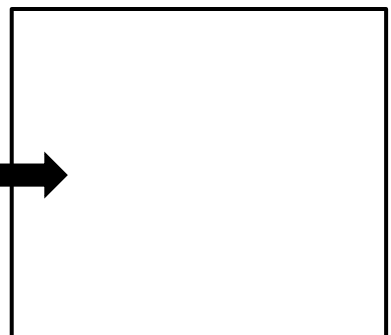
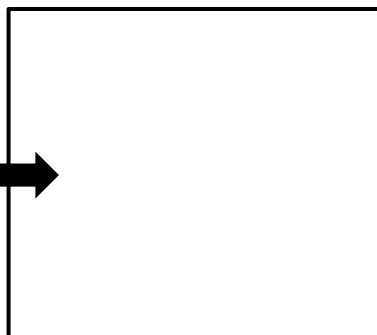
Plant	When to Water	Gallons Needed
 Bell Peppers	Steady watering from flowering through to harvest time	2 per week
 Cucumber	Frequently during flower and vegetable development	1 per week
 Tomato	During the first month after transplanting, and when flowers/fruit form	>1, twice per week
 Zucchini	Frequently, at all stages of growth	1 per week
 Corn	When tassels form on cobs, and cobs begin to swell	2 at each stage listed
 Basil	Regularly, keeping soil moist	Water as needed
 Kale	Regularly, keeping soil moist	Water as needed
 Potatoes	As soon as potatoes begin to form, and again when they are the size of marbles	2 per week
 Peas	When flowers form, during pod formation, and during picking	2 per week
 Carrots	During root development, and again before soil is completely dry	1 during root development, then 2 every 2 weeks
 Lettuce	Water frequently at all stages of growth	2 per week
 Onions	Infrequently under normal conditions, or during early stages during dry weather	1/2 - 1 per week if soil is dry

Colwood's Plant Guide

Plant name:



plant growth



Cut along this line



The name of my plant is:

My name is:

My plants unique needs:

Sun/Shade



Water



Space



Airflow



Nutrients



Little
GreenThumbs

Patient:

Name:



LIGHT

Check the leaves!

Excellent

Good

Poor

Unsure

- Leaves are the same colour - no yellow leaves.
- Leaves are not shrivelled up, dry, or cracking.
- Leaves are not spotty.



AIR

Check the air!

Excellent

Good

Poor

Unsure

- Air temperature is good.
- Plant is not too close or far away from heat.
- There is no extreme wind or air circulation.



WATER

Check the soil!

Excellent

Good

Poor

Unsure

- Soil next to the plant is not too moist.
- Soil next to the plant is not too dry.



NUTRIENTS

Check the stem!

Excellent

Good

Poor

Unsure

- There are no pests on the stem.
- The plant has been fertilized, if need be.



SPACE

Check its surroundings!

Excellent

Good

Poor

Unsure

- Other plants are not crowding its place.
- The roots have enough room to grow in its pot (for potted plants)

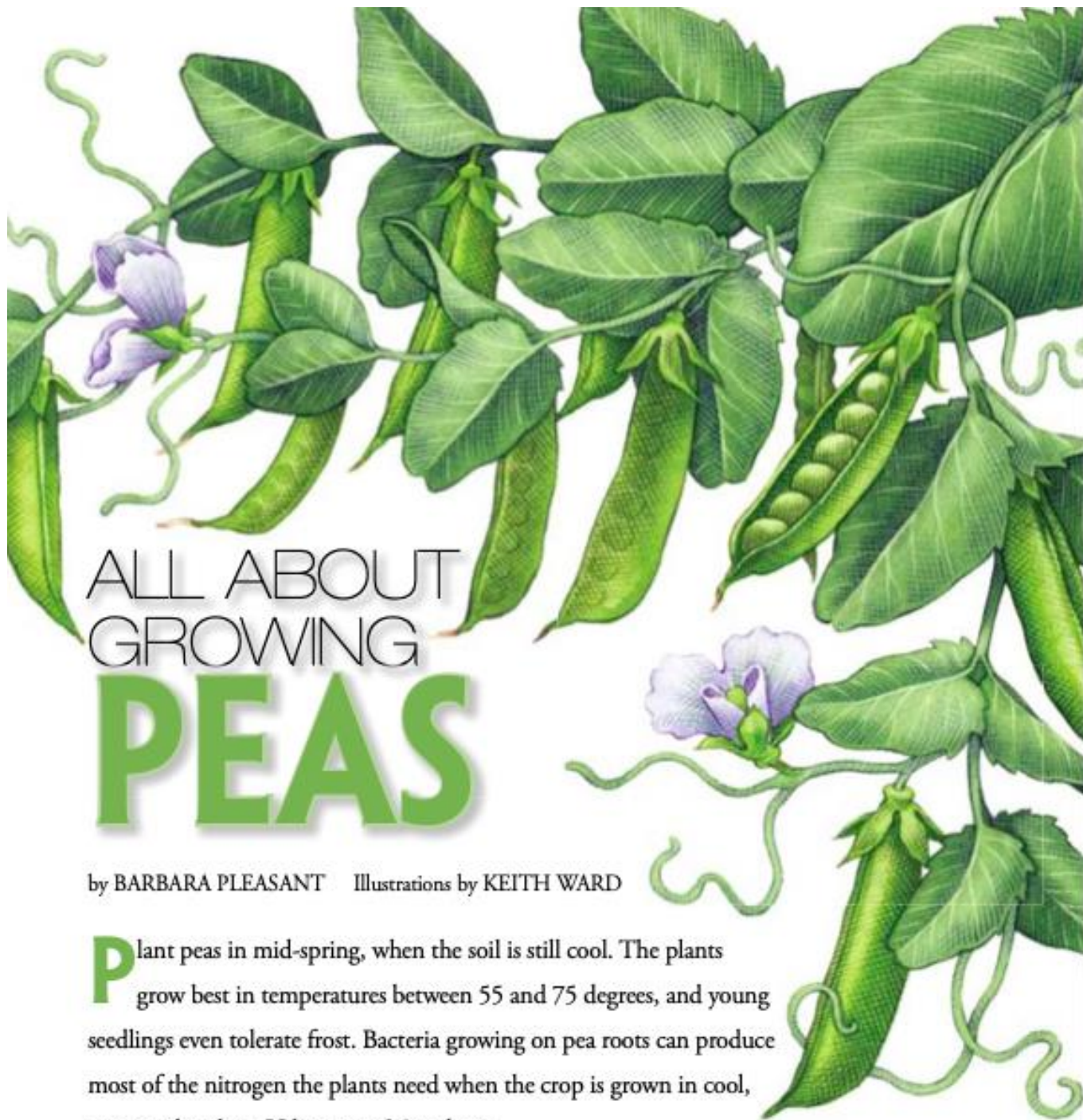
Seed Starting Log

It's a great idea to keep track of success and failure in the garden! Use this log to track what seeds you have started, and how well they grew. From year to year, this information can help inform your seeding schedule and seed choice.

[illegible]

Teacher Information for Planting

Spinach, Peas, Beans, and Potatoes



ALL ABOUT GROWING PEAS

by BARBARA PLEASANT Illustrations by KEITH WARD

Plant peas in mid-spring, when the soil is still cool. The plants grow best in temperatures between 55 and 75 degrees, and young seedlings even tolerate frost. Bacteria growing on pea roots can produce most of the nitrogen the plants need when the crop is grown in cool, moist soil with a pH between 6.5 and 7.0.

Types to Try

Vine length varies from one variety to another, and long-vined peas need a taller trellis than compact varieties. Both compact and long-vined varieties are available in the following four types, which vary in pod and seed characteristics.

Snap peas are eaten whole, and both the crunchy pod and the peas inside taste sweet. Snap peas yield more food per square foot than the other types.

Snow peas produce tender, flat pods that are eaten whole. Snow peas also produce the most tender vine tips for adding to salads or stir-fries.

Shell peas are often called English peas, because many fine varieties were developed in Great Britain in the 18th century. Sweet green peas are shelled from tough, inedible pods.

Soup peas produce hard, starch-filled seeds for drying inside inedible pods. Seed size and color vary with variety.



In the Kitchen

Many peas will be eaten before they ever reach the kitchen, because all peas except for starchy soup peas are great to eat raw. A 50-calorie heaping handful of snap or snow peas provide iron, fiber and one-third of your daily quota of vitamin C. Peas cook fast, so they are great to toss into stir-fried dishes. Snap and snow peas work well as finger foods to dip into salad dressings. Cook dried peas like beans, but pre-soak them for only a few hours before cooking them.

When to Plant

Sow in spring, about one month before your last frost date. Where summers are cool, additional sowings can be made three weeks apart. Peas produce poorly in hot weather, so an early start is always a wise strategy. In climates with mild winters, a second crop can be sown in late summer for harvesting in late fall.

How to Plant

All peas benefit from a trellis or other support. Install a 6-foot-tall trellis before planting long-vined varieties. Compact varieties can be staked with woody branches or unemployed tomato cages after they sprout, or you can interplant short-vined peas with oats, which serve as a living support.

Prepare a wide planting bed by loosening the soil to at least 10 inches deep while mixing in compost. Do not use fertilizer unless your soil is very poor or

low in organic matter. Plant seeds in a double row, with a row of seeds on each side of the trellis. Poke seeds into the prepared site 2 inches apart and 1 inch deep. Thinning is not necessary.

Harvesting and Storage

To avoid mangling the vines, use two hands to harvest peas. When green peas are ripe, harvest them daily, preferably in the morning. Pick snow peas when the pods reach full size and the peas inside are just beginning to swell. For best flavor and yields, allow snap peas to change from flat to plump before picking them. Gather sweet green shell peas when the pods begin to show a waxy sheen, but before their color fades. Immediately refrigerate picked peas to stop the conversion of sugar to starches and maintain the peas' crisp texture. Promptly blanch and freeze your extra peas.

Soup peas can be left on the vines until the pods dry to tan. After shell-

ing and sorting, allow soup peas to dry at room temperature until they are so hard that they shatter when struck with a hammer. Store in airtight containers in a cool, dry place.

Saving Seeds

Peas are open-pollinated and self-fertile, so saving seeds is a simple matter of allowing a few pods from your best plants to mature until the pods dry to brown. Select the largest seeds, and put them in the freezer for three days to kill any insects that may be hiding inside. Then store in a cool, dry place. Pea seeds will keep for at least three years, and often longer. About 4 ounces of seed is needed to plant a 10-foot double row.

Pest and Disease Prevention Tips

- Powdery mildew causes white patches to form on leaves and pods, but

Peas at a Glance

Type	Description	Cultural Tips	Varieties
Snap pea (subspecies macrocarpon)	Plump, edible pods have thicker flesh than snow peas and also stay sweet and tender longer.	Pod size and tenderness vary with variety. Extend the harvest season by growing short and tall varieties.	'Amish Snap,' 'Cascadia,' 'Sugar Ann,' 'Sugar Sprint,' 'Sugar Snap'
Snow pea (subspecies macrocarpon)	Flattened pods lack tough inner membrane present in shell peas, so they can be eaten whole.	Harvest pods when the peas inside are barely visible. Add tendrils to salads and stir-fries.	'Golden Sweet Pea,' 'Snowflake,' 'Snow Sweet,' 'Oregon Sugar Pod II,' 'Oregon Giant'
Shell pea (subspecies sativum)	Eat only the peas; pods are tough and stringy. Harvest when the pods begin to look waxy, before the sugars in the peas change to starch.	Plants produce all at once, making freezing and canning more convenient. Short varieties grow well in containers.	'Dakota,' 'Eclipse,' 'Knight,' 'Canoe,' 'Tom Thumb'
Soup peas (subspecies arvense)	Seed color may be beige, brown, yellow or green. Cooking time varies with variety.	Easy to grow and also can be used as a nitrogen-fixing cover crop. Many varieties are adapted to dry climates.	'Alaska,' 'Blue Podded,' 'Carlin,' 'Margaret McKee's Baking Pea'

it is easily prevented by growing resistant varieties. So-called "afila" types, which produce many tendrils but only a few leaves, are naturally resistant to powdery mildew.

- Rotate peas with non-legumes to avoid the buildup of soil-dwelling fungi that can cause roots to rot.
- Pea enation mosaic virus causes distorted new growth, and it is most common in the Northwest and Northeast. Several resistant varieties are available.

Growing Tips

Team up short and tall varieties of the same type by planting a compact variety on the outside of a quadruple row, with a long-vined variety closest to the trellis. The short variety will mature ahead of the taller one while helping to support it.

The easiest way to trellis peas is to let a short-vined variety cling to the stems and leaves of upright cover crops like oats or wheat. Many gardeners also save branches they have pruned from fruit trees or shrubs and use the branches to support compact varieties.

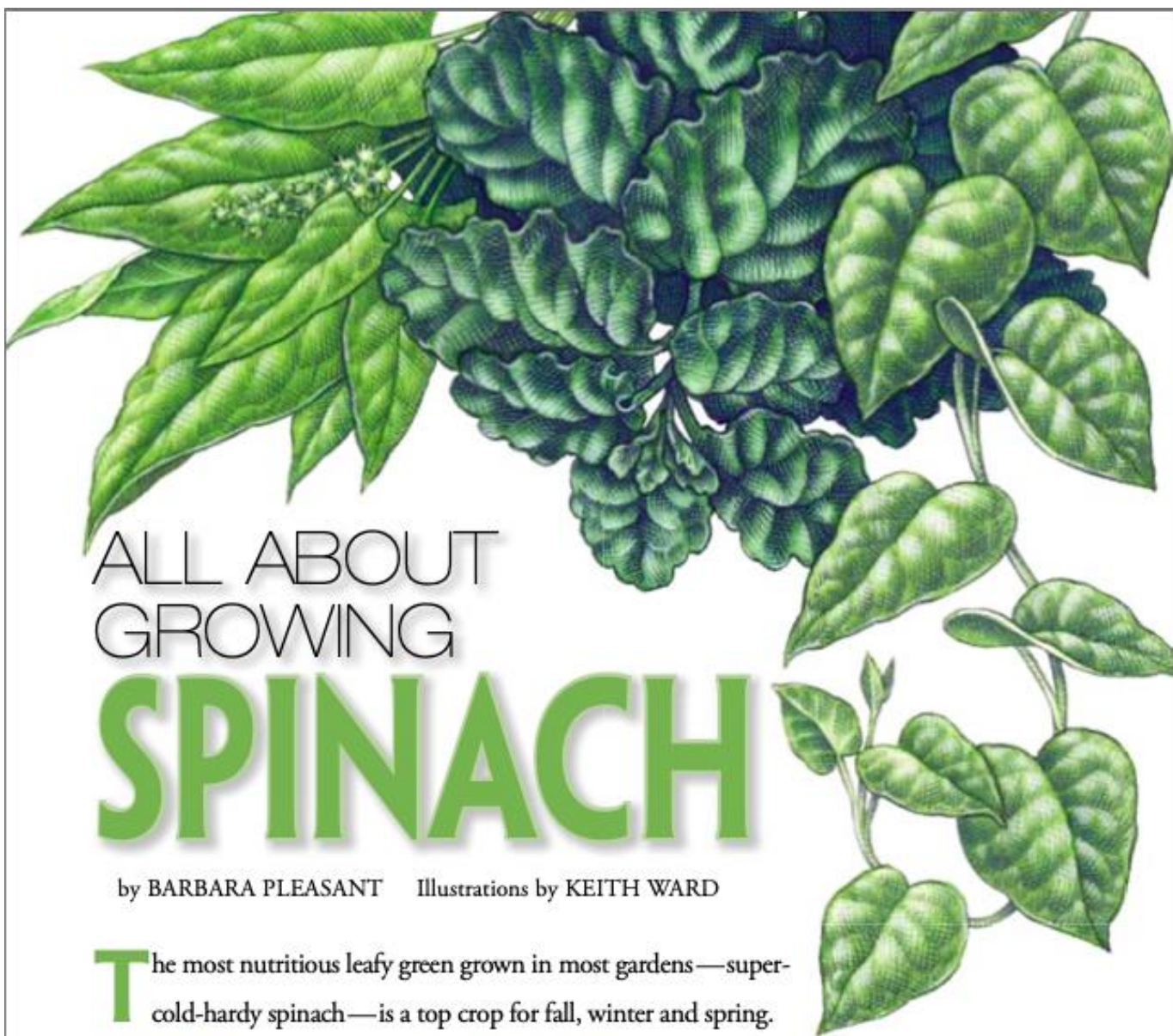
Use peas as edible ornamentals, especially varieties that produce lavender or purple flowers such as 'Swiss Giant' snow peas, 'Blue Podded' soup peas and 'Margaret McKee's Baking Peas.'

Soak seeds overnight in water before planting them. This will insure strong germination.

Coat seeds with a powdered pea/bean inoculant if you haven't grown peas in your garden. This will provide bacteria that live on pea roots and produce nitrogen. In subsequent seasons, scatter a spadeful of soil taken from last year's pea planting site onto your new pea bed. It will contain enough bacteria to help kick-start the nitrogen-fixing process.

Mulch plants when they are about 12 inches tall to help keep the soil cool and moist. Uniform soil moisture insures strong, steady growth.

Follow spring peas with carrots or cucumbers to make full use of the growing season. 🌱



ALL ABOUT GROWING SPINACH

by BARBARA PLEASANT Illustrations by KEITH WARD

The most nutritious leafy green grown in most gardens—super-cold-hardy spinach—is a top crop for fall, winter and spring.

Types to Try

Spinach varieties vary in the size, shape and texture of the leaves.

Savoyed and semi-savoyed types have dark green leaves—that are puckered or crinkled—and become especially crisp in cold weather. Many of the best varieties for growing through winter have savoyed leaves.

Smooth-leafed spinach is often a lighter shade of green compared to savoyed spinach, but the leaves are easier to wash and the plants tend to grow upright. Fast and easy to grow, smooth-leafed spinach can be gathered as baby greens, or you can let the plants grow to mature size.

When to Plant

In late winter, beginning six weeks before your average last spring frost date, start seeds indoors or beneath a protective frame outdoors. Make two additional spring sowings at three-week intervals.

In summer, skip spinach and try the hot-weather alternatives on Page 33.

In fall, six to seven weeks before your first fall frost date, sow your main crop for fall harvest.

About four weeks before your first fall frost date, sow *winter* spinach in a place where the seedlings can be covered in frigid weather with glass, plastic or a thick row cover. This planting will mature in early spring.

How to Plant

Prepare the planting bed by loosening the soil at least 10 inches deep. Thoroughly mix in compost along with alfalfa meal, soybean meal or another high-nitrogen organic fertilizer (follow label directions). Sow seeds a half-inch deep and 2 inches apart, in rows spaced at least 8 inches apart. As the plants grow, gradually thin them so the leaves of neighboring plants barely overlap.

Harvesting and Storage

Beginning about six weeks after planting, pinch off individual leaves as

In the Kitchen

Fresh from the garden, spinach is loaded with vitamins A and C, calcium and iron, and it has a remarkably buttery, nutty flavor when eaten raw in salads or sandwiches. Try semi-cooked wilted spinach salads made by pouring hot dressing over a bowl of torn spinach. Sage or thyme make great flavor accents. (Any dish with "Florentine" in its name includes cooked spinach.)



you need them in the kitchen, leaving the central rosette intact.

In spring, long, warm days cause spinach to "bolt" (flower and produce seeds). Unless you plan to save seeds, pull up the plants when you notice them developing a tall central stem. Thoroughly clean, then steam-blanch (which limits their uptake of water and fixes enzymes) and freeze bumper crops.

Saving Seeds

Spinach is pollinated by wind, so select a group of closely spaced plants to get seed

from an open-pollinated variety. Spinach plants can be male or female. Male plants quickly grow tall and release pollen from clusters of fringelike structures, while females are stockier and hold their flower clusters close to the main stem. If you save seeds, allow seed-bearing plants to stand in the garden until they begin to dry.

In wet weather, pull them up and let them finish drying in a warm, well-ventilated place. Strip the seeds from the plants and let them air dry for a few days before cleaning and sorting them. Store in a cool, dark place for up to three years. When

placed atop hospitable soil, seed-bearing plants often shed enough seed to start a fall crop.

Open-pollinated Options

Hybrid spinach varieties such as 'Tyee' (savoyed) and 'Space' (smooth-leaf) deliver high levels of disease resistance, but homegrown spinach rarely faces serious disease pressure. Among open-pollinated varieties, 'Monnopa' and 'Butterflay' are lower in oxalic acid compared to other varieties, which gives them a mild, sweet flavor. 'Giant Winter' and 'Monstrueux

Warm-Weather Spinach Alternatives

Plant Name	Description	Growing Tips
Patience Dock* <i>Rumex patientia</i>	Perennial to Zone 4; produces new flushes of edible leaves each time it is cut back.	Tolerates partial shade. Clip off flowers as they fade to prevent reseeding.
Golden Purslane* <i>Portulaca oleracea</i>	Lemon-flavored juicy leaves add crunch to salads; warm-season annual.	Sow in late spring in beds or containers. Pinch back often to prevent reseeding.
Perpetual spinach, spinach chard <i>Beta vulgaris ssp cicla</i>	Actually a compact, green-leafed Swiss chard; quite popular in European gardens.	Direct-sow from mid to late spring. Plant fall crop in late summer.
Garden sorrel* <i>Rumex acetosa</i>	Perennial to Zone 4; produces tangy leaves for cooking; 'Profusion' does not produce seeds.	Tolerates partial shade. Clip off flowers as they fade to prevent reseeding.
Lambsquarters* <i>Chenopodium giganteum</i>	Young leaves of "Mexican tree spinach" taste like spinach; plants can grow to 6 feet.	Leaves of 'Magenta Spreen' are splashed with pink. Prune as needed to prevent reseeding.
Orach <i>Atriplex hortensis</i>	Needs an early start, like spinach, but easier to grow and tolerates partial shade.	Red-leafed varieties make great edible ornamentals.
Vegetable amaranth* <i>Amaranthus species</i>	New leaves make tender and nutritious cooked greens; often added to Caribbean soups.	Sow after soil is warm. Pinch back often to push out new growth and prevent reseeding.
New Zealand spinach* <i>Tetragonia tetragonoides</i>	Young growing tips taken from sprawling plants resemble spinach when cooked.	Direct-sow from mid to late spring.
Malabar spinach <i>Basella rubra</i>	Vigorous twining vine from India produces glossy, edible leaves with fair flavor.	Sow in early summer, and train to grow on pillar or post.

*These plants can become weedy, so maintain tight control on reseeding. Grow responsibly!

de Viroflay' produce leaves twice the size of regular spinach.

Spinach Pest and Disease Prevention Tips

Keep plants widely spaced to help prevent problems that are encouraged by moist conditions, such as slugs and mildew diseases.

Avoid growing spinach where beets or chard were grown in the previous season. These crops are closely related to spinach, make similar demands on the soil and host the same soilborne diseases.

Gently squash leaf miners with your fingers or remove infested leaves. Spinach leaf miners are the larvae of small flies that make meandering pale tunnels as they feed inside spinach leaves. Where pressure is serious, use row covers to exclude the flies.

Pull back mulch to limit slug habitat, and trap them under boards or with beer-baited pit traps. Slugs make holes with clean edges in spinach leaves.

Pull up plants that show distorted new growth accompanied by yellowing of older leaves. Aphids and leafhoppers can transmit viral diseases to spinach.

Hybrids offer genetic resistance against downy mildew. Especially in the Southeast, downy mildew causes gray patches on affected leaves.

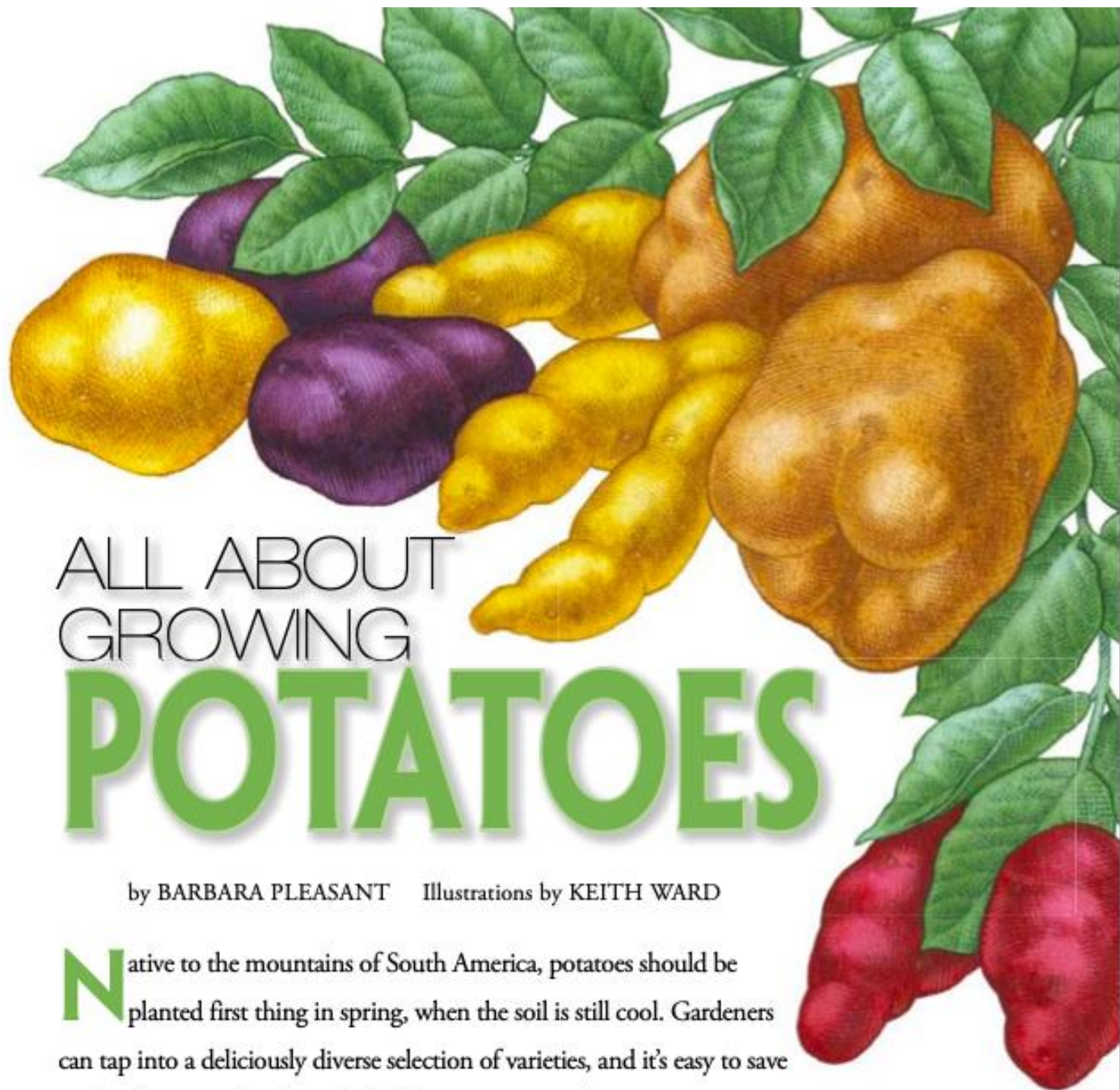
Growing Tips

Fertilize overwintered plants with a thorough drench of a fish-based fertilizer after they show new growth in spring. In spring, spinach often starts growing before the soil is warm enough to release enough nitrogen to meet the plants' needs. Spinach requires soil with a near-neutral pH, and germinates best when the soil ranges between 55 and 65 degrees.

Clip off old leaves as they turn yellow to reduce demands on the plant for nutrients and moisture.

Wait for frost to harvest your main fall crop. Exposure to cold increases the production of sugars in spinach leaves, which serve as natural antifreeze and taste great.

Use frames or tunnels to protect winter spinach from accumulated ice and snow as far north as Zone 4. Plants that receive winter protection will begin growing again early in the spring. 🌱



ALL ABOUT GROWING POTATOES

by BARBARA PLEASANT Illustrations by KEITH WARD

Native to the mountains of South America, potatoes should be planted first thing in spring, when the soil is still cool. Gardeners can tap into a deliciously diverse selection of varieties, and it's easy to save and replant your favorite varieties from one year to the next.

Types to Try

Potatoes vary in size, shape, color, texture and time to maturity. Maturation time is the most important variable, because potato tubers grow best when soil temperatures range between 60 and 70 degrees Fahrenheit. Try to get your crop harvested before hot summer temperatures arrive.

Early varieties that mature in less than 90 days are good fits for any garden. Creamy, round 'Irish Cobbler,'

purple-skinned 'Caribe,' and prolific 'Red Norland' fall into this group, along with 'King Harry,' which is resistant to Colorado potato beetles.

Midseason varieties mature in 100 days or so, and include 'Yukon Gold' and 'Red LaSoda,' which is often the top-producing potato in warm climates.

Late varieties need 110 days or more of growing time, but they typically produce a heavy set of tubers that keep well in storage. 'Butte' is an all-purpose brown-

skinned potato that performs well when grown in the Midwest; 'Katahdin' and 'Kennebec' rule in the Northeast.

Elongated fingerling potatoes vary in their maturation times and come in a range of colors and sizes. None are very early, but late-maturing fingerlings will size up earlier if you presprout the seed potatoes before you plant them.

(To shop for seed potatoes, go to www.MotherEarthNews.com/Find-Seeds-Plants.aspx. —MOTHER)



In the Kitchen

Garden-fresh potatoes are a rare delicacy that can be pan-fried for breakfast, steamed for a lunchtime salad, or served roasted or mashed as a supreme comfort food. An excellent source of vitamin C and iron, potatoes also deliver a range of B vitamins and minerals. Everything goes with potatoes: They pair particularly well with rosemary, onions and garlic, or with any type of roasted meat.

When to Plant

In climates with short springs and hot summers, plant the early and midseason varieties three to four weeks before your last spring frost date.

In climates with long springs and hot summers, plant early and midseason varieties three to four weeks before your last spring frost date; plant late-maturing varieties in early summer so they will mature in the cooler fall.

In climates with cool summers, plant early, midseason and late varieties two to three weeks before your last spring frost date.

How to Plant

Prepare the planting bed by loosening the soil to at least 10 inches deep. Potatoes adapt well to acidic soils with a pH below 6.0, which is lower than what is

preferred by many other vegetable crops. Thoroughly mix in a layer of compost or rotted leaves, along with a half-ration of alfalfa meal, soybean meal or another high-nitrogen organic fertilizer (follow label directions). Do not use manure because it is correlated with an increase in rough patches on spud skins.

Two days before planting, cut the seed potatoes into pieces, so that each piece has two to three buds (or "eyes"). Cutting the seed potatoes and letting the cut pieces dry for about two days reduces the risk of rotting. Work carefully if the eyes have already grown into sprouts. Allow the cut pieces to dry in a well-ventilated room. Plant the pieces 12 inches apart in 4-inch deep furrows; cover the seed pieces with 2 inches of soil. Fill in the furrows after the first sprouts emerge.

Harvesting and Storage

Potato plants die back as they finish making their crop. Begin digging when the foliage starts to yellow and wither. Gently knock off dirt and allow the tubers to dry indoors, covered with dry towels, for a day or two. Take care to protect the tubers from sunlight at all times to prevent greening that may result in bitterness. Store the most perfect tubers in a cool, 50- to 60-degree place to be used as seed potatoes. Eat the "less than perfect" potatoes first, but keep in mind that they won't store forever. For longer storage, potato slices can be blanched and dried. A pressure canner must be used to can potatoes.

Saving Seeds

Occasionally potatoes produce true seeds, but they are easiest to propagate by

Pest and Disease Prevention

Problem	Description	Controls
Colorado potato beetle (<i>Leptinotarsa decemlineata</i>)	Yellow and black striped beetles lay orange eggs on leaf undersides. Brick red larvae eat leaves and flowers.	Resistant varieties ('King Harry'), row covers, straw mulch, crop rotation, hand picking, spinosad.
Slugs and snails	Soft-bodied mollusks, with or without shells, chew holes in leaves at night or during rainy weather.	No evening watering, hand picking, trapping, encouraging ground beetles and other natural predators with enhanced habitats, practice delayed or reduced mulching.
Flea beetles (<i>Eptitrix cucumeris</i>)	Tiny black beetles chew numerous small round holes in leaves. Second generation may tunnel into tubers.	Tolerate light damage, or use spinosad to control serious infestations.
Scab (<i>Streptomyces species</i>)	Soilborne bacteria cause corky patches to form on potato skins. Affected potatoes are good to eat, but less than beautiful.	Rotate with nonrelated crops, maintain constant soil moisture, use resistant varieties, do not use any kind of manure.
Early blight (<i>Alternaria solani</i>)	Widespread fungal disease causes brown spots to form on leaves. Encouraged by wet weather and the presence of mature, failing plants.	Maintain wide spacing and use drip irrigation to keep leaves dry. Harvest plants before the disease becomes severe.
Late blight (<i>Phytophthora infestans</i>)	Devastating fungal disease encouraged by mild, wet weather; causes leaves to wilt and turn brown within a few days.	Resistant varieties; early planting, wide spacing to help keep leaves dry.

replanting the actual potatoes. If you are a new gardener, start with certified disease-free seed potatoes. Resist the urge to eat several pounds of perfect, medium-sized potatoes—they will be great for planting the following year. Most experienced gardeners experiment with varieties and eventually assemble a collection of favorites. About 6 pounds of seed potatoes are needed to plant 50 feet of row—yield will vary from 75 to 125 pounds.

Growing Tips

Buy interesting-looking potatoes if you see them in stores. If you love the way they taste, save a couple and use them as seed potatoes in the spring. In rural areas, farm supply stores sell seed potatoes of varieties known to produce well under local conditions.

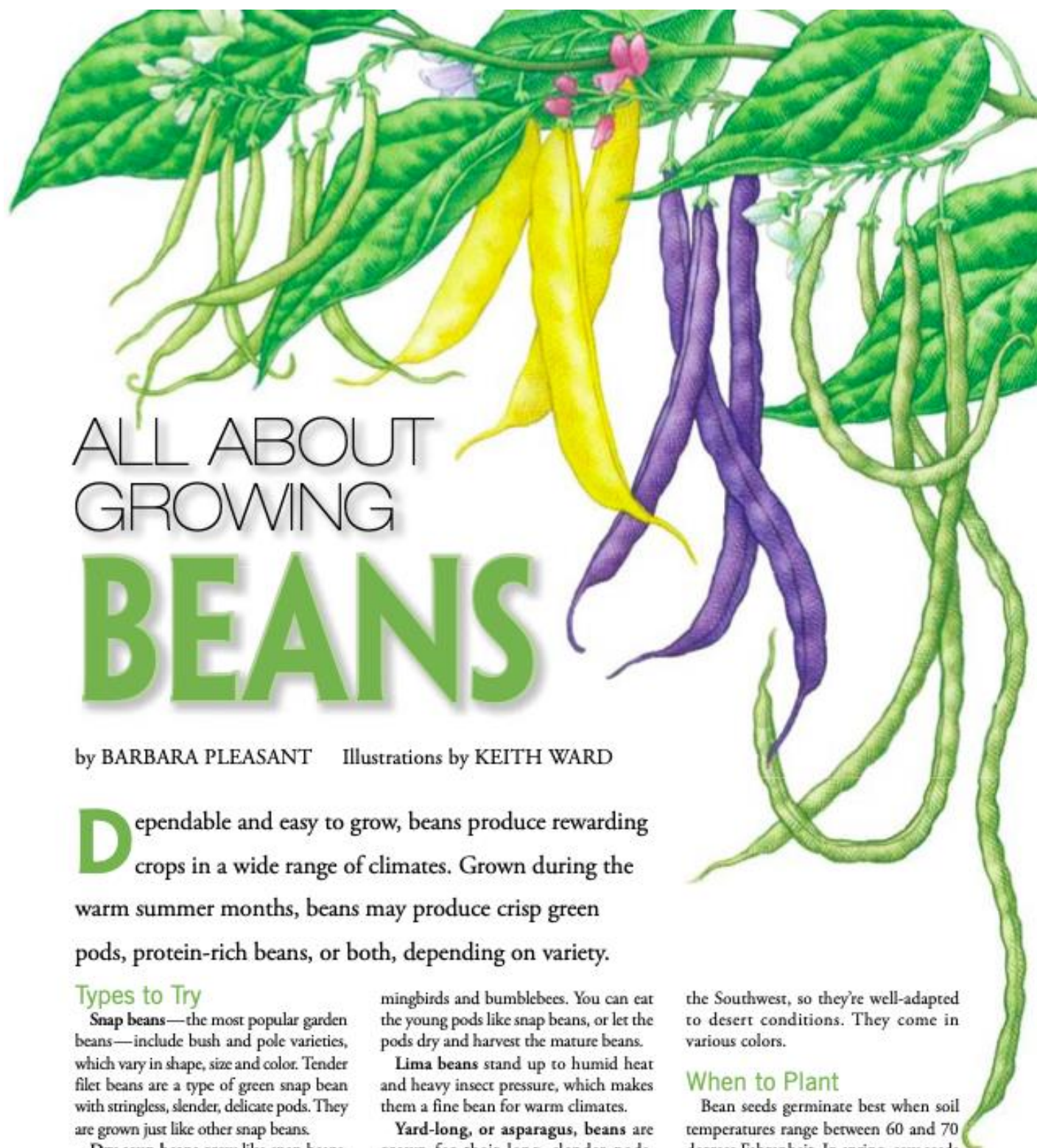
Get an earlier crop by presprouting your seed potatoes indoors. Presprouted seed pieces will mature up to a month ahead of seed pieces bearing dormant eyes. Five weeks or so before planting, spread out your seed potatoes in a single layer in a warm, well-lit room, and wait for them to sprout from the eyes. Presprouted potatoes are fragile, so be careful when handling them. Large sprouts that break off of the parent potato often will grow when planted in moist soil.

Fertilize in halves, with half of the fertilizer mixed into the soil before planting, and the rest used if needed as a side dressing when the plants are 12 inches tall, just before piling on mulch or hilling up soil around stems (to prevent sunburned spuds).

Use old blankets to protect newly emerged potatoes if late frosts are forecast. Once the blankets are removed, the stems will pop back up within a day. (If nipped back by frost, potatoes will re-grow from secondary buds.)

Mulch plants heavily with weathered leaves or straw to keep the soil moist and protect tubers from sunlight. In slug-prone seasons, hill up loose soil over the bases of the plants instead of mulching.

After harvesting the potatoes in the early stages of summer, plant the vacated space with beans or squash, or with a cover crop of buckwheat. 🌱



ALL ABOUT GROWING BEANS

by BARBARA PLEASANT Illustrations by KEITH WARD

Dependable and easy to grow, beans produce rewarding crops in a wide range of climates. Grown during the warm summer months, beans may produce crisp green pods, protein-rich beans, or both, depending on variety.

Types to Try

Snap beans—the most popular garden beans—include bush and pole varieties, which vary in shape, size and color. Tender filet beans are a type of green snap bean with stringless, slender, delicate pods. They are grown just like other snap beans.

Dry soup beans grow like snap beans, but the immature pods stay tender for only a few days as the plants hurry to produce mature seeds. They are very easy to dry.

Scarlet runner beans produce showy clusters of red blossoms that attract hum-

mingbirds and bumblebees. You can eat the young pods like snap beans, or let the pods dry and harvest the mature beans.

Lima beans stand up to humid heat and heavy insect pressure, which makes them a fine bean for warm climates.

Yard-long, or asparagus, beans are grown for their long, slender pods, which are harvested at 12 to 18 inches long. Pods may be green, burgundy or streaked.

Tepary beans, a type of dry bean, were developed by the native people of

the Southwest, so they're well-adapted to desert conditions. They come in various colors.

When to Plant

Bean seeds germinate best when soil temperatures range between 60 and 70 degrees Fahrenheit. In spring, sow seeds in fertile, well-worked soil starting on or after your last frost date. When growing fast-maturing bush snap beans, make additional plantings at three-week intervals until midsummer.

In the Kitchen

Kids of all ages love to munch garden-fresh green beans, especially sweet and tender filet types. Extra green beans are easy to blanch and freeze, and rehydrated dried snap beans taste almost as good as fresh ones. Gather some of your soup beans at the mature green stage to use in succotash and other summer dishes, and dry the rest for winter. Green beans are a good source of fiber and vitamins A and C, while dry beans are rich in B vitamins and minerals. Team up beans with grains (such as rice or corn) to get prime protein from both foods, as beans and grains contain complementary essential amino acids.



How to Plant

Prepare the planting bed by using a garden fork to loosen the soil. Mix in a 1-inch layer of mature compost. Plant seeds 1 inch deep and 2 to 4 inches apart. Thin bush beans to 4 inches apart; thin pole beans to 6 inches apart. Wide double rows (two parallel rows of beans planted 12 to 14 inches apart) are the most space-efficient way to grow beans.

Harvesting and Storage

Harvest green beans when they are young and tender, and use two hands when picking to keep from breaking the brittle plants. Most bush beans will produce a second or third flush of beans

after the first one is picked. Harvest pole beans at least twice a week to keep the plants productive. The mature beans of all snap bean varieties usually make good soup beans.

Allow dry beans to stay on the plants until the pods turn tan and the beans inside show good color and a hard, glossy surface. If damp weather sets in just when your beans should be drying, pull up the plants and hang them in a dry place until they are dry enough to shell and sort. Allow your shelled beans to dry at room temperature for two weeks before storing them in airtight containers. If you think insects might be present in your stored beans, keep them in the freezer.

Saving Seeds

To save dry beans for replanting, select the largest, most perfect seeds from your stored beans. With snap beans, it is best not to harvest beans from plants grown for seed production. That way, the plants will channel all their energy into big seeds that will grow into big seedlings. Be patient, because snap bean varieties that have been bred to stay tender for a long time are often slow to develop mature seeds. Under good conditions, bean seeds will store for at least three years. A packet will plant about 25 feet of row, which should produce 20 to 30 pounds of bush snap beans, or 40 pounds or more of pole beans. Expect about 1½ pounds of dry beans from a 25-foot row.

Beans at a Glance

Type	Description	Varieties
Snap beans (<i>Phaseolus vulgaris</i>) 50 to 55 days bush; 50 to 67 days pole	A great beginner crop, snap beans seldom fail. Try bush and pole types, which also vary in pod shape and color.	'Provider' bush, 'Royal Burgundy' bush, 'Fortex' pole, 'Kwintus' pole
Dry soup beans (<i>Phaseolus vulgaris</i>) 55 days green; 85 days dry	As easy to grow as bush snap beans, these bush beans are even easier to store. Many varieties can be enjoyed as green beans, fresh shelled beans, and dry beans.	'Tiger's Eye,' 'Jackson's Horticultural,' 'Cherokee Wax,' 'Flagolet'
Scarlet runner beans (<i>Phaseolus coccineus</i>) 60 days green; 90 days dry	Top edible ornamental attracts pollinators and bears edible pods followed by big, colorful dry beans. Best in climates where summers are not extremely hot.	'Scarlet Emperor,' 'Painted Lady'
Lima beans (<i>Phaseolus lunatus</i>) 75 days bush; 85 days pole	Limas need heat to produce well and stay on schedule. Green baby limas are tedious to shell, but dry lima beans shell easily.	'Dixie Butterpea' bush, 'Fordhook 242' bush, 'Christmas' pole, 'Sieva' pole
Yard-long beans (<i>Vigna sesquipedalis</i>) 80 days	Related to southern peas, yard-long (asparagus) beans need plenty of warm sun. Harvest pods when they are the diameter of a pencil. Older pods become pithy.	'Mosaic,' 'Red Noodle,' 'Green Pod'
Tepary beans (<i>Phaseolus acutifolius</i>) 80 to 90 days	Drought-tolerant plants produce beans that may be flattened or plump. Bean color varies with variety, and can be white, brown or speckled with blue.	'Mita Black,' 'Blue Speckled,' 'Sonoran' (all bush or semi-bush)

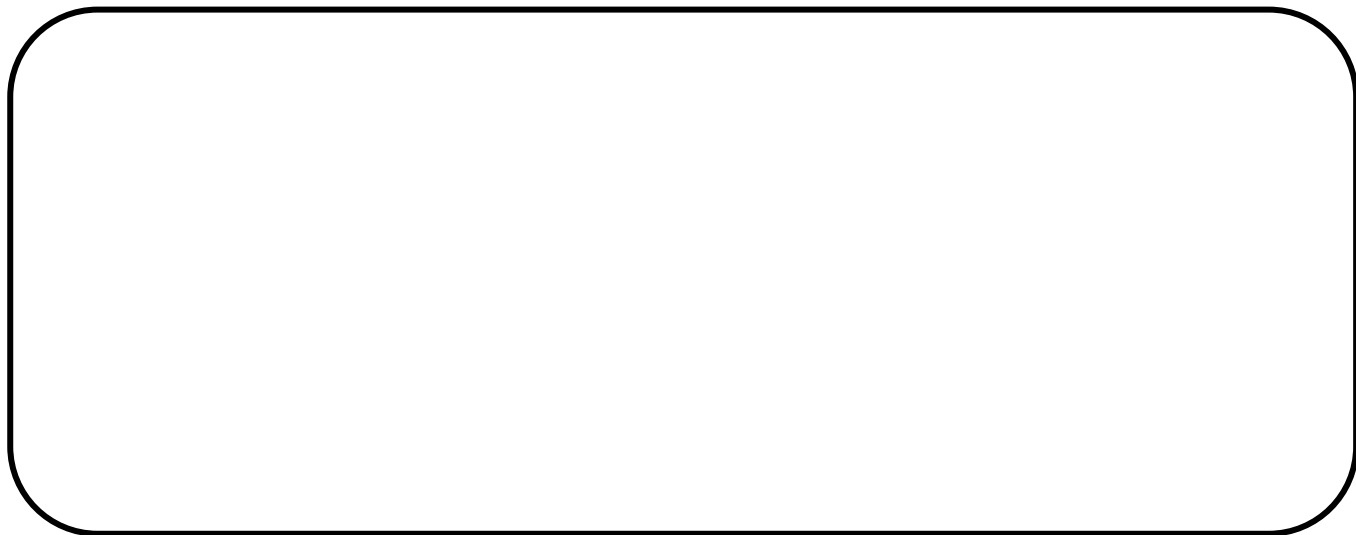
Pest and Disease Prevention Tips

- Brick-colored Mexican bean beetles sporting black spots often lay clusters of yellow eggs on leaves, which hatch into yellow larvae that rasp tissues from leaves. Handpick this pest in all life stages, and try spraying neem oil to control light infestations. In large plantings of more than one-fourth of an acre, releasing beneficial *Pediobus* wasps is a worthwhile strategy.
- Beans grown in sites that recently supported grasses are often sabotaged by night-feeding cutworms. Diatomaceous earth sprinkled over the soil's surface can help reduce losses.
- Several fungal and bacterial diseases cause dark spots and patches to form on bean leaves. To keep from spreading diseases among plants, avoid working in your bean patch when foliage is wet.
- Promptly cut down and compost plants that are past their prime to interrupt the life cycles of pests and diseases.

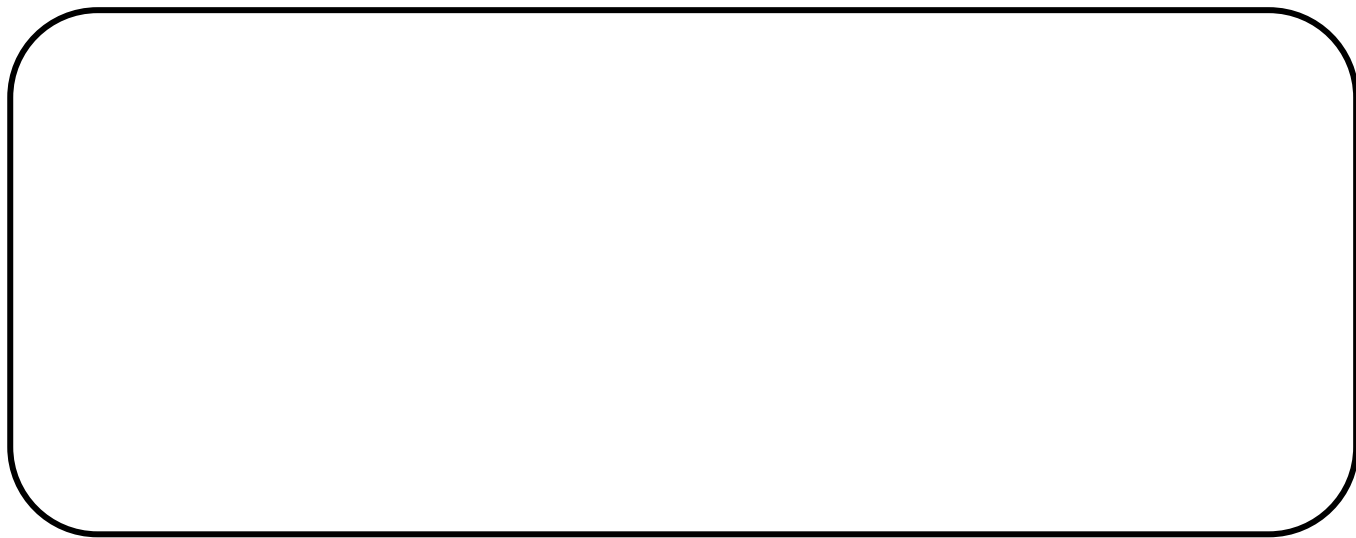
Growing Tips

- Extend your harvest of bush snap beans by planting them two or three times, with each sowing three weeks apart. In warm climates, make a sowing in late summer, about 10 weeks before your first fall frost is expected.
- Grow more beans in less space by growing pole varieties, which produce more per square foot by making good use of vertical growing space. Tall bamboo poles or saplings make easy tripods to support pole varieties.
- Be stingy with fertilizer. Beans benefit from fertile soil with a slightly acid pH (between 6.0 and 6.5), but once they are up and growing, beans make most of the nitrogen they need (which they use to nurture their crop of seeds). When growing beans in a new garden site, inoculating seeds with nitrogen-fixing bacteria before planting can help kick-start this process. Even simpler, scatter a few spadefuls of soil from last year's bean patch into new planting sites.
- Use bush beans as a cover crop in warm summer weather. You can turn the plants under, or pull them up and compost them. 🌱

Garden Inquiry Booklet

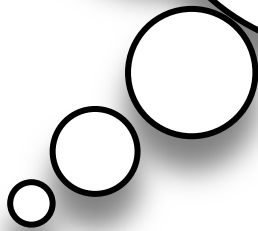


Garden

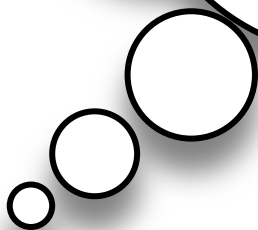


Garden

I wonder _____



I wonder _____





Indigenous Perspectives



Indigenous Perspectives



Epic Reading App

I can record something new I learned.



Epic Reading App

I can record something new I learned.



3 New Words I have Learned



1. _____: _____

2. _____: _____

3. _____: _____

3 New Words I have Learned



1. _____: _____

2. _____: _____

3. _____: _____

STEM Challenge



STEM Challenge

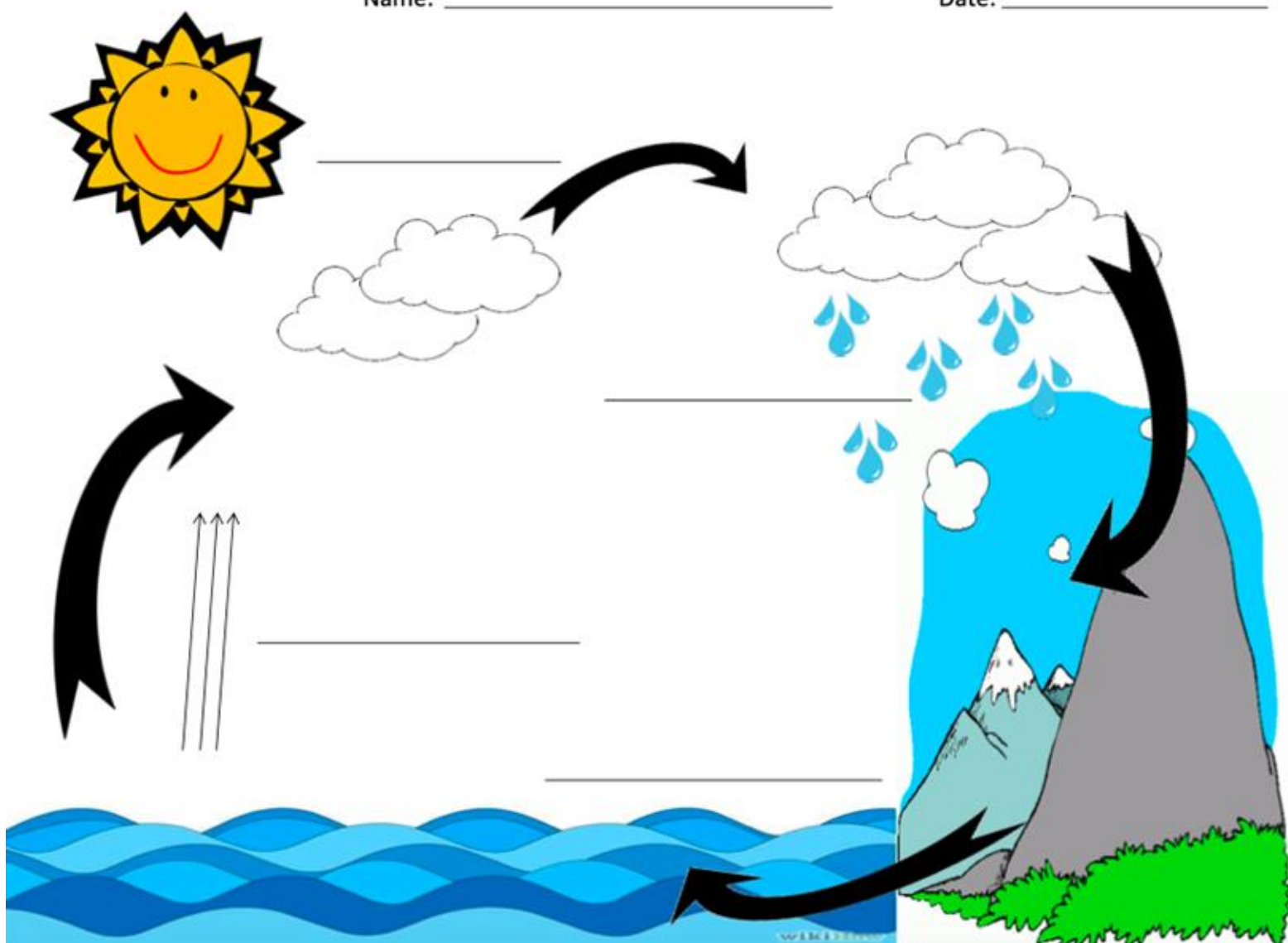




Water Cycle Resources

Name: _____

Date: _____



What is the Water Cycle?

Click me to find out

Condensation

Click here to find the water cycle to cut and color

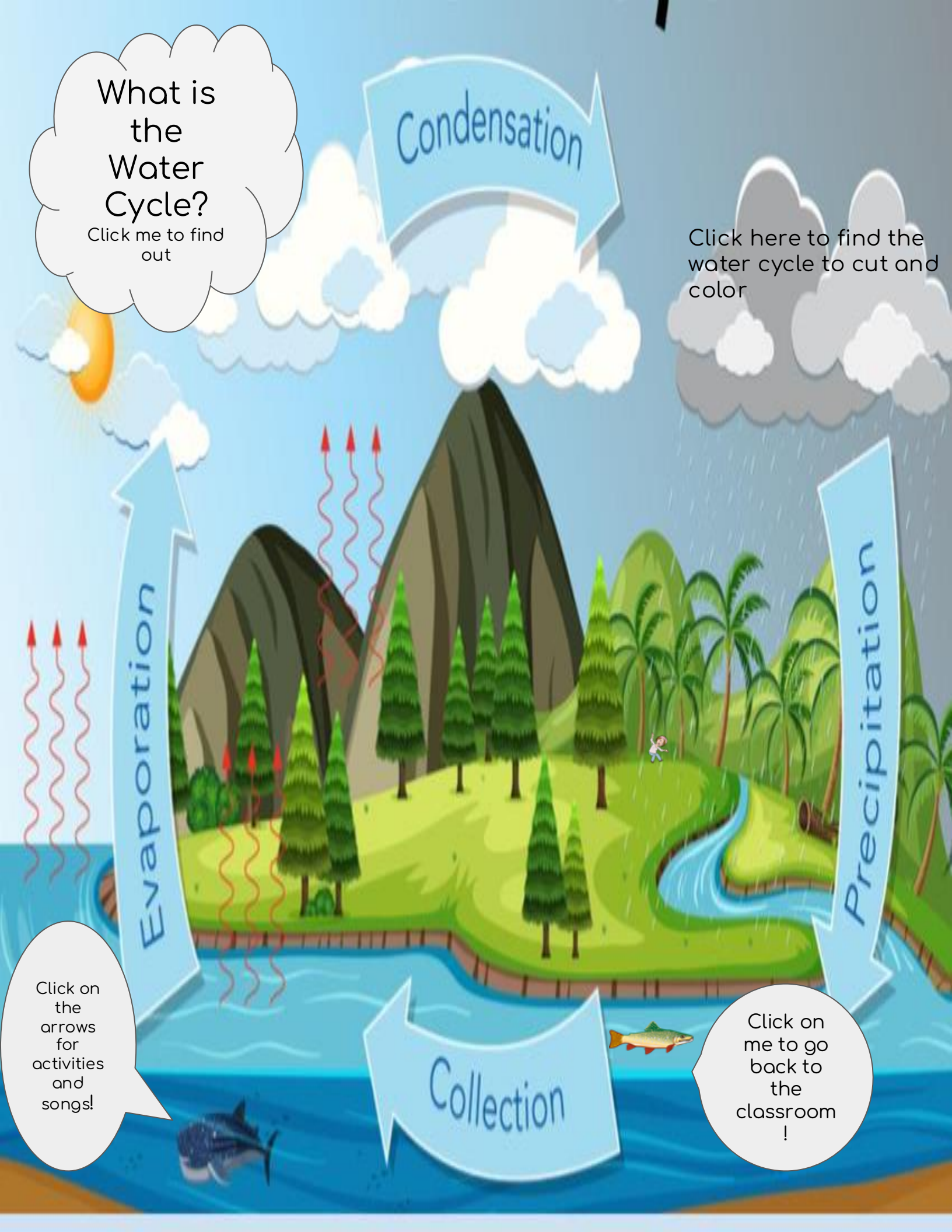
Evaporation

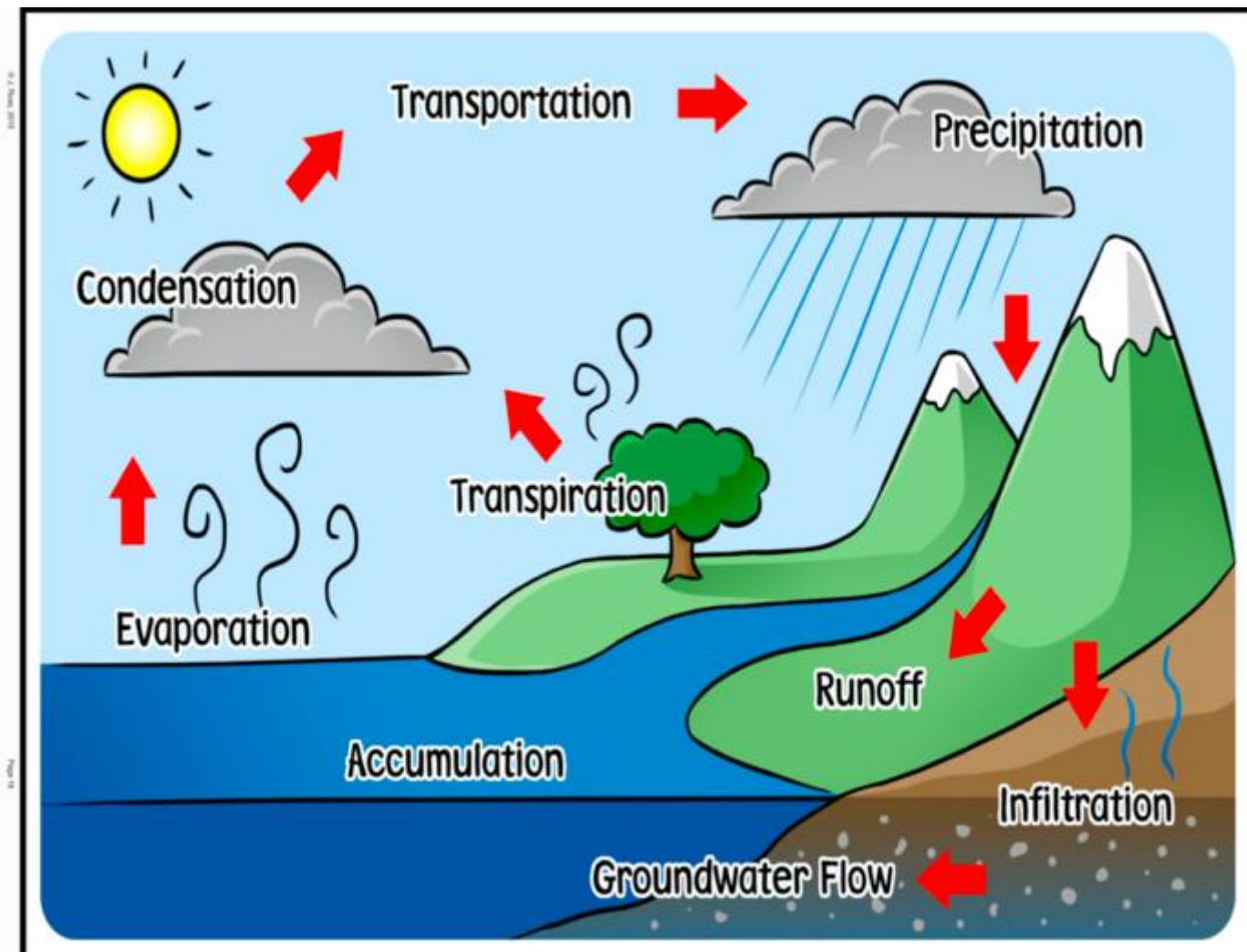
Precipitation

Collection

Click on the arrows for activities and songs!

Click on me to go back to the classroom !





Water Cycle Game Rules

1. Each player puts their game piece on "start"
2. Roll the die and move across the game board.
Triangles also count as squares, don't pass over them.
3. Each time the student passes a triangle; they should practice saying that part of the water cycle out loud.
4. If a player lands on "trade places" they must switch places with another player, even if they are in the lead.
5. If a player lands on the "extra loop" box they must go up the transpiration route and back around.
6. Optional fun rule: If you land on the same square as another player, you can push their game piece back to start.
7. To win the game you must roll the exact number to land on the finish star.

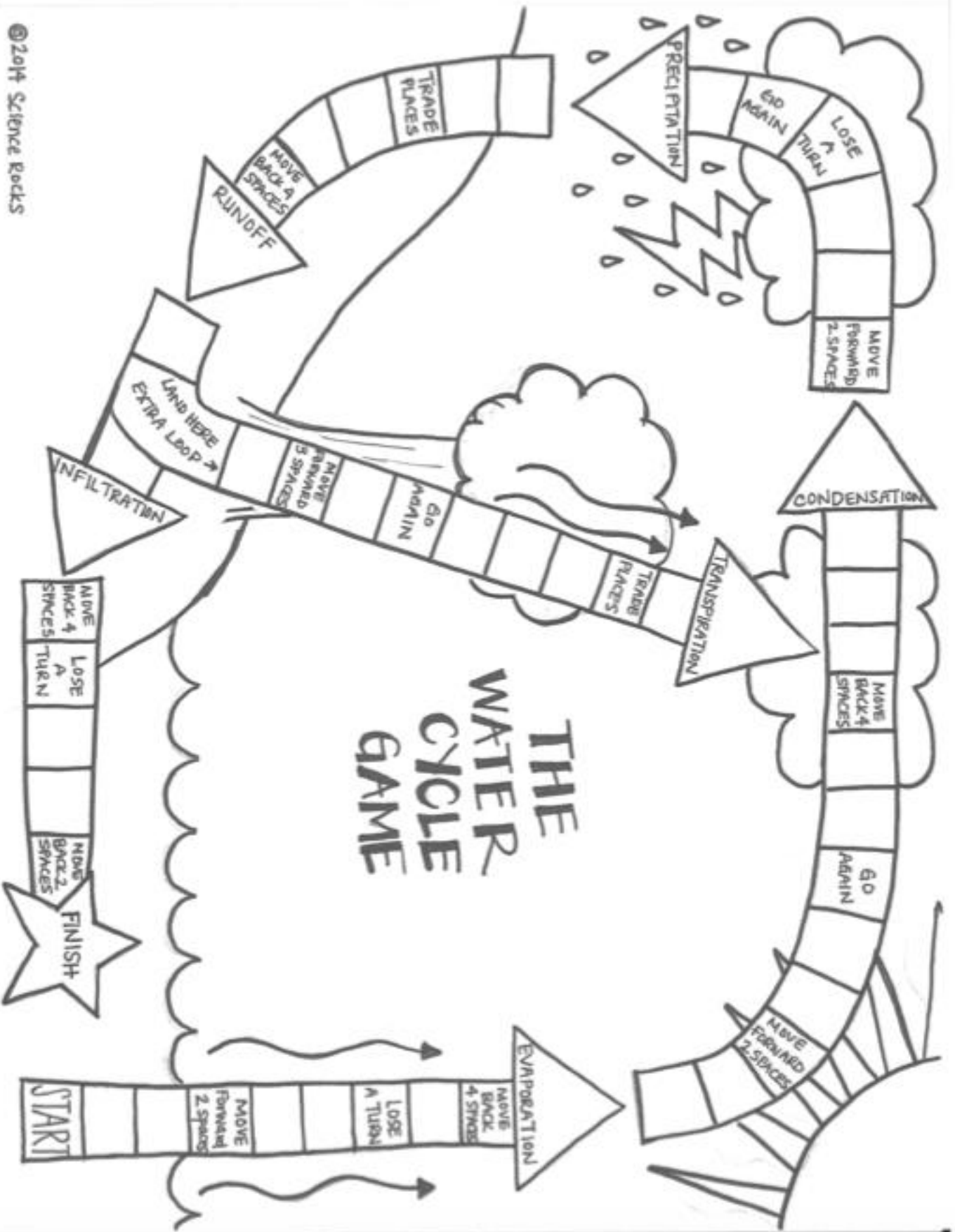
It is best if you print this game board and enlarge it to poster size and laminate so you can use for years to come. I hope your students enjoy it!

Thanks,

Science Lessons That Rock



SCIENCE LESSONS THAT ROCK!





Water Cycle Bracelet

	Green	
	Yellow	
	Clear	
	White	
	Blue	



Key:

Green: Land

Yellow: Sun

Clear: Evaporation

White: Cloud/Condensation

Blue: Precipitation

Name: _____ Date: _____

Reading: The Water Cycle

The water cycle describes the movement of water on, above, and below the Earth's surface. The steps of the water cycle are: evaporation, condensation, precipitation and collection.

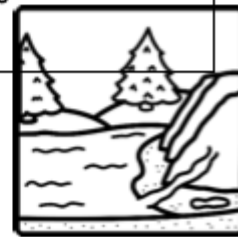
Evaporation is when the sun heats up water in bodies of water and turns the water into vapor or steam. The water vapor or steam leaves the body of water and rises up to the air. When this is happening, the water is a gas.

Condensation is when the water vapor or steam in the air gets cold and changes back into a liquid and forms clouds. The water vapor changes from a gas to a liquid.

Precipitation is when there is too much water that has condensed in the air and it cannot be held anymore. Precipitation happened in the clouds. The clouds become heavy and rain falls back to the Earth in different forms: rain, snow, sleet or hail.

Collection is when the water falls back to the Earth and goes into different bodies of water: rivers, lakes, oceans or soaked into the land.

Once collection occurs, the water cycle starts all over again!



Name: _____ Date: _____

Activity: The Water Cycle

Directions: Describe each part of the water beside the pictures.



This is showing:



This is showing:



This is showing:



This is showing:

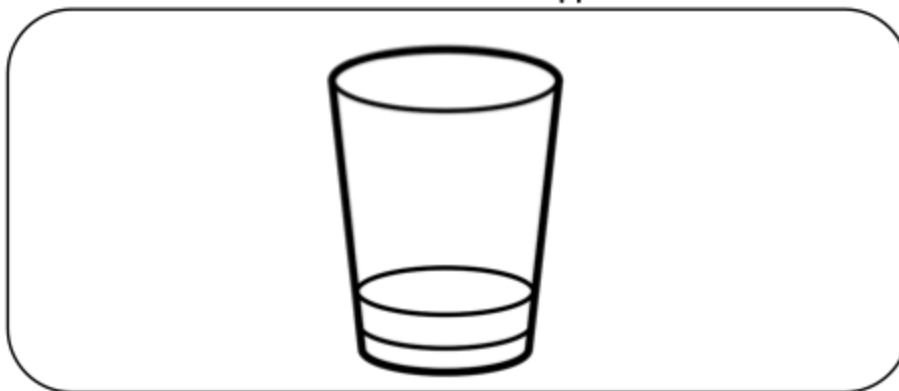
Name: _____ Date: _____

Rain Cloud in a Jar Experiment

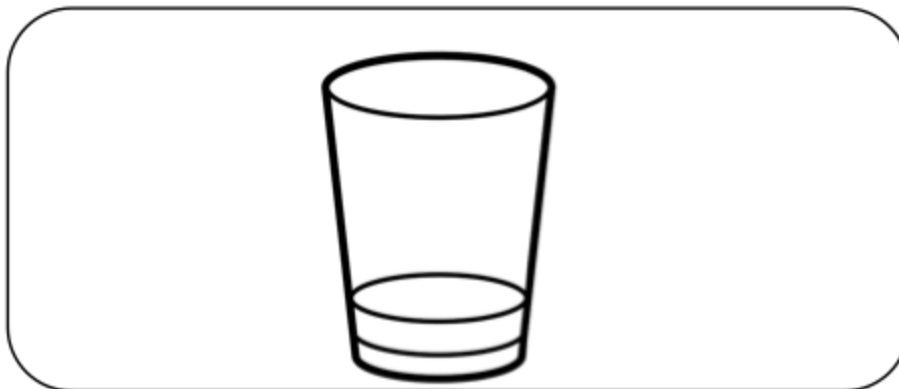
Materials Required:



What I think will happen:



What I observed:



Name _____ Date _____ Number _____

WATER CYCLE TEST

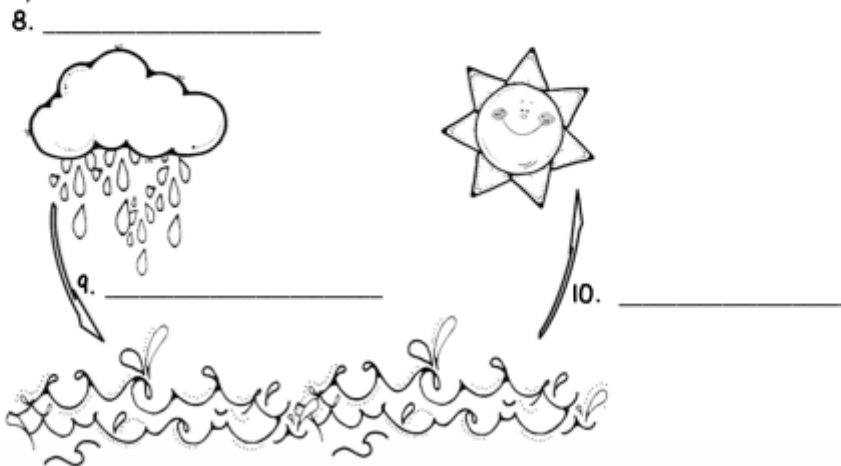
Match each word with it's meaning by writing the correct letter on each line:

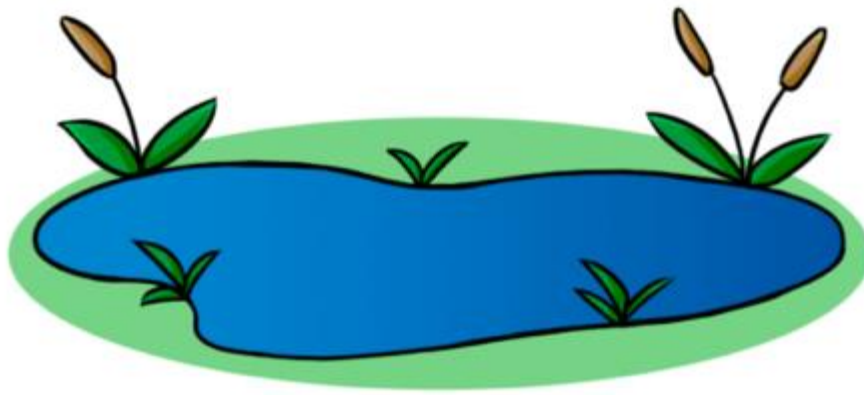
- | | |
|------------------------|---|
| 1. _____ evaporation | a. water is warmed by the sun and turned into water vapor |
| 2. _____ condensation | b. rain, snow, sleet, and hail |
| 3. _____ precipitation | c. water vapor cools and forms a cloud |

Choose the best answer:

4. What happens when a gas (water vapor) turns into a liquid (water)?
a. evaporation b. melting c. precipitation d. condensation
5. _____ occurs to create a cloud.
a. evaporation b. precipitation c. freezing d. condensation
6. What happens to the water on my driveway?
a. it precipitates b. it condensates c. it evaporates
7. What happens when the cloud becomes heavy? _____

Label the water cycle:

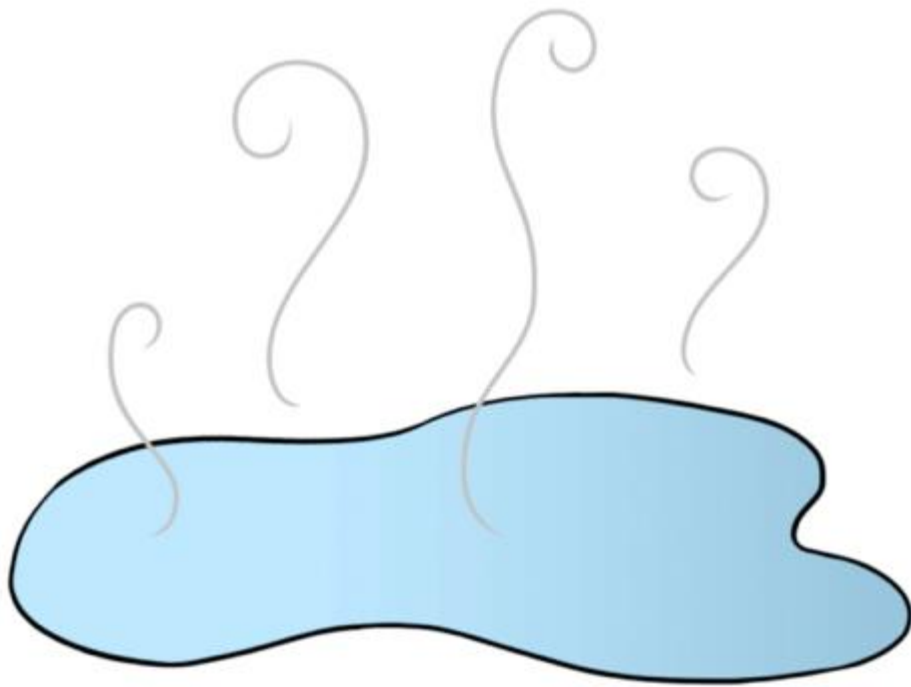




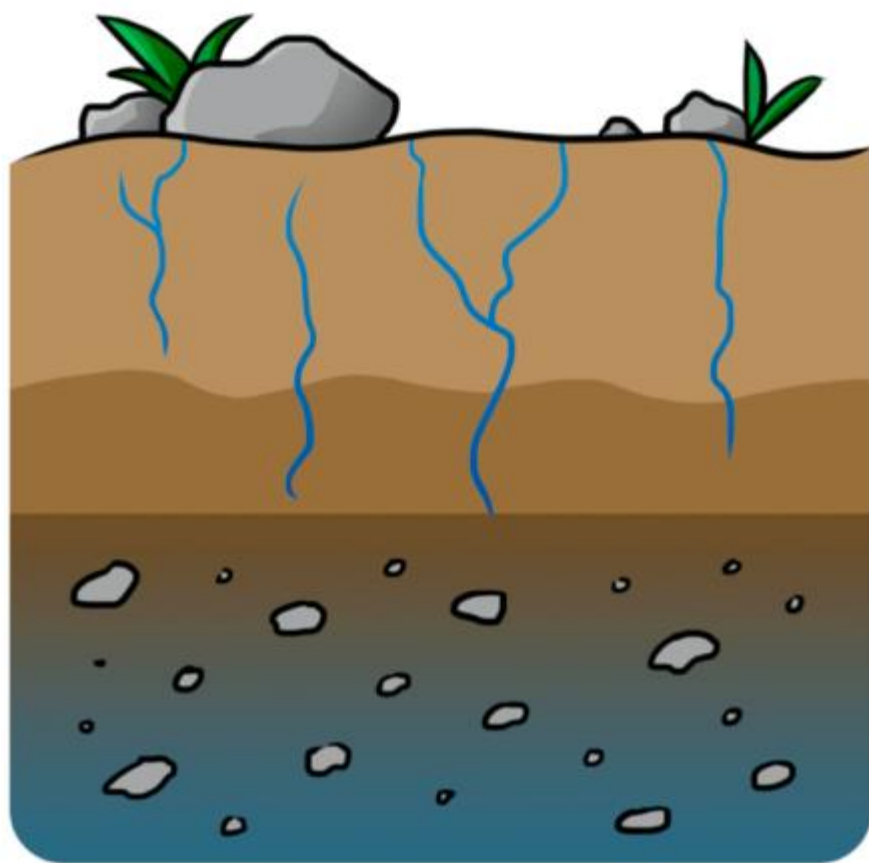
accumulation



condensation



evaporation



infiltration



precipitation



runoff



transpiration

Q

water that
flows along the
Earth's surface

O

the process in
which water
collects in rivers,
lakes, and
oceans

R

the process in
which liquid
water becomes
water vapor

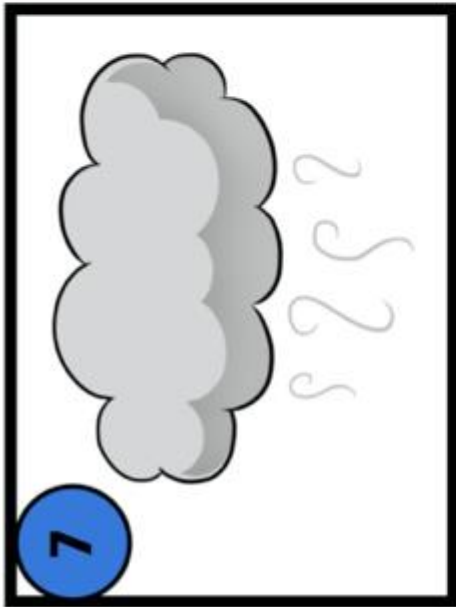
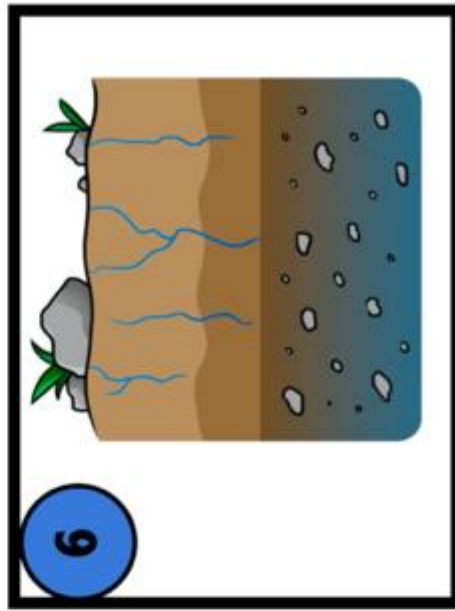
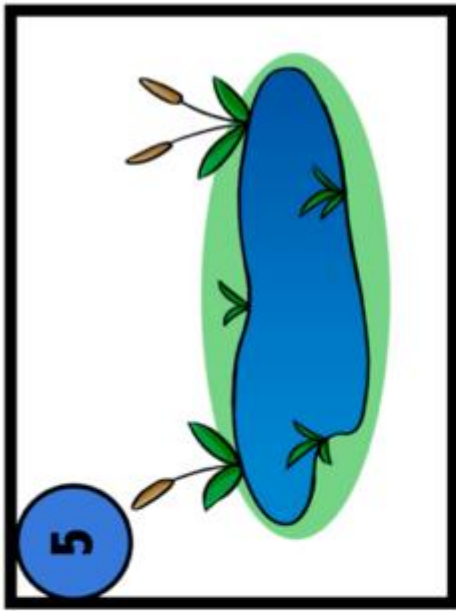
P

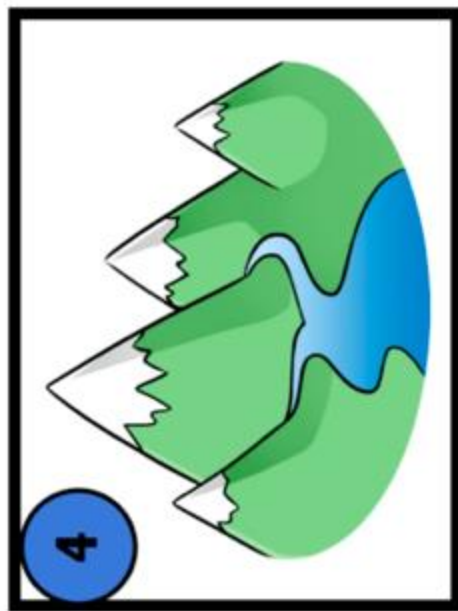
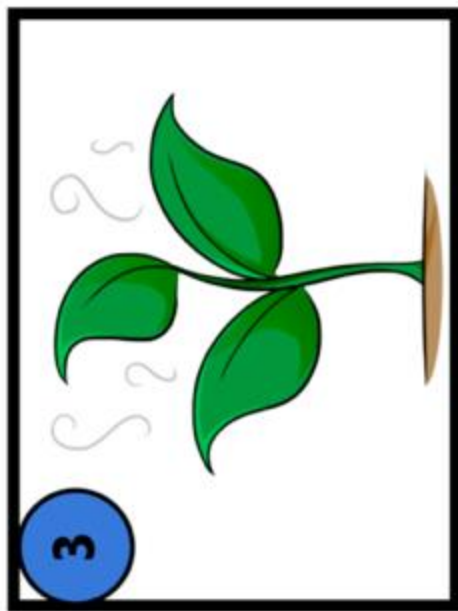
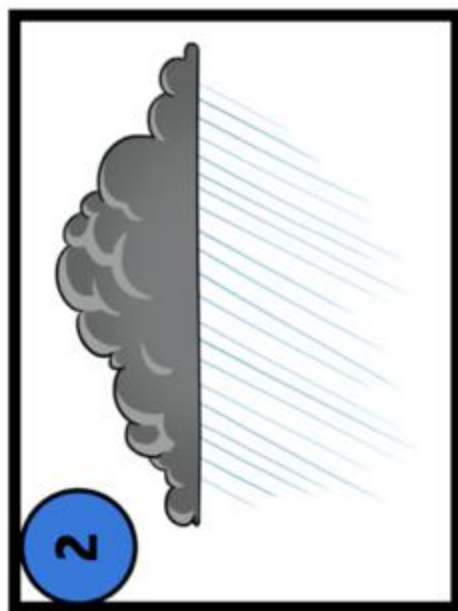
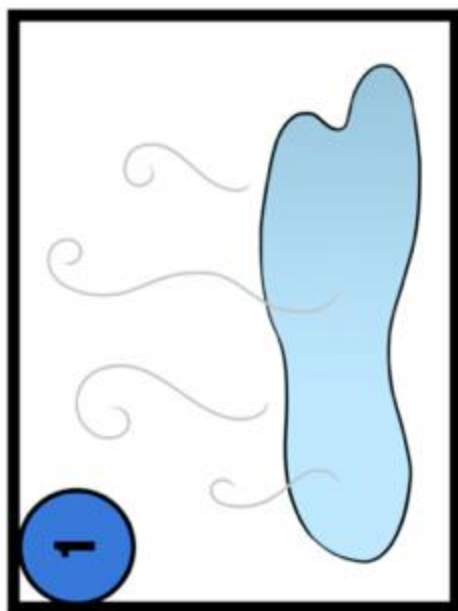
the process in
which water falls
from clouds in
the sky

U the process in
which water
on the Earth's
surface enters
the soil

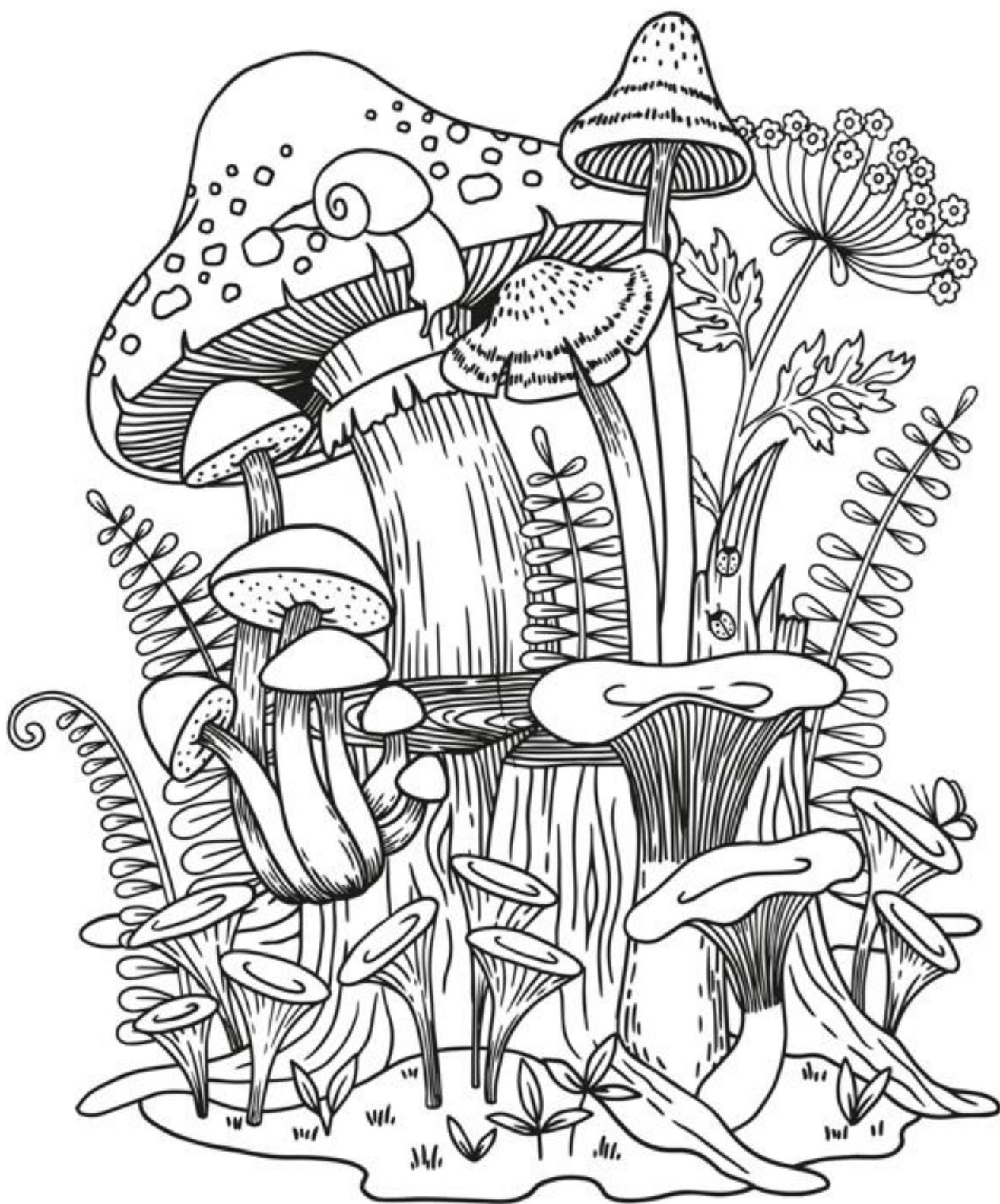
S the process in
which water
vapor in the air
turns into liquid
water

T the process in
which water
within plants
evaporates into
the atmosphere





Fungi Resources



Habitat

Mushrooms can grow in many places, in fact you would be surprised at some places mushrooms can appear. Below is a list of the most common possible places certain species make their home, to help with your recording, including both habitat and substrate.

Habitat	Substrate
Mixed Woodlands	Trees
Coniferous Woodlands	Dead Trees
Deciduous Woodlands	Alive Trees
Fields	Rotting Trees
Agricultural Fields	Leaf Litter
Grasslands	Soil
Moors	Sticks
Pastures	Wood Chips
Gardens	Moss
Sand Dunes	Decaying Animals
Parks	Animal Feces (Dung)
Paths	Insects
	Other Mushrooms

Determining the correct habitat and substrate for one of your fungal finds can be vital for correct identification.

So, listing a location as

"Cow Field - Growing from Cow Feces"

would be better suited to recording your find, than just saying

"In a Field"

Be specific, even if you feel it unnecessary.

Texture & Smell

Many words are used to describe fungi, some of which are necessary for correct identification. Below are some examples to help with your recording.

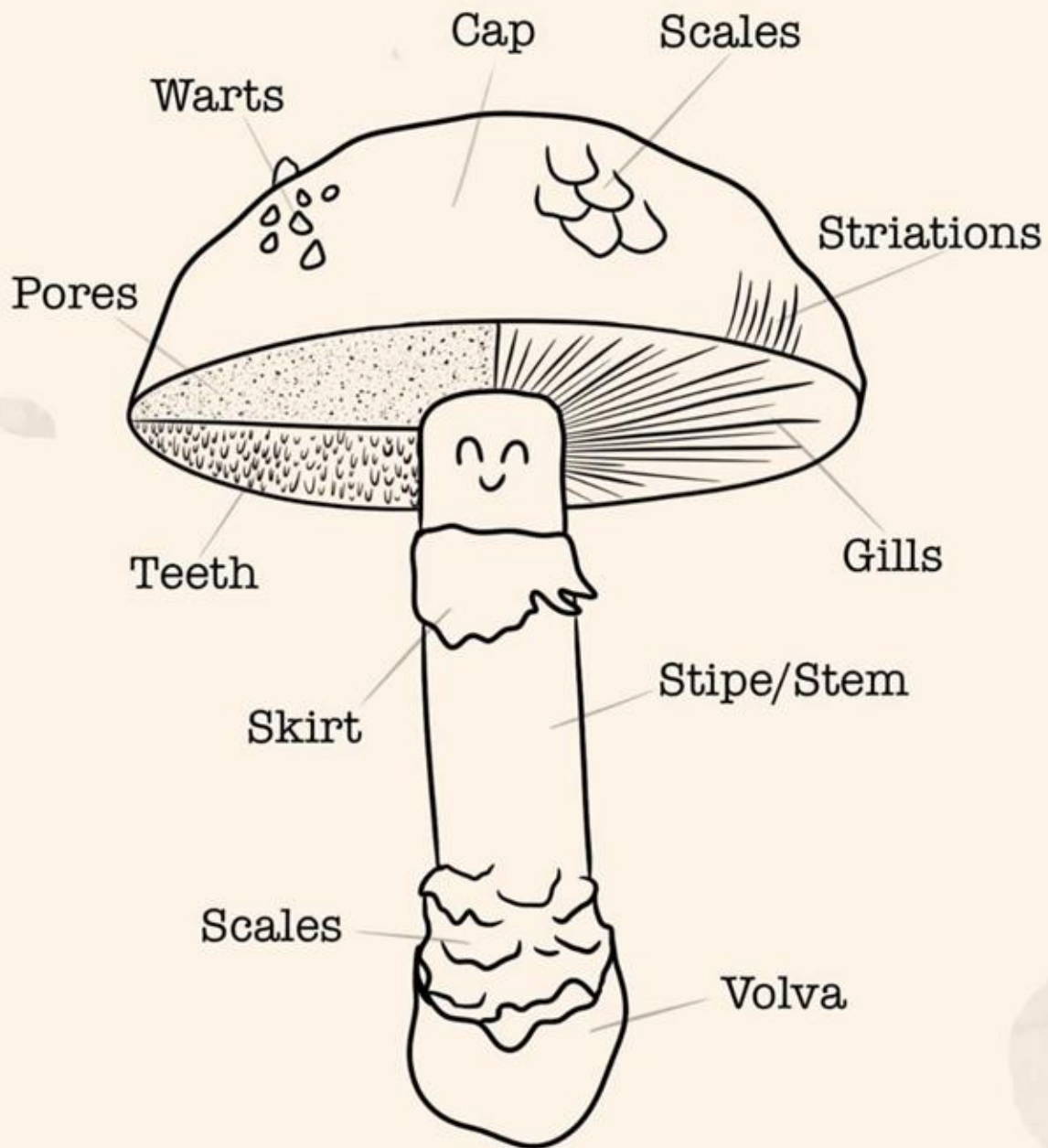
Textures

Spongy
Rough
Coarse
Slippery
Smooth
Firm
Tender
Rubbery
Slimy
Dry
Hard
Dense
Crumbly
Spikey
Velvety
Hairy
Bumpy
Tough
Brittle
Chalky
Meaty
Sticky
Greasy
Woolly
Silky
Fibrous
Felt
Flaky
Fuzzy
Shaggy
Stubbly

Smells

Chemically
Earthy
Soapy
Woody
Sweet
Sour
Fruity
Nutty
Fishy
Lemon
Watermelon
Apricot
Peaches
Brown sugar
Cheese
Spermaceous
Sweaty Socks
Yeasty
Mealy
Savoury
Rotten
Eggy
Potato
Celery
Garlic
Onion
Cucumber
Anise
Peppery
Vanilla
Curry
Cured Ham
Sewers
Parsley
Chlorine

Basic Mushroom Anatomy



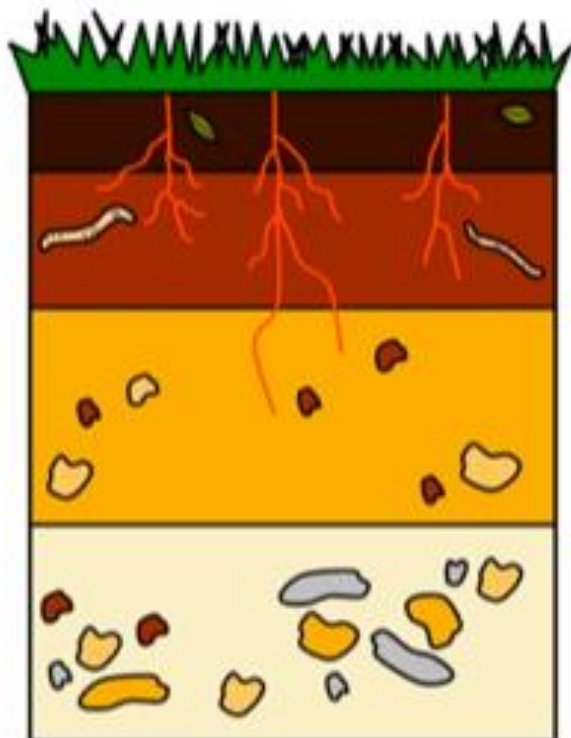
Soil and Decomposer Resources

3 Groups of Soil



Sand	Silt	Clay
• Large particles • Dry and gritty • Can't hold water	• Medium particles • Slick when wet	• Smallest particles • Sticky when wet • Hard when dry

Soil Horizons



- **O** Decomposed leaves and animals
- **A** Roots and creatures
- **B** Hard soil
- **C** Parent material of horizons O, A and B

Name: _____ Date: _____

Soil Sample #1

Place soil sample here:

What is your soil like? Check each box that describes your soil.

- | | |
|----------------------------------|------------------------------------|
| ☐ dry | ☐ moist |
| ☐ crumbly | ☐ clumpy |
| ☐ gritty | ☐ sticky |
| ☐ rocks | ☐ leaves |
| ☐ sticks | ☐ creatures |

Answer the questions:

1. Did you find anything interesting in your soil?

2. Describe how your soil felt.

3. Describe how your soil looked.

Name: _____ Date: _____

Soil Sample #2

Place soil sample here:

What is your soil like? Check each box that describes your soil.

- | | |
|----------------------------------|------------------------------------|
| ☐ dry | ☐ moist |
| ☐ crumbly | ☐ clumpy |
| ☐ gritty | ☐ sticky |
| ☐ rocks | ☐ leaves |
| ☐ sticks | ☐ creatures |

Answer the questions:

1. Did you find anything interesting in your soil?

2. Describe how your soil felt.

3. Describe how your soil looked.

Name: _____ Date: _____

Soil Sample #3

Place soil sample here:

What is your soil like? Check each box that describes your soil.

- | | |
|----------------------------------|------------------------------------|
| ☐ dry | ☐ moist |
| ☐ crumbly | ☐ clumpy |
| ☐ gritty | ☐ sticky |
| ☐ rocks | ☐ leaves |
| ☐ sticks | ☐ creatures |

Answer the questions:

1. Did you find anything interesting in your soil?

2. Describe how your soil felt.

3. Describe how your soil looked.

Kinds of Soil

Soil is made up of many different materials. There are many kinds of soil. Study the illustrations below. Think about how soils are alike and different.

This soil is sandy.



Loam contains clay & sand.



This soil contains clay.



Use the illustrations to answer the questions.

1. Look at the first illustration. What kind of soil is shown?

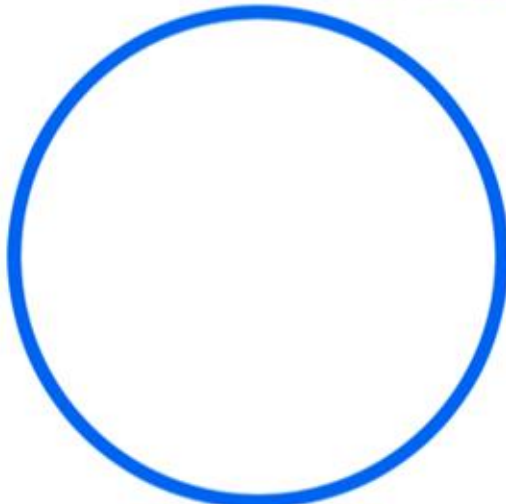
2. What kinds of materials are found in loam?

3. How is the soil in the third illustration different from loam?

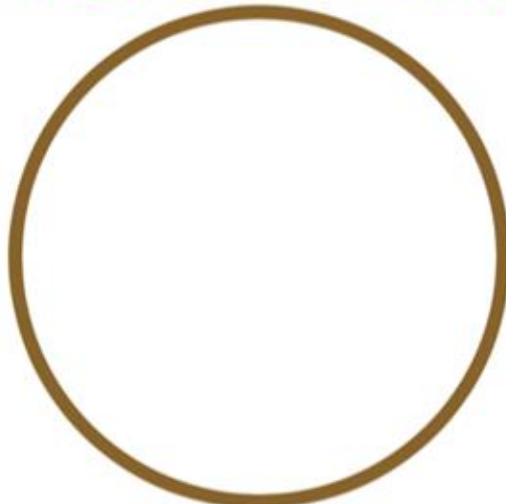
4. Think about soil that you see in your town. Do you think it is made up of more sand, or more clay? Explain.

What did YOU find?

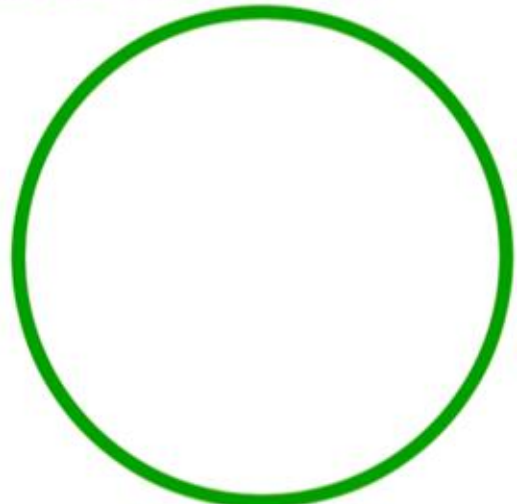
SORT YOUR FINDINGS IN THE CIRCLES BELOW. THEN, SCAN THE QR CODES
WITH YOUR IPAD TO CLASSIFY YOUR BUGS, ROCKS AND ROOTS!



BUGS



ROCKS

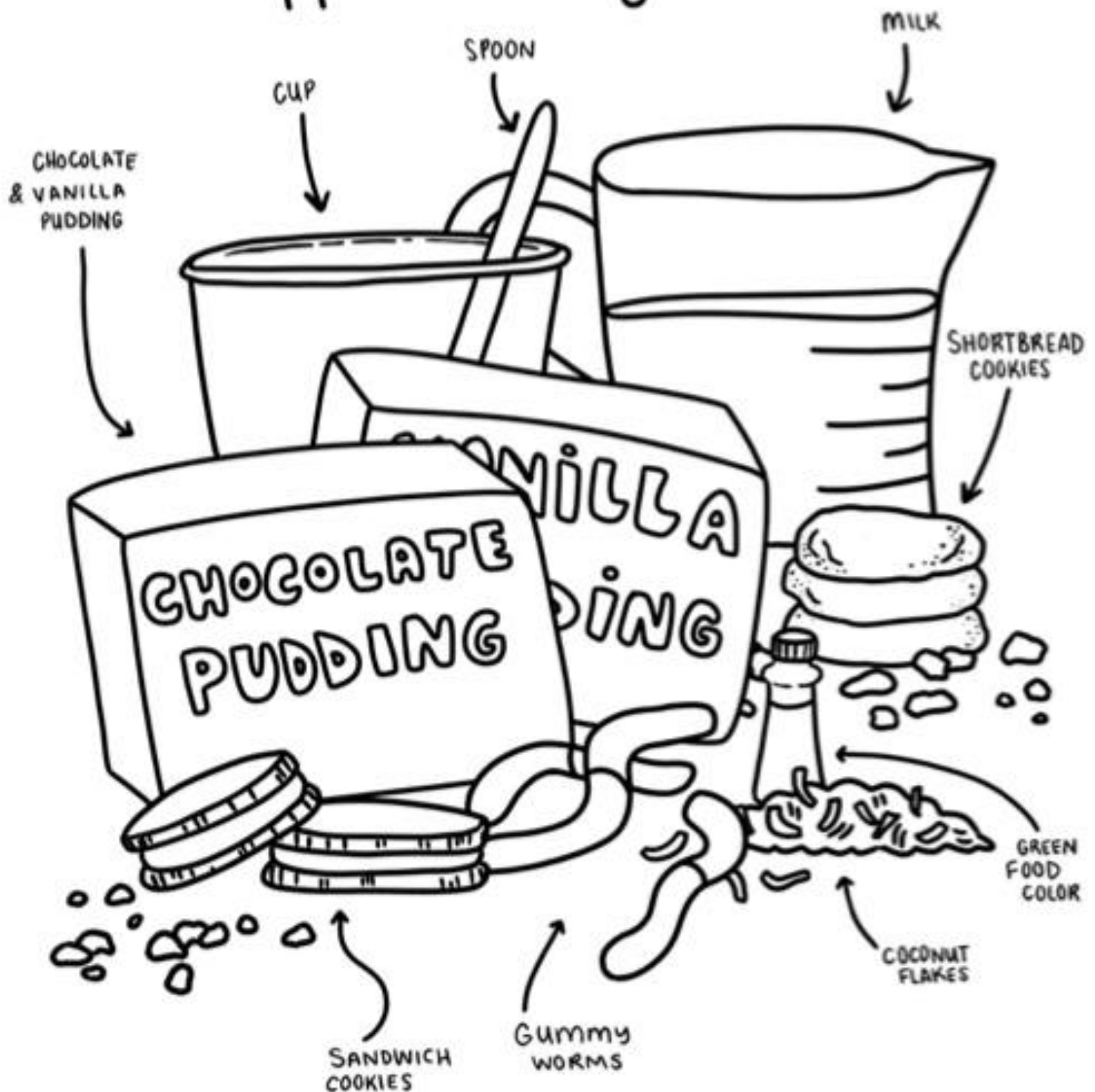


ROOTS



EDIBLE Soil

Supplies & Ingredients

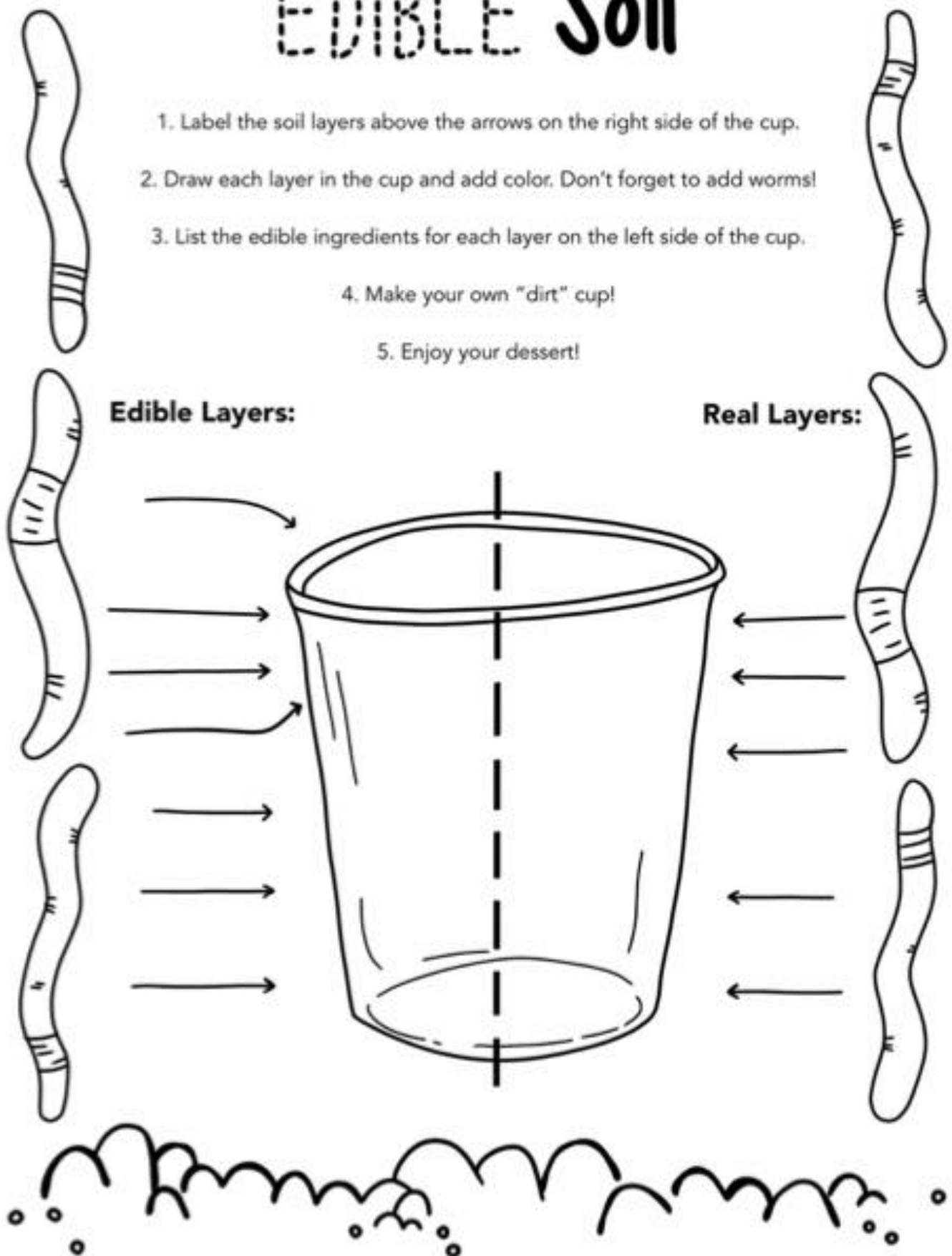


EDIBLE Soil

1. Label the soil layers above the arrows on the right side of the cup.
2. Draw each layer in the cup and add color. Don't forget to add worms!
3. List the edible ingredients for each layer on the left side of the cup.
4. Make your own "dirt" cup!
5. Enjoy your dessert!

Edible Layers:

Real Layers:



EDIBLE Soil

1. Label the soil layers above the arrows on the right side of the cup.
2. Draw each layer in the cup and add color. Don't forget to add worms!
3. List the edible ingredients for each layer on the left side of the cup.
4. Make your own "dirt" cup!
5. Enjoy your dessert!

Edible Layers:

GREEN-DYED
COCONUT FLAKES

CHOCOLATE
PUDDING &
CRUMBLED SAND-
WICH COOKIES

CHOCOLATE PUDDING
WITH CHOCOLATE BITS

GUMMY WORM

VANILLA
PUDDING

CRUMBLED
SHORTBREAD COOKIES

SOLID
SHORTBREAD COOKIES

Real Layers:

HUMUS

TOPSOIL

SUBSOIL

ROCK
FRAGMENTS

BEDROCK



Soil Study Guide

Test Date:

Soil - a mixture of minerals, weathered rocks, water, air, and humus. *Soil has three different layers.

*There are three different types of soil. Soils can have different colors and textures. Darker colored soils (black) have more humus; therefore, more nutrients than the lighter colored soils. Soil texture describes how big the pieces or grains of soil are.

loam- soil made up of a mixture of sand, silt, and clay, best soil for growing plants; it's neither too wet or too dry. Georgia's Coastal Plains have many farms because of the rich loam found there.

clay - soil with the smallest grains; reddish color; holds a lot of water

sandy - sand has a wide range of grain sizes; holds very little water

humus- bits of decayed plants and animals that add nutrients to soil

natural resource- material on Earth that is necessary or useful to people

weathering- the breaking down of rocks into smaller pieces. Weather like wind and rain, breaks down the bedrock into tiny pieces or grains.

erosion-the movement of rocks and minerals from one place to another. This can happen when wind blows. Rain can also move bits of rock to new places.

- topsoil- the top layer of soil, dark and rich in humus (plants grow in this layer).
- subsoil- the layer of soil that has a lighter color and less humus than the layer above it.
- bedrock- lowest layer, made of solid rock

The making of soil starts with the weathering of rocks.

- Soil takes a long time to form. People need to try to prevent soil erosion by planting trees and plants. We can also add minerals and humus to soil to keep it healthy. Soils that are made of rich humus are good for growing plants.

Name _____ Date _____

1. What are the 3 layers of soil?

1

2

3

2. Humus is

3. What are the 3 types of soil?

1

2

3

4. _____ is perfect for growing plants because it is the perfect mixture of sand, silt, and clay.

5. _____ is too dry for growing plants.

6. _____ is too wet for growing plants.

7. Weathering is the breaking down of _____ into smaller pieces.

8. Weather like _____ and _____ breaks down the bedrock into tiny pieces or grains.

9. Erosion is the movement of _____ and _____ from one place to another. This happens when the _____ blows.

10. _____ is the top layer of soil and it is dark because it is rich in humus.

Soil Colours And What Minerals They Have

Dark Brown: More organic matter

Red and Yellow: Iron

White: Calcium

Black: Magnesium, sulfur and nitrogen

Grey: acidic, waterlogged

What is the difference between humus and organic matter? Organic matter is the raw material and humus is the rich, dark, crumbly finished product.

ACTIVITY

3

Introductory Activity

Grades 3-12

Objective

For 3 to 5 days, students survey the packaging materials and food waste left over from their lunches. Students determine what can be composted, reused, recycled, or landfilled.

Time

3-5 days to gather materials; 30-40 minutes for main activity

** Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.*

Environmental Lunch

Materials Needed

- Lunch discards from cafeteria or home lunches
- Environmental Lunch Log Sheets (p. 10)
- Four bags or buckets labeled: Compost, Recycle, Reuse, and Landfill
- Chart paper for making a graph

Background Information

Much of the material we throw away can be reused, composted, or recycled. What people buy and how it is packaged can have a big impact on the garbage problem, as well as other environmental problems. Looking through their lunches and finding ways to reduce the amount of garbage empowers students to find their own ways of helping the earth. Students will also have the opportunity to learn what natural resources were consumed to make this waste.

Management Skills

One of the most important elements of this activity is gathering enough lunch materials to sort and develop a sample. You may want to gather some extra materials from the cafeteria, just in case.

Procedure

1. Make enough copies of the log sheet for the students to use on days 2, 3, 4 and 5, depending on how many days you choose to do the activity.
2. Set up buckets with signs which read Reuse, Recycle, Compost, and Landfill. (Put a tarp under buckets to keep classroom neat.)
3. Before lunch, ask your students to bring everything left over from their lunch back into the classroom. Hand out used bags if needed. Students should include all uneaten food and packaging materials. Nothing should be thrown away or recycled until the log is filled out.
4. For three to five days, when students are finished eating, they bring their lunches back to the



classroom to fill out their log sheets. They must include what type of material it is: reusable, recyclable, compostable, or material that must be sent to the landfill. Students then put materials in the appropriate bucket. Make sure to have a lid for the compost bucket and mix in small amounts of dry shredded paper or sawdust from untreated wood to avoid smells and suppress flies.

5. Introduce the Reduce, Reuse, Recycle hierarchy. Reducing the amount of packaging is best. Reusing a package is second best. Recycling/Composting comes in third, with Landfilling as a last resort.

6. Have the students fill in the totals on the log sheet each day.

7. Graph class totals each day for Recycled, Reused, Composted, and Landfilled materials. Repeat for three to five days. In small groups, students can brainstorm ideas for reducing the amount of lunch trash they create.

Other Options

- Instead of tracking for three to five days, have students multiply the results of just one day's totals by five to represent the amount of materials generated in one week. This number then can be multiplied by the number of weeks in a school year. This total can even be multiplied by the

number of classes in their school, and the number of schools in their city, county, state, or country.

- Bring in a scale and have students weigh each category of discards.

- Have students organize a class-wide or school-wide zero waste lunch day. The goal is to have no materials from lunch go to the landfill.

- Have students examine their garbage with regard to natural resources. For example, write the following headings on a piece of butcher paper: Rock, Mineral, Oil, Plant, and Animal. Make a pie chart representing the percentages over a period of time.



Source: San Francisco League of Urban Gardeners

Environmental Lunch Log Worksheet

Describe Item	Reuse	Recycle	Compost	Landfill	Could Replace with:
Banana Peel			X		
Whole Orange	X				
Juice Box				X	Reusable thermos or reusable plastic bottle of juice

Name: _____ Date: _____

ACTIVITY

4

Introductory Activity

Grades 2-6

Objective

Participants will play a tag game that illustrates the cycle of life and the role of decomposers in the food web.

Time

30-40 minutes

* Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.

Decomposition Tag

Materials Needed

- 2-5 light colored armbands
- 1-2 dark colored armbands

Background Information

Without decomposers such as bacteria, fungi, worms, ants, beetles, and mites, decomposition would stop and resources which sustain life would be depleted. A seemingly endless variety of decomposers all serve different functions in the decomposition process.

Every compost pile has its own food web. In this activity, we will look at the role decomposers play in the cycle of life: life, death, decay, and re-birth.

Management Skills

This game can accommodate any number of participants. It can be a "walking" tag game if it is to be played in a confined area.

Procedure

1. Introduce the life cycle and the role of decomposers in nature and in composting.
2. One participant will play the character "death" and wears a dark colored armband. If the group is large, you can have two.
3. Two to five participants are decomposer characters and wear light colored armbands. As a general rule, $\frac{1}{5}$ of the class should



be decomposers. All other participants are plants or animals.

4. Plant and animal characters “die” when they are tagged by the death character. When tagged, they freeze in place until one of the decomposers unfreezes them by walking around them three times. The decomposers unfreeze the plants and animals as fast or faster than death freezes them.

5. The game has no natural end. You should let participants play long enough to experience the concept, and stop the game well before participants get exhausted or lose interest.

6. To summarize, form a circle and review the life cycle and the role of decomposers. Encourage students to talk about how they felt during the game, and what they learned.

Other Options

- To demonstrate that life would stop without the decomposers recycling dead things, you can allow the death character to tag and freeze the decomposer characters along with the plants and animals. The game, and life on earth, ends when everyone is frozen except the death character.

- Once everyone is dead on the ground, use guided imagery to encourage students to feel what it might be like to be part of the soil and, slowly, with water and sunlight grow into a plant.

*Source: Composting Across the Curriculum,
Marin County Department of Solid Waste*

ACTIVITY

5

Introductory Activity

Grades 2-6

Objective

Students will play a game that reinforces their knowledge of what materials can and cannot be composted.

Time

20-30 minutes

* Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.

I Can Compost

Materials Needed

One ball (soft and tossable)

Background Information

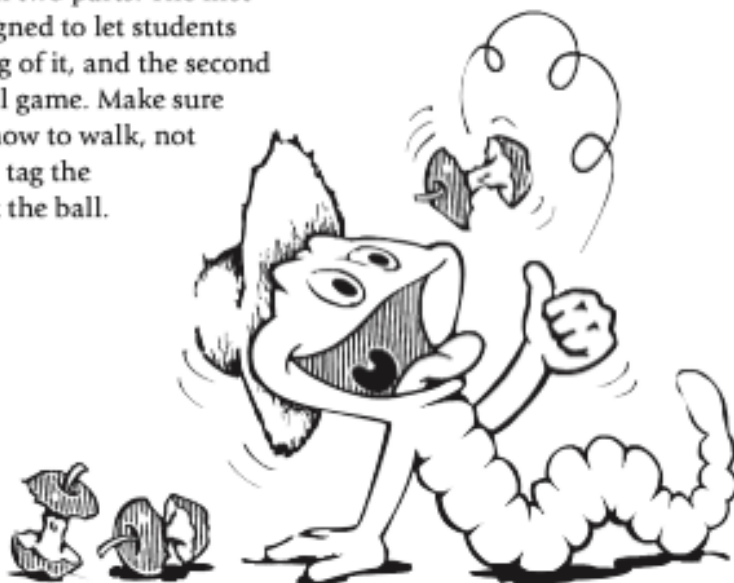
Anything that can decompose is biodegradable material. Biodegradable materials include wood chips, twigs, straw, paper, leaves, manure, fruits, and vegetables. Some less common materials are kelp and old cotton clothes. All of these materials can be composted at home.

Management Skills

In order for students to enjoy the game, they need a thorough knowledge of what kinds of materials can be composted. The game is best played outdoors, but can be played sitting down in a confined or indoor setting. The game can be played in two parts. The first part is designed to let students get the hang of it, and the second is the actual game. Make sure students know to walk, not run, and to tag the person, not the ball.

Procedure

1. Remind participants that some of the things we throw away, like aluminum cans and plastic bottles, do not decay. They are called non-biodegradable because the material they were made from does not decay easily. Banana peels, leaves, wood, and paper are all examples of biodegradable matter. Biodegradable matter can decay, or break down, and eventually becomes compost. Composting is a way of recycling the organic materials that the participants otherwise might throw away.
2. On the board or on individual papers, give participants three minutes to list as many biodegradable items as possible that could be composted. You may also want to list materials that cannot be composted.



3. To start the game everyone stands (or sits) in a circle. The first part of the game is to give students a taste of the game. It is not tag at first.

4. Call out a participant's name and something that can be composted: "Sarah, Banana Peel!" Toss the ball to the participant named and then sit down. The participants continue on this fashion, calling out compostable material and tossing the ball to the named participant, until everyone is sitting.

5. Now the tag part can begin. One participant is placed in the middle of the circle and becomes "it." The person in the middle must tag the person with the ball before the ball is tossed. The person throwing the ball names something that can be composted and then throws it to someone else before being tagged. If the student with the ball doesn't name something before s/he throws the ball, s/he will be tagged, become "it," and will change places with the one in the middle.

*Source: Composting Across the Curriculum,
Marin County Department of Solid Waste*

Basic Composting
Grades 2-12

Objective

Students will:

- explore active compost, and
- identify various decomposer animals in their piles.

Time

20 minutes

* Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.

Compost Critters

Materials Needed

- Compost
- Toothpicks
- Newspaper
- Compost Critter Worksheets (p. 15)
- One Compost Critter Information Sheet (pp. 16-17)
- Pencils

Background Information

There are many different animals that help break down organic materials into the rich soil helper we know as compost. A compost pile and worm bin have an entire network of different bugs. Bacteria do most of the work, even though they are invisible to the naked eye. Other animals large enough to see, such as beetles, worms, centipedes, millipedes, and sow bugs, are also important decomposers. Without decomposer animals all life would stop because new plants would not have the necessary nutrients needed to grow. Decomposers turn our garbage into plant food.

Management Skills

Students will sort through compost in groups of four. Each student will have his/her own worksheet. This is an exploratory activity. For some kids, it will be the first time they will have explored compost.

Procedure

1. Read the Compost Critter Information Sheet before the activity begins. This will give you a good idea about the different roles bugs play in the ecosystem of a worm bin or compost pile.
2. Ask children why they think decomposers are important. Ask them what kind of bugs they have seen in soil.
3. Tell them these bugs eat dead things, turn them into soil, and therefore help new life begin. They play a vital role in the life cycle by breaking down organic materials.
4. Hand out worksheets and pencils to each student.
5. Divide kids into groups of four.
6. Have a representative from each group get a pile of compost and a toothpick for each person in their group.
7. Mention that the compost they are touching used to be grass, fruit, leaves, veggie scraps, etc.
8. Ask them to identify the bugs by referring to their worksheets.
9. Collect the compost after eight minutes or so.
10. The teacher or student may read from the Information Sheet about the different bugs found by the students.
11. Summarize by restating the role and importance of decomposers.

COMPOST CRITTERS WORKSHEET

Circle Me If You Can Find Me



collembola



springtail



mite



sow bug



slug



worm cocoon



beetle



fruit fly



white worms



redworm



spider



snail



mold



ant



centipede



bacteria



millipede



pill bug

Name: _____ Date: _____

Compost Critters Information Sheet

Pill Bug or Roly Poly

I am an isopod, which means I have ten pairs of legs that look very similar to each other. I eat old leaves and veggie scraps. I am about ½ inch long and I roll up in a ball if I am disturbed. Some people think that I look like a little armadillo. I am a grayish, dark color.



Centipede

I move quickly on my many legs. I have 15-137 segments with a pair of legs on each. I am a fierce hunter. I love to eat earthworms. I use my pair of poison claws to help keep my prey from getting away. I am about 1 to 2 inches long. I am usually reddish brown.



Ant

I am an insect with 6 legs. I help to decompose by breaking materials into smaller particles. I create tunnels, and move soil into clumps. Some people would rather not have me around their homes. I am black, brown, or red.



White Worm

I look like a frayed piece of thread. I am a skinny, white worm. I am ½ to 1 inch long. I am related to an earthworm. I like to eat rotting food after the other bugs get to it. You might think of me as one who likes to finish off the job.



Bacteria

We are so tiny that you can't even see us. We are everywhere. I am colorless. I can eat almost anything. Some of us live together in groups and others don't.



Mold

I am a fungus. I am related to mushrooms. Most of us live on old food. You might see me on old food in your home or your worm bin.



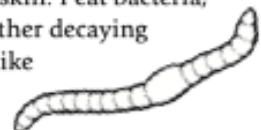
Sow Bug

I have 10 pairs of legs. That makes me an isopod like my cousin the Roly Poly. I eat vegetation and old leaves. My ½-inch-long body is oval and flat with flattened plates, but I can't roll up into a ball like Roly Poly. I am related to crayfish and lobsters. I breathe with gills so I must live in a damp, moist place. I am a dark, grayish color.



Earthworm

I am a long, thin, soft-bodied animal. My body is made up of little segments. I do not have legs or eyes. I sense light and I breathe through my skin. I eat bacteria, fungi, and other decaying materials. I like dark, moist places.



Fruit Fly

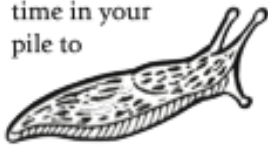
I am a very small fly. People don't like me, but I don't bite, sting, or make buzzing sounds. I don't harm earthworms either. Sometimes you will see me around a worm bin if a person forgot to bury their food. I like to lay my eggs where it's moist and warm.



Compost Critters Information Sheet

Slug

I have muscular discs on my underside that are adapted for creeping and crawling. I lay egg masses that look like jello. I eat living material but will make an appearance from time to time in your pile to



compost eat fresh garbage and garden trimmings.

Mite

I am tiny. It would take 25 of us to cover an inch-long line. My body is round and fat so it's hard to see my 8 legs. I eat plant materials such as mold and soft tissues of leaves. Some of us eat the manure of other organisms. I am usually white or brown.



Millipede

I have so many legs you would have a hard time counting them. My name means "thousand legs," but I don't have that many. I am very shy and I roll up into a ball to avoid danger. I am a vegetarian and eat soft, moist, decaying plants. I am dark-red in color and am 1 to 3 inches long.



Springtail

I am a tiny insect less than $\frac{1}{16}$ inch long. I eat molds and decaying materials. I have a little spring that helps me jump high into the air. I am white in color.



Collembola

I am a close relative of the springtail but I can't jump. I am tiny, and less than $\frac{1}{16}$ of an inch long.



I eat molds and decaying matter. I am white in color.

Beetle

I am an insect with shiny, black, tough wings and am about $\frac{1}{2}$ inch long. I am a predator and eat slugs, snails, and soft insects such as caterpillars. I live beneath stones, boards, and other moist places.



Snail

Like my friend, the slug, I am a mollusk and creep around on my muscular belly. I carry on my back a spirally curved shell. I also have a broad retractable foot and a distinctive head. Like slugs, I prefer to eat living material, but I will also show up in your compost pile or worm box from time to time for lunch.



Spider

I am related to mites and have 8 nifty legs. I am one of the least appreciated animals in the garden and compost. I feed on other insects and work hard to help control pests that will hurt a garden.



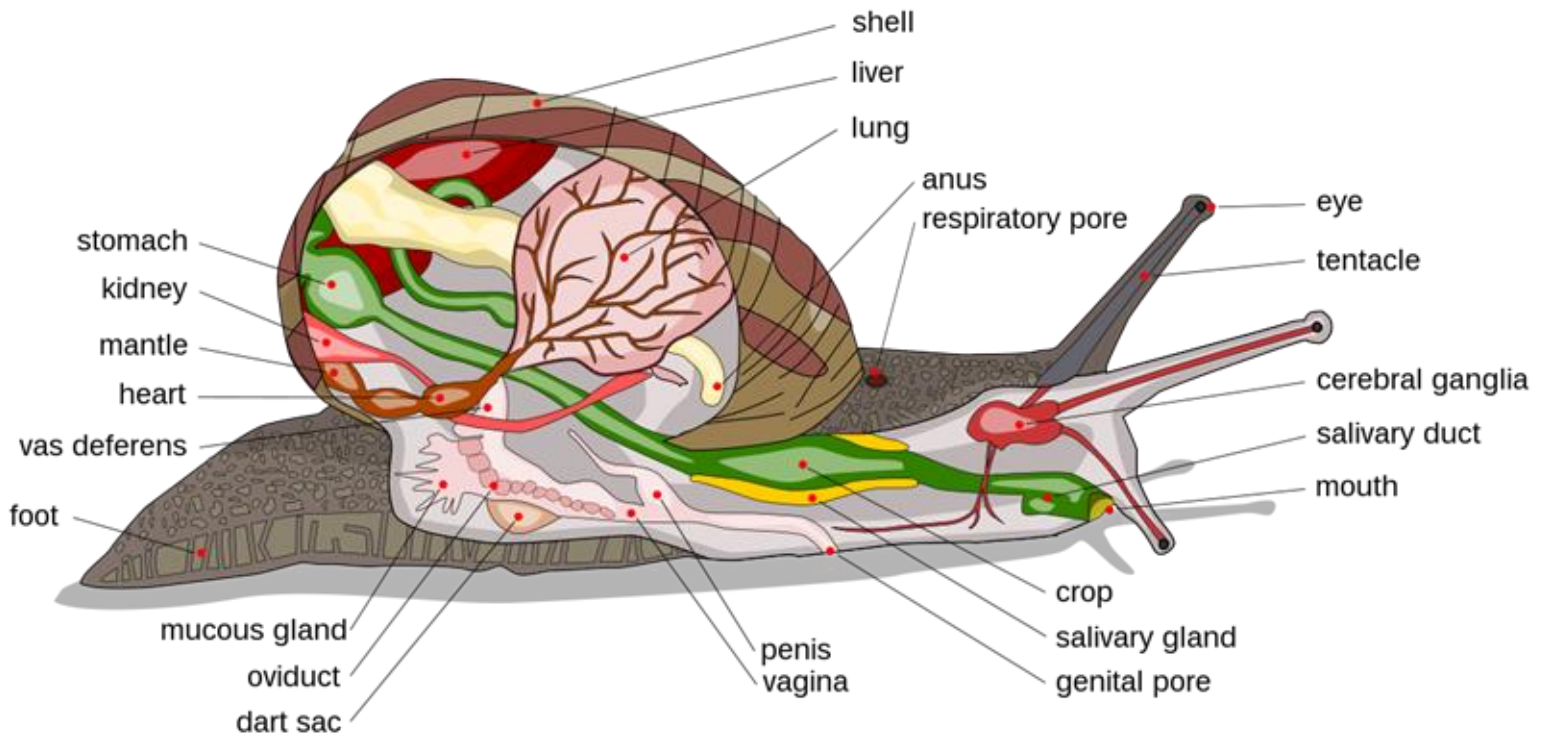
Worm Cocoon

You can find me in a worm bin or compost pile. Before I have hatched, I am clear and yellowish and the shape of a lemon, and $\frac{1}{8}$ inch long. After I have hatched



I turn pea green. Two or more baby worms are hatched at once.

Decomposer: Snail Diagram



The Difference between Green and Brown Matter

ACTIVITY

7

Basic Composting Grades K-12

Objective

Students will build a compost pile outside in a compost bin, and describe what compost is, how it is used, and why it is important.

Time

40-60 minutes

* Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.

Building a Compost Pile

Materials Needed

- Pitchfork or spading fork
- "Green" and "Brown" plant trimmings (see *Background Information* below)
- Yard clippers
- Water
- Compost bin
- Flat-edged shovel

Background Information

With the help of micro-organisms and insects, we can take our biodegradable materials and turn them into a rich, dark soil amendment called compost. In this way, valuable nutrients are returned to nature rather than shipped away to a landfill. Composting is an excellent way to demonstrate the cycle of life: life, death, decomposition, and re-birth.

The four essential ingredients of compost are the BIG FOUR: browns, greens, air, and water. "Browns" are dry and woody plant trimmings, such as wood chips, dried leaves, and straw. Browns are rich in carbon. "Greens" are moist vegetable and fruit scraps, green leaves, and fresh manure. Greens are rich in nitrogen. In a compost pile, you want approximately half brown materials and half green materials by volume. Decomposer organisms need air and water to break down organic matter. Turning and watering your pile pro-

vides it with the air and moisture needed for micro-organisms. The pile should be as moist as a wrung out sponge. These four ingredients create the perfect environment for the main decomposers: fungi, bacteria, and insects.

Management Skills

Make sure your compost bin is close to a source of water and is rodent resistant. A rodent-resistant bin has a top and a bottom, and all openings must be less than a ¼-inch. Include participants in all aspects of building a pile (gathering materials, layering, mixing, watering, and turning). The pile should be located outdoors and on top of soil rather than concrete or asphalt. Make sure to include students whenever possible. Also, encourage students to bring organic materials collected from the school to help build the pile.

Procedure

1. Introduce the cycle of life and the concept of decomposition. Explain that by building a compost pile, we build a home for decomposers.
2. Biodegradable matter is anything that can decay. Have participants give examples of biodegradable materials that they might throw away at home or at school (banana peel, dried leaves). Keep a list.



3. Explain that composting is a way of recycling the materials that the participants have listed. Composting recycles materials such as yard trimmings and food waste through a process of decomposition. Bacteria, earthworms, and other creatures actually eat these materials and break them down into food that plants can eat. The end result is a rich, dark brown, earthy smelling material called compost. This compost can then be returned to the earth to help build a healthy soil and ensure more plant growth.

4. Pass around a small bag of finished compost.

5. Now that they have some idea what compost is, ask participants to describe possible reasons to compost. Answers may include:

- By composting at home, we can put less in the landfill.
- It's fun.
- By returning biodegradable material to the soil, we are caring for the environment.
- Adding compost to a garden improves the health of the plants and soil, which reduces the need for chemical fertilizers and pesticides.

6. Explain the basics of composting. Composting works best when a compost pile contains a proper mix of the BIG FOUR: browns, greens, air, and water. Browns are materials such as dried leaves, wood chips, or sawdust. Greens are materials such as grass clippings and food waste. The pile is

made by alternating equal layers of green and brown materials. If it is kept moist and aerated, the pile becomes a home for beneficial fungus, bacteria, and insects (the "FBI"). Over time, these decomposers break down the green and brown materials until you are left with finished compost.

7. Review with the class the three steps to building a pile:

- a. **Chop materials** in to pieces that are six inches in size or less.



- b. **Mix browns and greens** (half of each by volume).



- c. **Maintain moisture** by keeping pile as wet as a wrung-out sponge.



8. Include in the pile any materials students may have collected, such as orange peels, apple cores, other vegetable and fruit trimmings, and paper. You can also add plant matter from around the school, like grass clippings and leaves. Avoid diseased plants. You may want to ask participants to bring lunch debris from the day before, although use this in moderation. Do not add dairy or meat products which may attract animals to the pile. Always bury the food waste in the center of the pile.

9. Have the participants collect the brown and green materials in separate piles (an equal amount of each works well).

10. Assign students to help with each of the various tasks of chopping, layering greens, layering browns, mixing, and watering.

11. Students can chop materials by piling up materials on the ground and using a flat edge shovel to bruise or chop pieces. Clippers can be used to cut up pieces. Ideal size is about six inches long, although any bruising is helpful. These activities should be carefully supervised.

12. Build the compost pile by alternating layers of brown and green material. Add water by spraying with a hose as you add each layer. The pile should be about as wet as a wrung-out sponge.

13. Stir the layers together with a pitchfork as you build the pile. Keep the pile "fluffed up" to maximize the air in the pile.

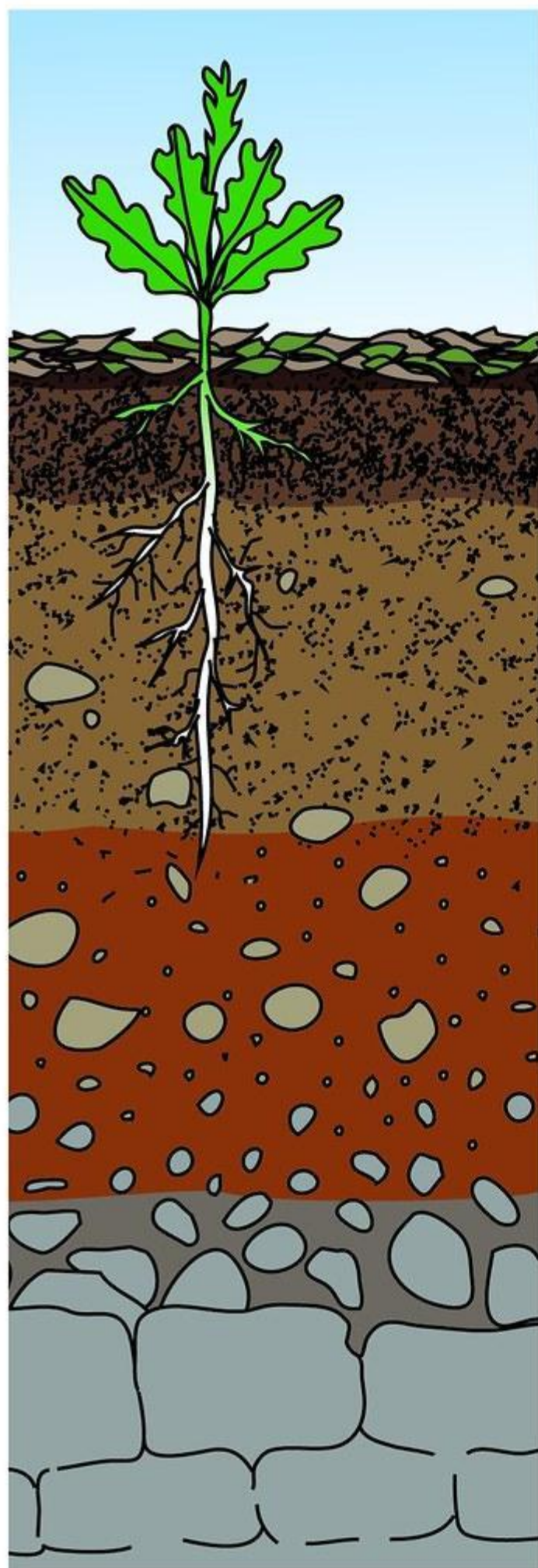
14. Be sure to plan for the ongoing maintenance and eventual harvesting of the compost pile.

15. Once the pile is built, review the basics of composting and why it is important.

16. Always finish the pile with a layer of browns, finished compost, or soil. Don't put greens on top; this will help prevent fly nesting.

DRAW A CIRCLE AROUND THE GREENS AND A SQUARE AROUND THE BROWNS.





Humus

Topsoil

Subsoil

Weathered
rock fragments

Bedrock

Producers, Consumers, and Decomposers Video

Producers

Algae



Some Bacteria



Valuing the Garden Ecosystem Game

Name: _____

Garden Ecosystem Game: Clues and Answers

1. I am small and have six legs and a red spotted body. What am I?
Answer: A ladybug.
2. I am tiny and colored green or black. Ladybugs like to eat me. What am I?
Answer: An aphid.
3. Aphids climb on my stems and leaves and suck the juice out of me. What am I?
Answer: A plant.
4. A plant grows fruits, stems, leaves, seeds, and flowers for me to eat. What two-legged animal am I?
Answer: A human.
5. When the days are warm and the soil is dry, a human may use a hose to sprinkle me over the garden. What liquid am I?
Answer: Water.
6. I am an animal who loves to take baths in water outside. I fly from tree to tree. What am I?
Answer: A bird.
7. A bird loves to eat me. I am small and hard, but when I grow I can get very big. What am I?
Answer: A sunflower.
8. A sunflower seed grows up to provide food for animals. What does a sunflower seed grow into?
Answer: A sunflower plant.
9. The sunflower needs me. In the summer, I provide warmth and light. I help plants grow and make the leaves green. What am I?
Answer: The sun.
10. The sun keeps me warm. I hunt for food in the garden, but I do not eat vegetables. I am a reptile. What am I?
Answer: A snake.
11. A snake is my predator, and I am his prey. I am small and grey and run very quickly. What am I?
Answer: A mouse.
12. Mice hide from me. I make my nest in high places overlooking open spaces. I have sharp eyes and can see mice from very far away. What am I?
Answer: A hawk.
13. The hawk nests in me. I am tall, I have deep roots, and I sway in the wind. What am I?
Answer: A tree.

14. A tree is the place for me. I love to climb up and down and all around. The tree provides me with food and shelter. I have a big bushy tail. What am I?
Answer: A squirrel.
15. Squirrels eat me. Plants produce me to make another plant. I remain dormant during the cold winter months. What am I?
Answer: A seed.
16. Seeds grow in me. As a whole, I am not alive but filled with living and nonliving things. What am I?
Answer: The soil.
17. I live in the soil. I am long and wriggle through the garden making tunnels. I help plants decompose. What am I?
Answer: An earthworm.
18. The worm burrows bring oxygen down to me. I make a strong base for my stems. I absorb water and nutrients from the soil. What part of a plant am I?
Answer: A root.
19. I have long mycelium roots that hold me up from the ground. I feed many creatures and feed on many more. I especially love the roots around trees. What am I?
Answer: Fungi.
20. I am a tiny creature that loves to eat tiny root fungi. What am I?
Answer: A nematode.
21. I am a predator who loves to munch on nutrient-rich nematodes. What am I?
Answer: An arthropod.
22. I am blind, but I still hunt down tasty arthropods in my long tunnels. My big hands help me dig after them. What am I?
Answer: A mole.
23. I like to hide in mole burrows during the hot summer days. But at night I come out and munch on all the tasty green leaves I can find, or even the dead ones. What am I?
Answer: A slug.
24. Slugs enjoy eating the food I grow in my soil. Humans plant seeds throughout me, growing carrots and tasty foods. The energy from the sun comes to warm me up. What ecosystem am I?
Answer: A school garden.

Sun	Aphid	Mouse
School Garden	Slug	Seed
Earthworm	Bird	Roots
Tree	Fungi	Water
Snake	Mole	Ladybug
Plant	Sunflower Seed	Soil
Squirrel	Arthropod	Hawk
Nematode	Sunflower Plant	Human

Name: _____

Soil Investigations

Where is your soil from? _____

What was growing near it? _____

What colors are in it? _____

How does it smell? _____

How does it feel? _____

Name: _____

Soil Investigations

Where is your soil from? _____

What was growing near it? _____

What colors are in it? _____

How does it smell? _____

How does it feel? _____

Names: _____

Plant Growth Chart

	Plant Varieties		
	1.	2.	3.
Week 1 Planted on (date):			
Observations			
Week 2 Observations			
Size/height (cm or in)			
Week 3 Observations			
Size/height (cm or in)			
Week 4 Observations			
Size/height (cm or in)			
pH: Nitrogen (N): Phosphorus (P): Potassium (K):			
Week 5 Observations			
Size/height (cm or in)			
Week 6 Observations			
Size/height (cm or in)			

Worm Resources

ACTIVITY

10

Worm Composting Grades 3-6

Objective

Participants will:

- learn about worms and their role in nature through observation and discussion, and
- overcome any fear of worms

Time

20-40 minutes

* Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.

Warming Up to Worms

Materials Needed

- Magnifying boxes or glasses (younger students)
- Worms
- Warming Up to Worms worksheets (p. 29)
- Paper towels (older students only)
- Toothpicks (older students only)

Background Information

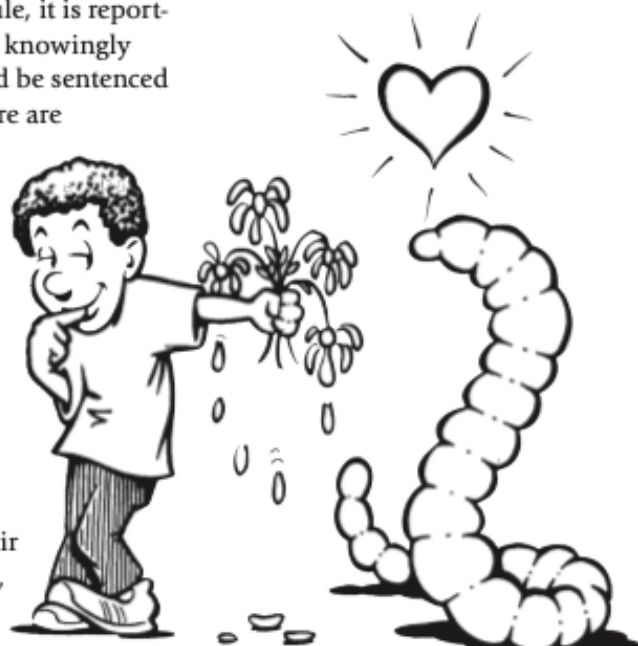
Worms are incredible decomposers. The worms we use for composting in boxes are surface feeders called *Eisenia foetida*. They are also called manure worms, red wigglers, or redworms. Over 7,000 species of worms inhabit the world, and they are important to ecosystems. In ancient Egypt under Cleopatra's rule, it is reported that anyone who knowingly killed a worm would be sentenced to death. Today, there are engineers in India who are learning how to clean sewage water using worm systems.

There are lots of fun facts to know about redworms. They have five pairs of hearts, no eyes, and no teeth. They breathe through their skin, and need dark,

moist surroundings. Eight adult redworms can produce 1,500 offspring within six months, if conditions are favorable. Each worm is both male and female and can eat over half of its weight in food every day.

Management Skills

Worms are very sensitive to light, so handle them with care. Make sure there is a moist piece of paper towel in each participant's magnifying box. You should also put a little bit of bedding or worm castings in the magnifying box with them. For older students, use moist paper towels and toothpicks. Younger children may not be able to use the worksheet.



Procedure

1. Ask participants to brainstorm questions about worms. Encourage students to ask any kind of question about worms. Try brainstorming worm adjectives.
2. Discuss how worms are recyclers, how they have been held in high esteem by many cultures for centuries, and that they can help us manage our waste.
3. Tell participants they are now going to investigate the answers to their questions through direct observation of redworms. Have participants divide into small teams of two or more and hand out a magnifying box with a worm to each team. (For older kids, a paper towel and a toothpick is fine.)
4. Hand out the *Warming Up to Worms* worksheet to each participant.
5. Ask the teams to observe their worm through the magnifying box for a few minutes. Walk the class through filling out the worksheet.
6. Once the students are finished, facilitate a discussion on the questions that were brainstormed at the beginning of the lesson. Some of the questions might not have been answered from observations. How would participants research those unanswered questions?
7. Ask participants to add adjectives to their list. Point out differences from the first list.
8. Summarize the main points again.

Source: Cindy Nelson, Alameda County Master Composter/LITES Program; Mills College, Oakland, CA.



Warming Up to Worms

1. What color is the worm?
2. What shape is the worm? Describe it.
3. How does the worm's skin feel?
4. Is there a difference between the top side and the bottom side of a worm?
Describe what both sides are like.
5. Can you tell which is the front end of a worm and which is its tail?
How do you know?
6. Does an earthworm have...

EYES?

EARS?

LEGS?

A NOSE?

A MOUTH?
7. How does your worm move? Describe it.
8. What's the name of your worm?
9. Why are worms important to life on earth?



ACTIVITY

11

Worm Composting

Grades K-12

Objective

Students will:

- set up a worm composting system, and,
- learn about the importance of worms in the life cycle and as transformers of garbage.

Time

40-60 minutes

** Look in the back of this booklet for how this activity applies to the Vermont Framework of Standards and Learning Opportunities.*

Setting Up a Worm Bin

Materials Needed

- Worm bin
- Bedding materials
- Handful of soil
- One pound of worms
- Water
- Collection container
- Worms at School worksheet (p. 32)

Background Information

Worm composting is a fun, low-maintenance way of recycling your organic kitchen scraps. Worms eat your vegetative food scraps, turning them into a high quality fertilizer known as worm castings.

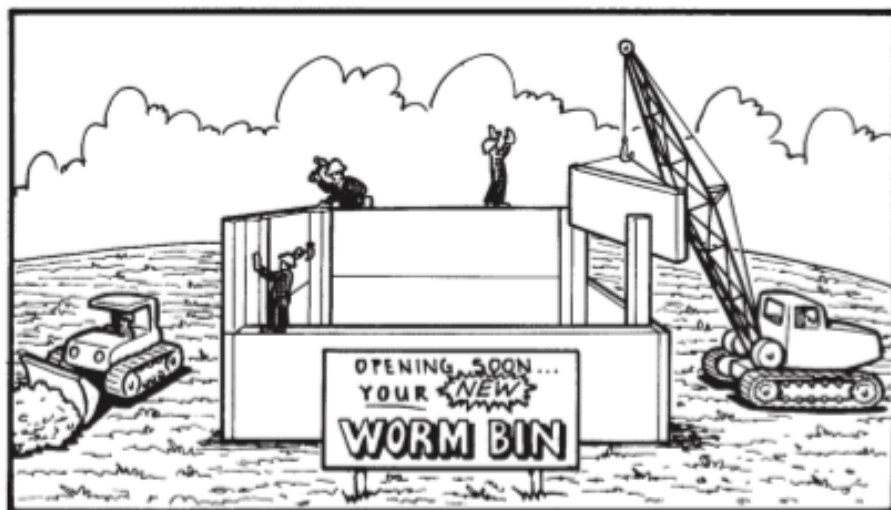
You provide the living environment for the worms—the bin, bedding, and food—and the worms do the rest. Worm composting can be done inside or outside (depending on climate),

requires no turning, is odorless if done correctly, and can be done in small spaces. Worm composting is most appropriate for food scraps.

The compostable matter we throw away—such as apple cores, melon rings, and soggy bread—are things that worms like to eat. Redworms eat food scraps and break them down into rich, dark brown, earthy-smelling material called worm castings. Castings, which are nitrogen-rich fertilizer, can be returned to the earth and are good for lawns, gardens, and houseplants.

Management Skills

Since participants will be setting up a worm composting system in the classroom, it is necessary to secure both worms and a steady supply of worm food. Worm bins need regular maintenance. Please be mindful not to overfeed.



Procedure

1. Introduce worm composting by discussing the life cycle, the importance of worms in nature, and worm composting as a waste management strategy. (See Introduction for more information.)

2. Buy, scrounge, or build a worm bin:

- A worm bin can be made of wood, plastic, or other materials.
- The size of your classroom worm bin should be at least 1 ½ square feet, and about 16 inches deep.
- Good ventilation is essential for aerobic decomposition and a healthy environment for worms.

3. Prepare Worm Bedding:

- Tear newspaper into ½" to 1" wide strips (tear lengthwise, with the grain).
- Dunk newspaper strips in water and add to bin.
- Add a handful of soil and fluff.
- Toss everything like a big salad.

4. Add worms and food:

- Purchase or obtain about 1 pound of red worms (about 500 to 1,000 worms)
- Gently place your worms in the moist newspaper bedding near the bottom of the bin.
- Put a handful or so of food waste near the worms and cover well with the moist newspaper bedding.

- Add more dry shredded newspaper to fill the bin, and then a layer of burlap or cloth.

5. Explain to participants that using worms to compost our food scraps makes sense for a lot of reasons:

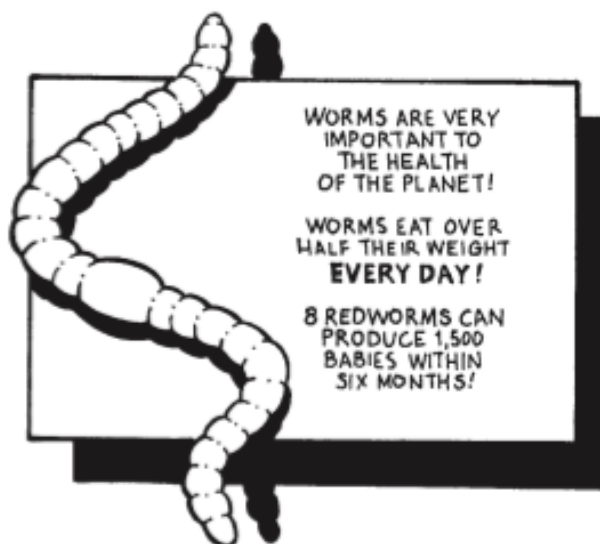
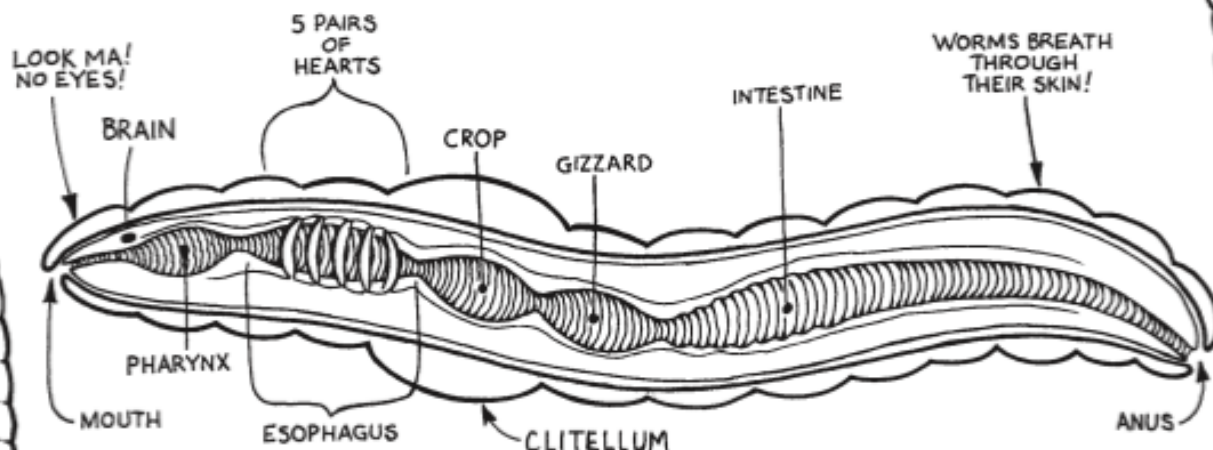
- We will reduce the amount of garbage we create.
- Compost improves the soil and makes it hold water better.
- Using compost reduces the need for chemical fertilizers, which helps prevent the creation of more pollution.
- Composting with worms is fun!

6. Let your worm bin rest by not adding additional food for 1-2 weeks. This allows the worms a chance to get used to their new environment and for the food to begin to decompose.

7. For ongoing maintenance, feed every three to seven days, always burying the food under paper. Do not overfeed. Bad smells or large amounts of uneaten food indicate overfeeding. Add more paper as needed to cover food.

8. Harvest castings after three to six months. (See "Harvesting a Worm Bin," p. 36.)

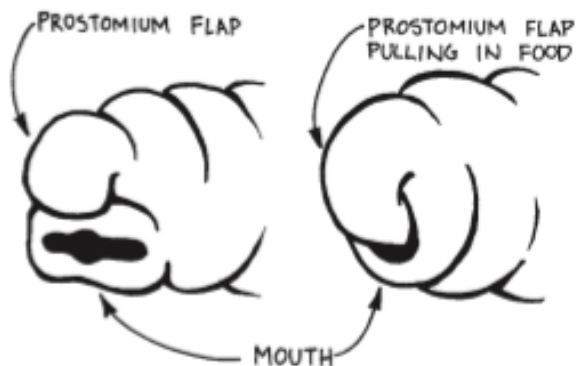
WORMS INSIDE & OUT



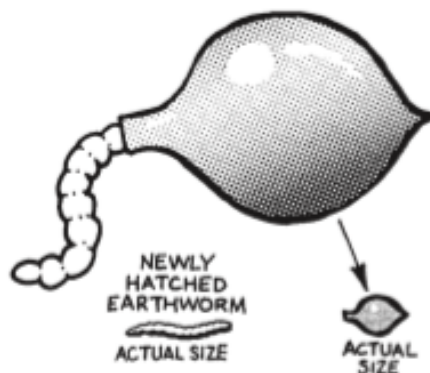
CROSS-SECTION



THE MOUTH



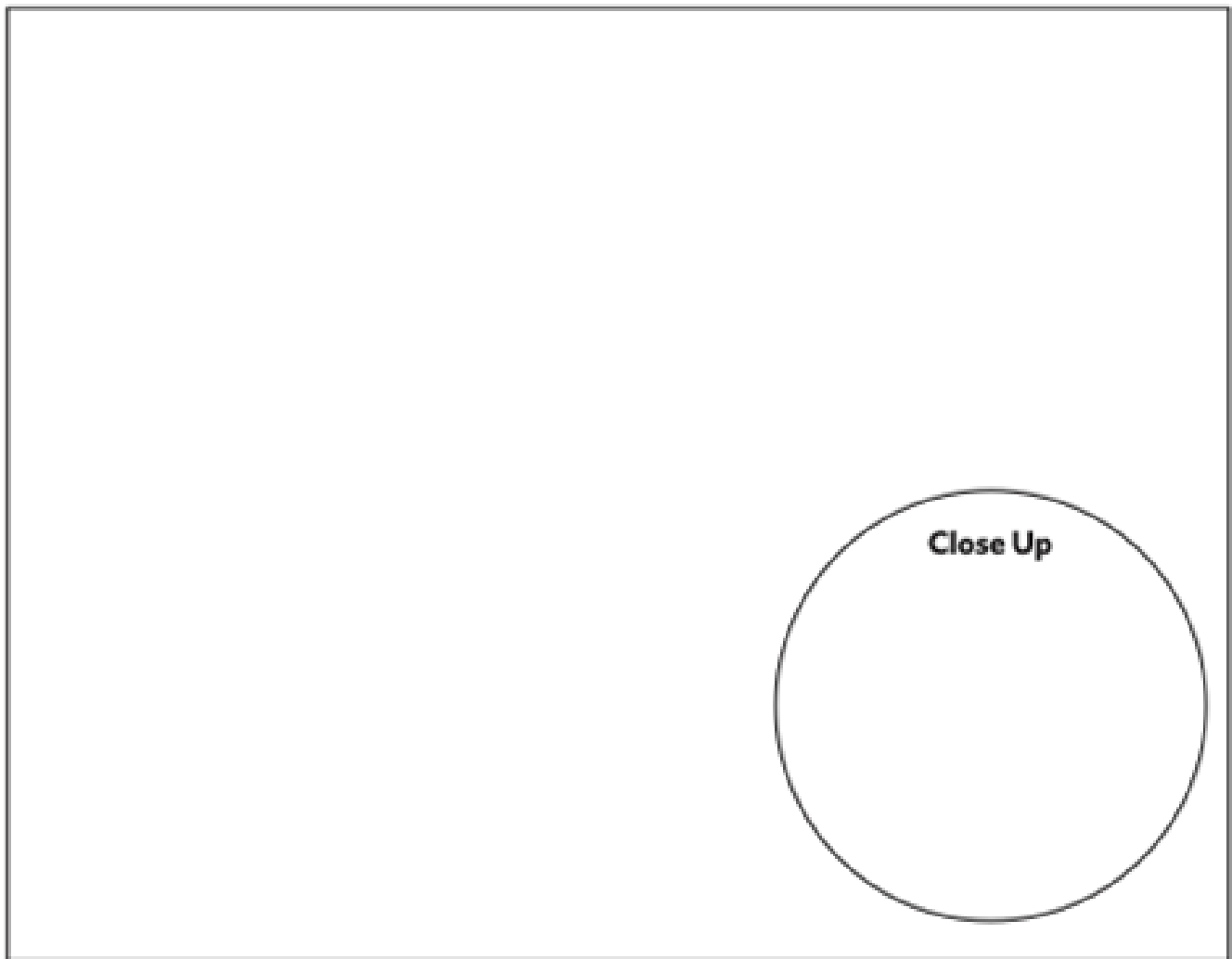
EGG SAC (COOON)



Name: _____

Meet an Earthworm

Below is a picture of what I saw:



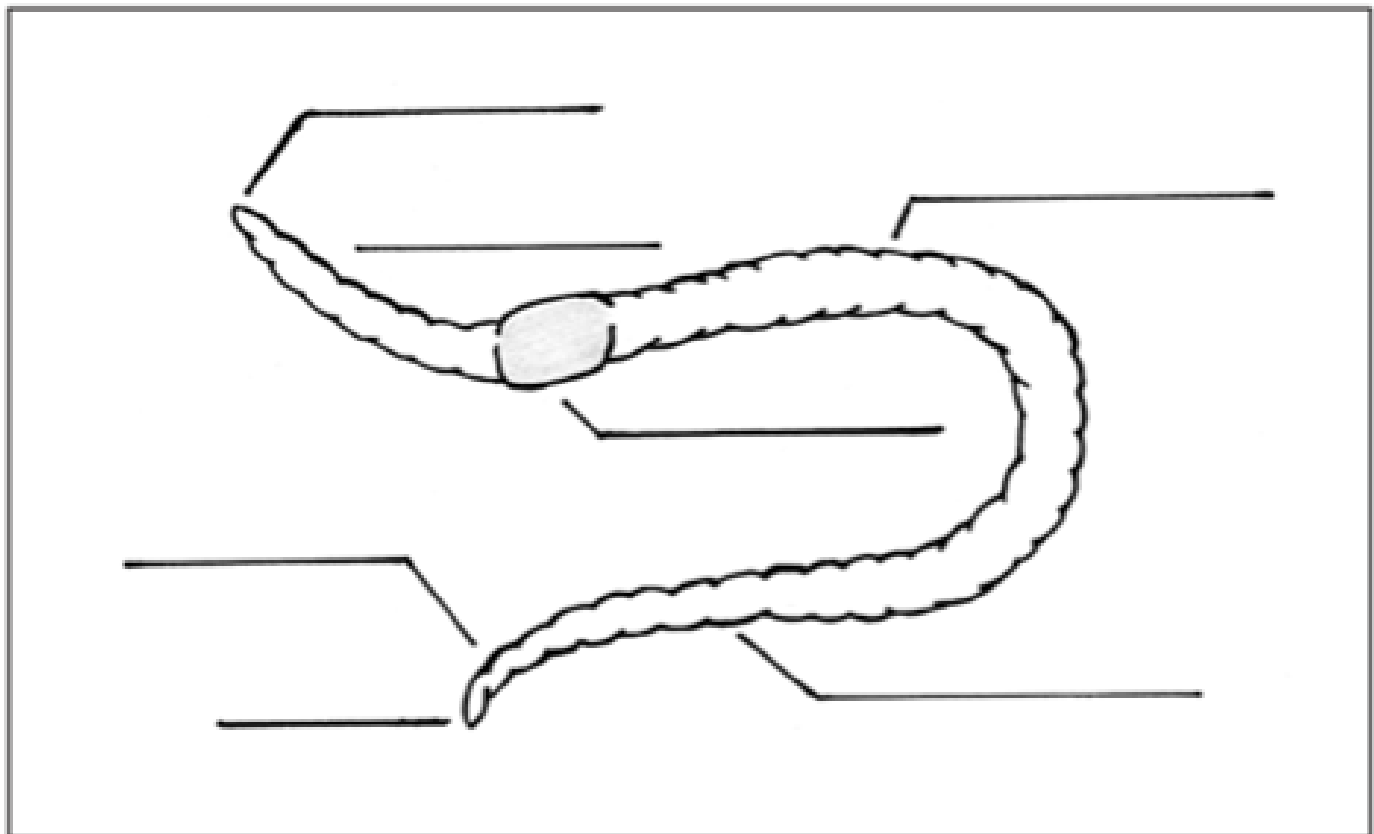
One thing I don't know about this worm is: _____

Name: _____

External Worm Anatomy

Step 1. Identify the parts of a worm from your sample.

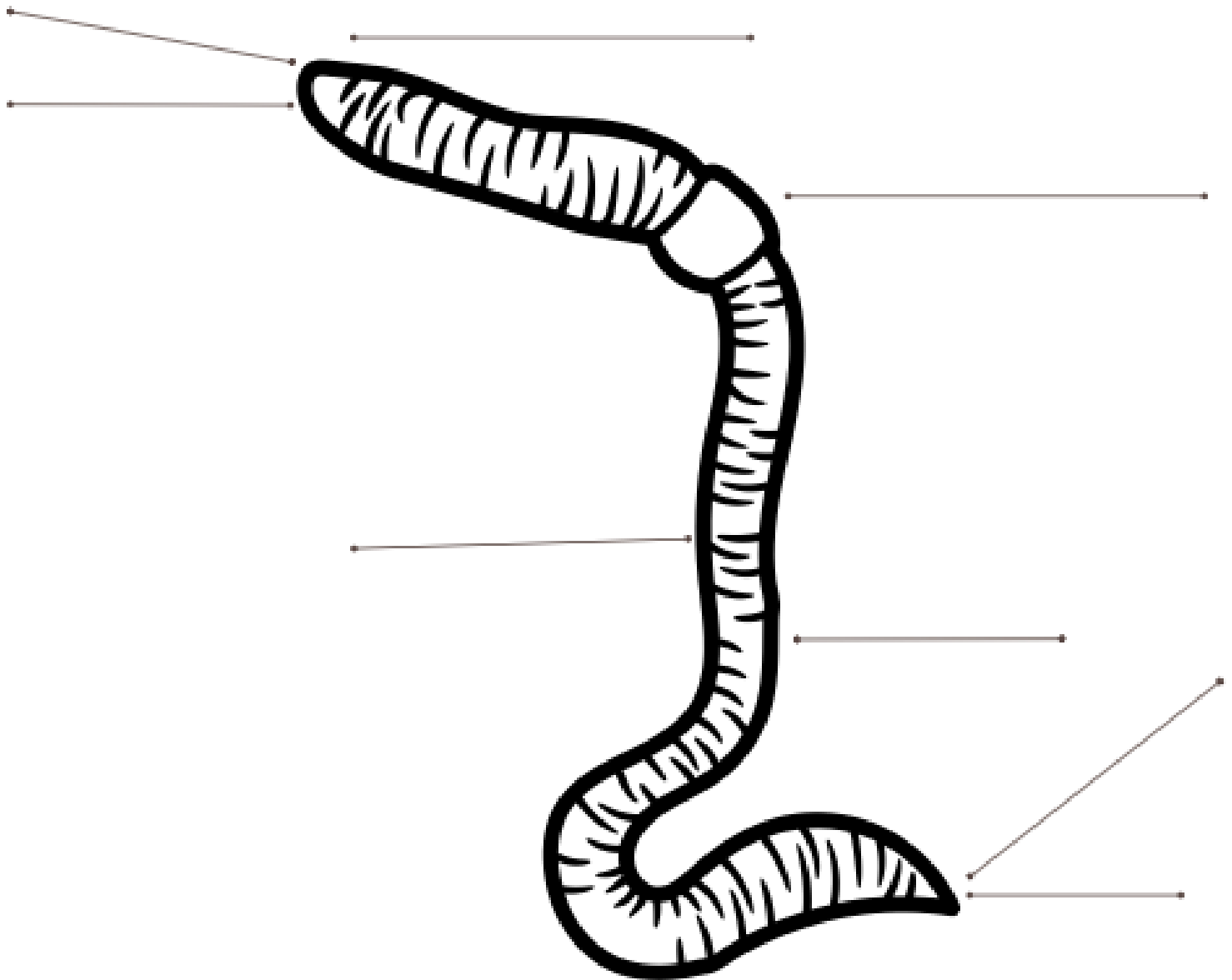
Step 2. Label these parts on the picture below in the correct spot.



Is your worm an adult? How can you tell? _____

EXTERNAL WORM ANATOMY

Name: _____



Vocabulary

Setae

Anterior

Posterior

Clitellum

Mouth

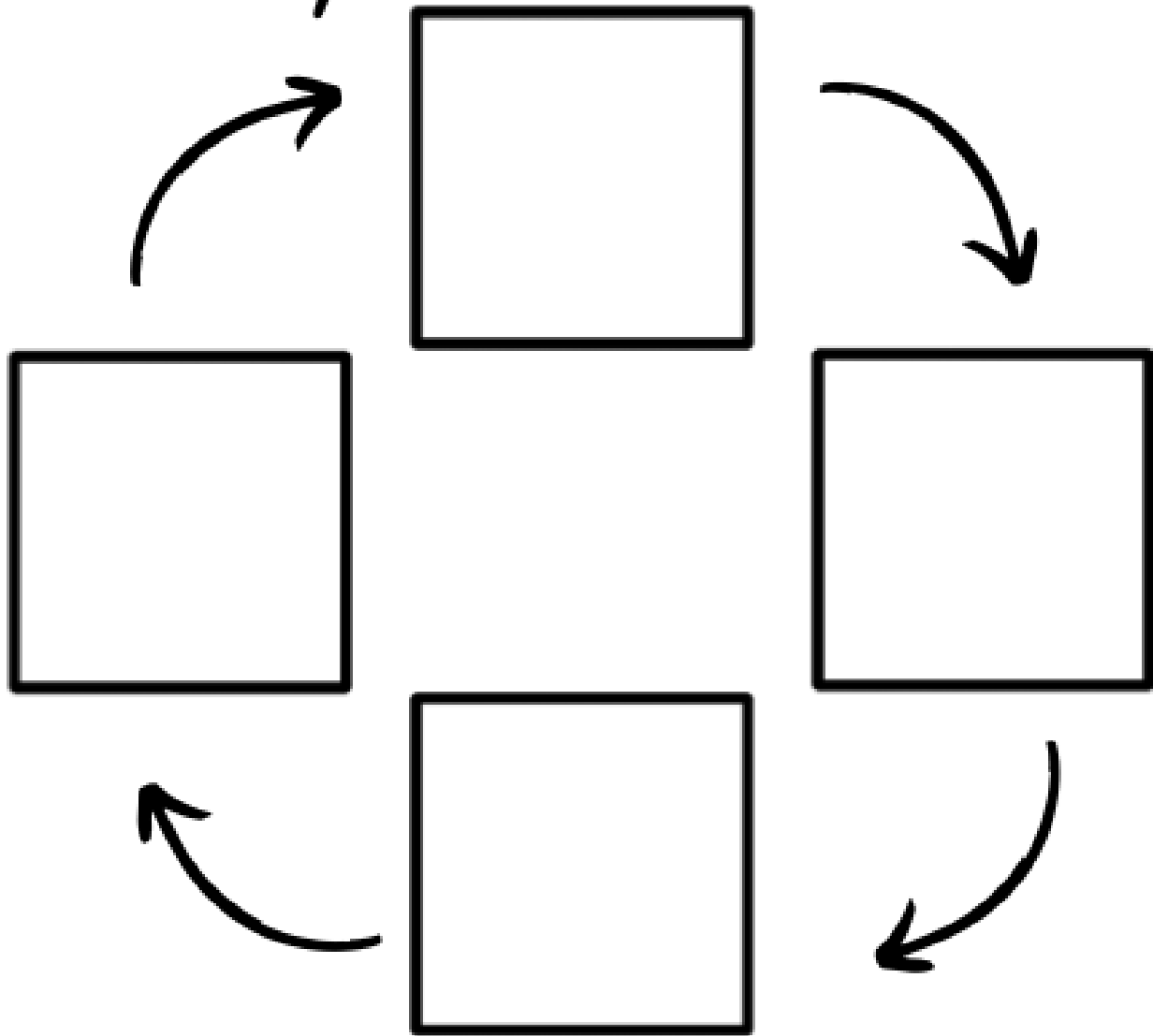
Anus

Prostomium

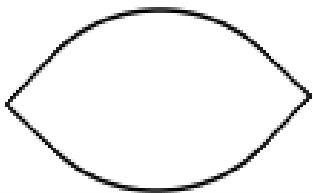
Muscle Segments

Name _____

Life Cycle of a Worm



Cocoon



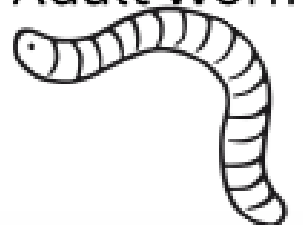
Hatching



Young Worm



Adult Worm



Name: _____

Mini Worm Bin Experiments

Part 1: Assembling

1. Assemble your mini worm bin, as instructed:
2. Cut off the top of your bottle where it starts to bend. Practice safety!
3. Carefully put 6 inches of soil in the bottom of your container.
4. Go out to the compost and gather food for your worms.
5. Cover the worms with one inch of newspaper and spray the newspaper with water until it is fully moist.
6. Put plastic wrap over the container opening, securing it with a rubber band. Carefully poke holes into the top.

Part 2

Draw what you see below, recording as much detail as possible.



Part 3: Checking In

- ☐ Are your worms moving (active)?
- ☐ Are they eating their food?
- ☐ Is the soil moist?
- ☐ Is it dark enough for your worms?
- ☐ Does the worm bin smell healthy?
- ☐ Is there enough food for your worm?

Experiment #1: How Do Worms See Light?

Prediction (circle one)

I think worms like: bright light darkness partial light

Or, I think worms will _____

Design

Construct an experiment to test your prediction using the materials you have on hand.

What Happened During Your Experiment?

Describe the behavior of your worm when exposed to:

Light	Partial Light/Dark	Darkness

Conclusions

Was your prediction correct? Yes No

What does this tell you about how worms sense light? _____

Extra

How fast do worms travel? _____

Directions

Using a stopwatch, record how long it takes a worm to travel one foot (12 inches) with light, without light, and in partial light/dark.

Results (in minutes or seconds)

Light	Partial Light/Dark	Darkness

Experiment #2: How Do Worms Smell?

Design

Using three different food samples from the garden, design an experiment to test which food your worm prefers.

Prediction

Which substance do you think the worms will prefer and why? _____

Test

Substance	Worm #1	Worm #2
Item 1		
Item 2		
Item 3		

Conclusions

Was your prediction correct? Yes No

What item did your worms prefer? _____

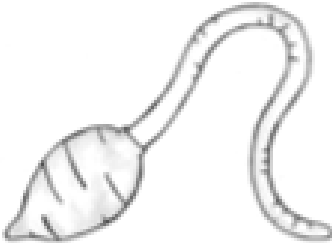
What body parts did they smell it? _____

List what behaviors you noticed: _____

Experiment #3: The Life Cycle of a Worm

Directions:

1. Carefully pour your worm bin on a place mat.
2. Using a pencil or wooden stick, explore the contents of your bin, searching for the following worm life stages.
3. Keep a tally of your findings below:

Cocoon 	How many do you see? _____ What do they look like? _____ _____ _____ _____
Young Hatchling 	How many do you see? _____ What do they look like? _____ _____ _____ _____
Immature Adults 	How many do you see? _____ What do they look like? _____ _____ _____ _____
Mature Adults 	How many do you see? _____ What do they look like? _____ _____ _____ _____

Experiment #4: What Soils Do Worms Prefer?

Hypothesis: _____

Design

1. Gather four soil samples for your experiment.
2. Using the provided materials, design an experiment that will test which type of soil your worms will prefer.

Soil Sample #1: _____ 	Soil Sample #2: _____
Soil Sample #3: _____ 	Soil Sample #4: _____

Conclusions

Was your hypothesis correct? Yes No

What soil did your worms seek out? _____

What behavior did they show to indicate this to you? Describe in detail. _____

Questions

Come up with two questions about worms and this experiment:

1. _____

2. _____

Name: _____

What Worms Eat

Apples	Cucumber
Lemon	Chicken Bones
Banana Peels	Oatmeal
Pizza Crust	Oranges
Tea Leaves	Pumpkin
Egg Shells	Coffee Grounds
Tomatoes	Grapefruit Peels
Pancakes	Garlic
Cheese	Watermelon Rinds
Cake	Cream Cheese
Onion Peel	Potato Chips
Pineapple Rind	Olive Oil

Name: _____

Recipe for a Worm Bin

Ingredients

1. A container: Wooden or plastic box, composting container, or _____

2. Bedding: Peat, coconut fiber, or _____

3. Grit: Fine ground gravel or _____

4. Compost (There are more players in the decomposition game than just worms!)
5. Water (The soil should feel like a wrung-out sponge.)
6. Food scraps: _____

7. Worms: Not all worms like to live in worm bins. For our school worm bins, we use _____

Worm Fact: Some people believe that worms enjoy eating raw plant matter, but worms' mouths aren't strong enough to feed on hard surfaces like fresh apple slices. Instead, they wait for microbes to feed on the food, letting it decompose and begin to get moldy and mushy before taking nice slurps of gooey, delicious, composting soup!

Seed Resource

Time Lapse of Beans Sprouting Video



Seeds are unique!





Lesson 1: What is a seed?

vocabulary: seed, DNA, embryo

This lesson introduces children to seeds and what they are made up of. Discuss the vocabulary with your students then have them write down the definitions of the vocabulary words in their Plant Parts Vocabulary mini booklet.

Read aloud (or have students read) the information sheet titled "What is a seed?".

Seed Observation Activity:

materials needed: lima beans, water in a bowl, paper towels, magnifying glass

directions: Review all of the enclosed vocabulary cards with your students before the first lesson. Whenever you come to one of the vocabulary words in the lesson, bring back out the vocabulary word card. These cards can also be used for word walls and decor.

After the seed observation activity is completed, have your students complete the worksheet: A peek inside a seed.....

Show students the pictures on the page titled, "Seeds are unique!" so that they can see the differences in seeds.

If you have a seed collection this would be a good time to show your students how unique each type of seed is.

Activity: Seed hunt

Take your students outdoors and have them collect seeds or draw the seeds as they see them.

*This would be a great day to have students begin their Plant Observation Journal! (see Teacher's Guide on page 3 for more information)

What is a seed?

A seed is a baby plant that is protected by a hard outer covering called a seed coat. The seed coat is the part we see when we look at a seed. Not all seeds look alike. Some are black and some are brown with white stripes!



Every plant has its own unique kind of seed with a special code inside of it called DNA. This special code tells the plant exactly what kind of plant to grow into. This is how a sunflower knows to become a sunflower and not a strawberry.

If we cut a seed in half, we might be able to see a baby plant inside. We call that baby plant an **embryo**. Do you see the tiny leaves? What about the tiny root? All of the other stuff inside of the seed that is surrounding the baby plant is the food that the plant needs to grow big and strong so it can burst out of its protective coating.



Activity:

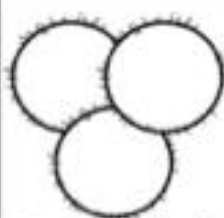
Soak some lima beans in a bowl of water. Let it sit overnight. The next day take the seeds out of the water and gently rub the outer coating off of them. Carefully open the seed and look inside. You may want to use a magnifying glass to see the embryo close up. Record your observations by drawing and labeling a picture of what you saw.

Plant in a bag

What you will need:



Sandwich bag



3 cotton balls



Any type of
bean



water



tape

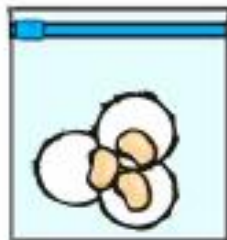
Directions

1



Wet 3-4 cotton balls cotton balls and place it in the sandwich bag

2



Place 3-5 dry beans in the sandwich bag, on top of the wet cotton balls.

3

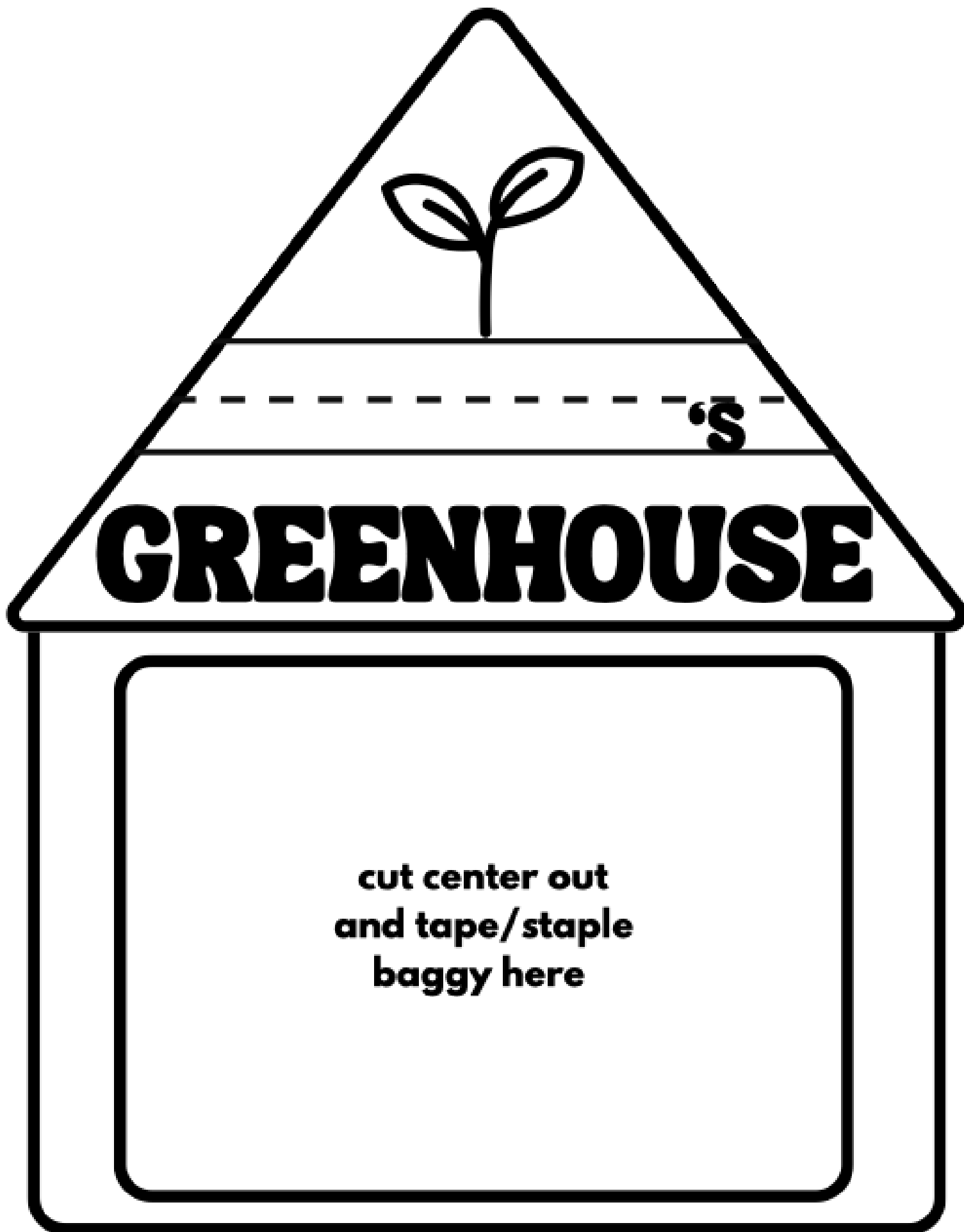


Color your greenhouse and staple or tape it to the bag. (make sure you can still see the seeds)

4



Tape your bag to a window that gets sunlight and watch your plant grow!



Name:

A peek inside a seed...

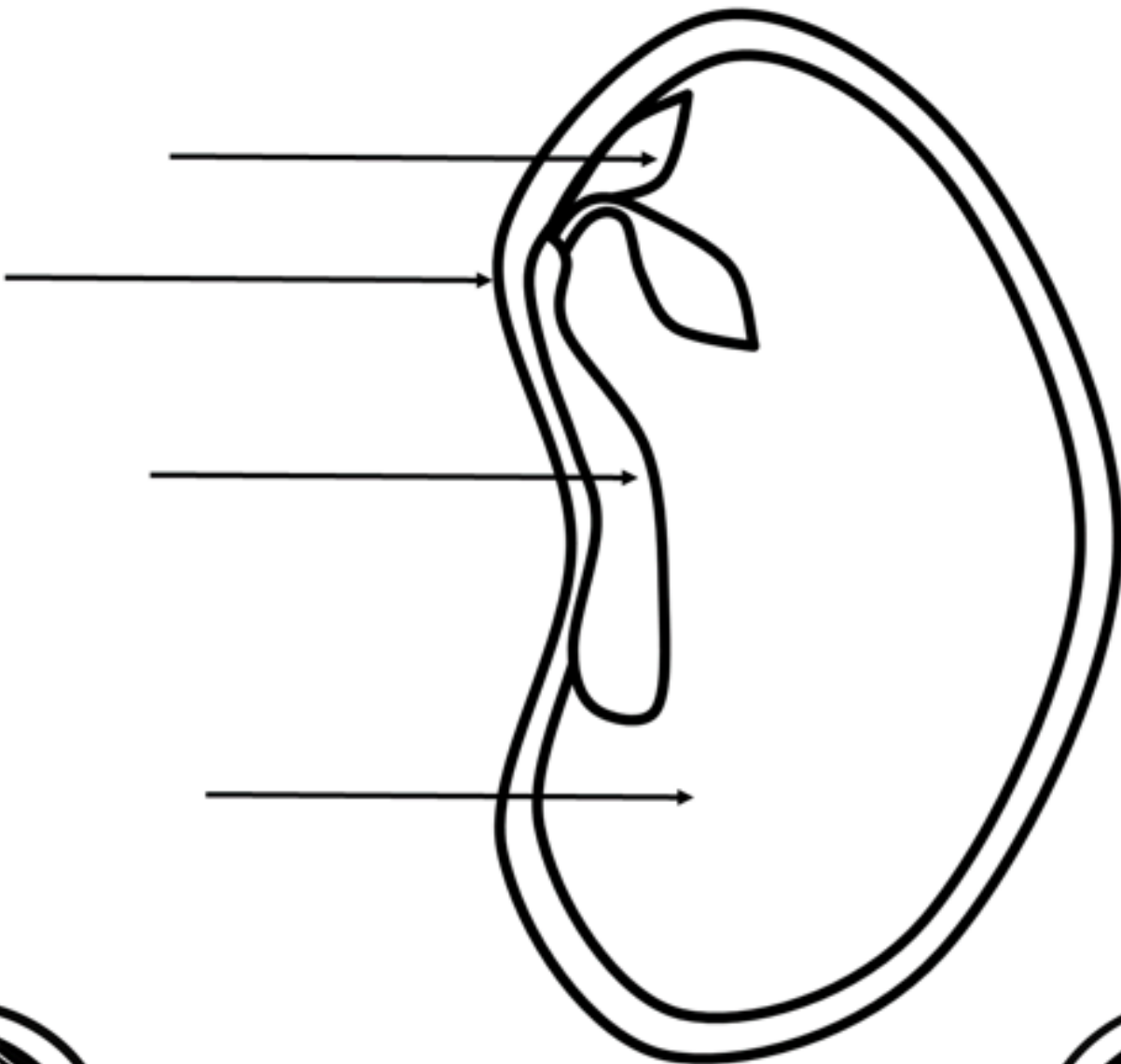
Directions: Color and label the parts of the seed.

root

leaves

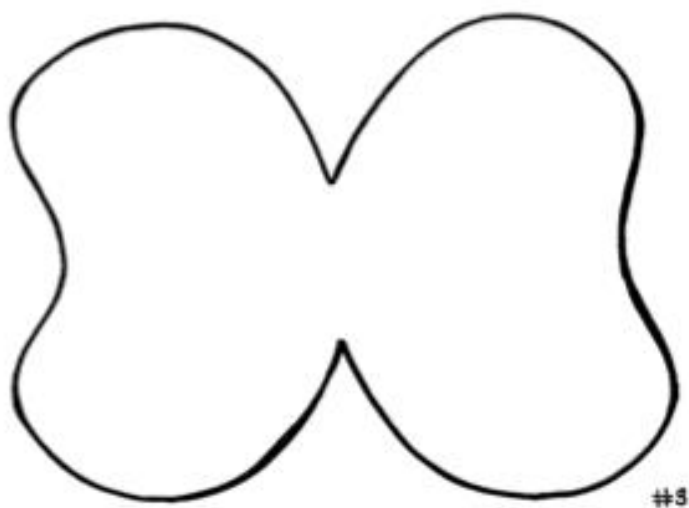
seed coat

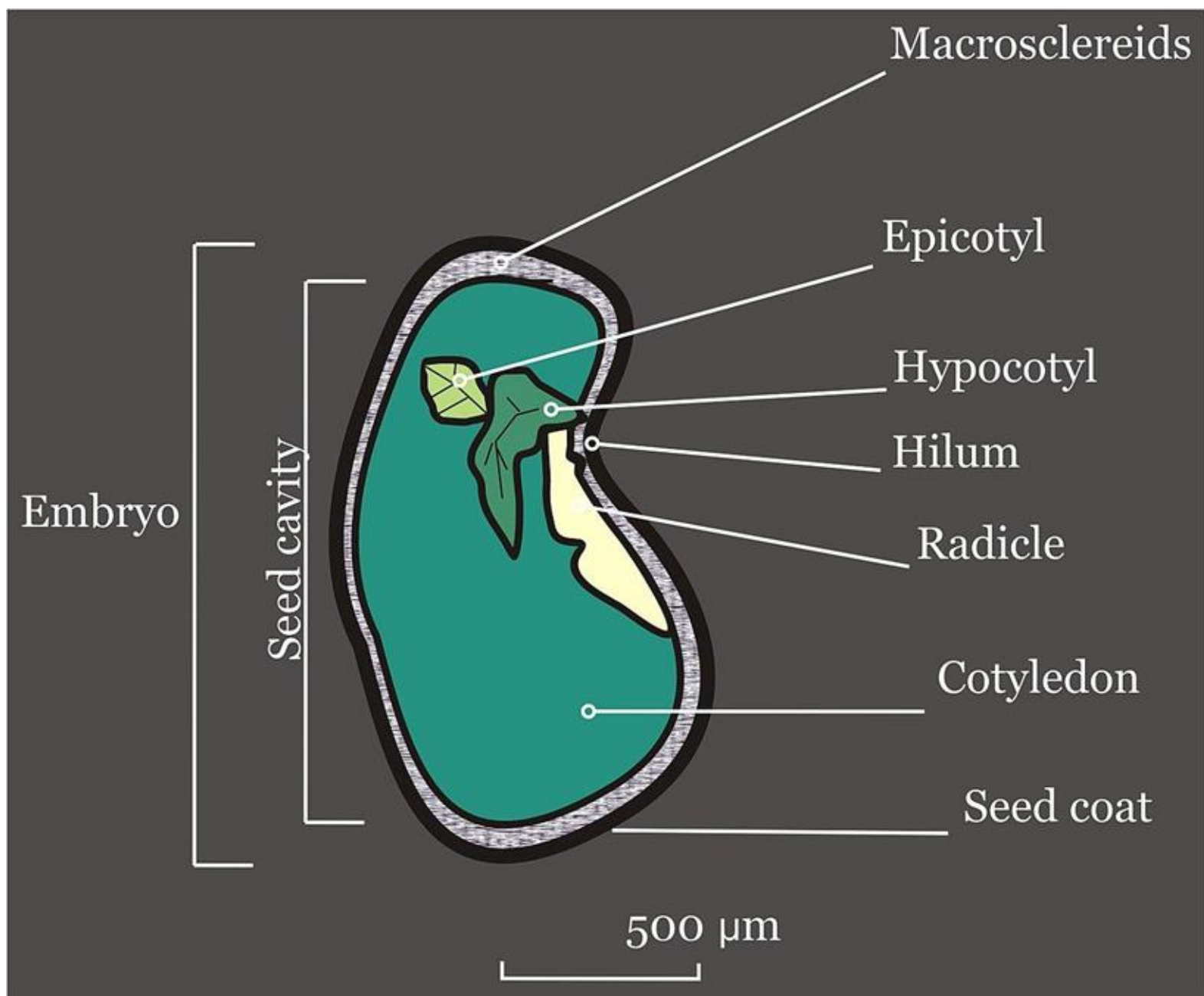
food

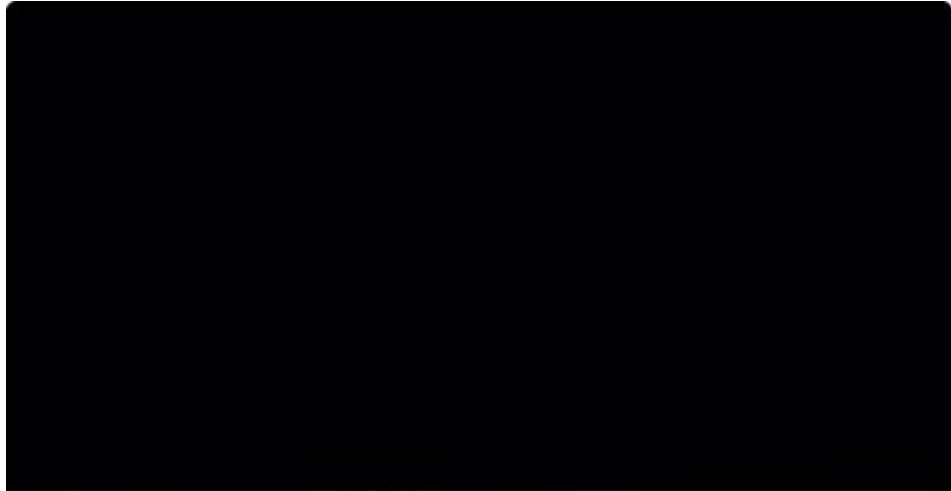


Name: _____

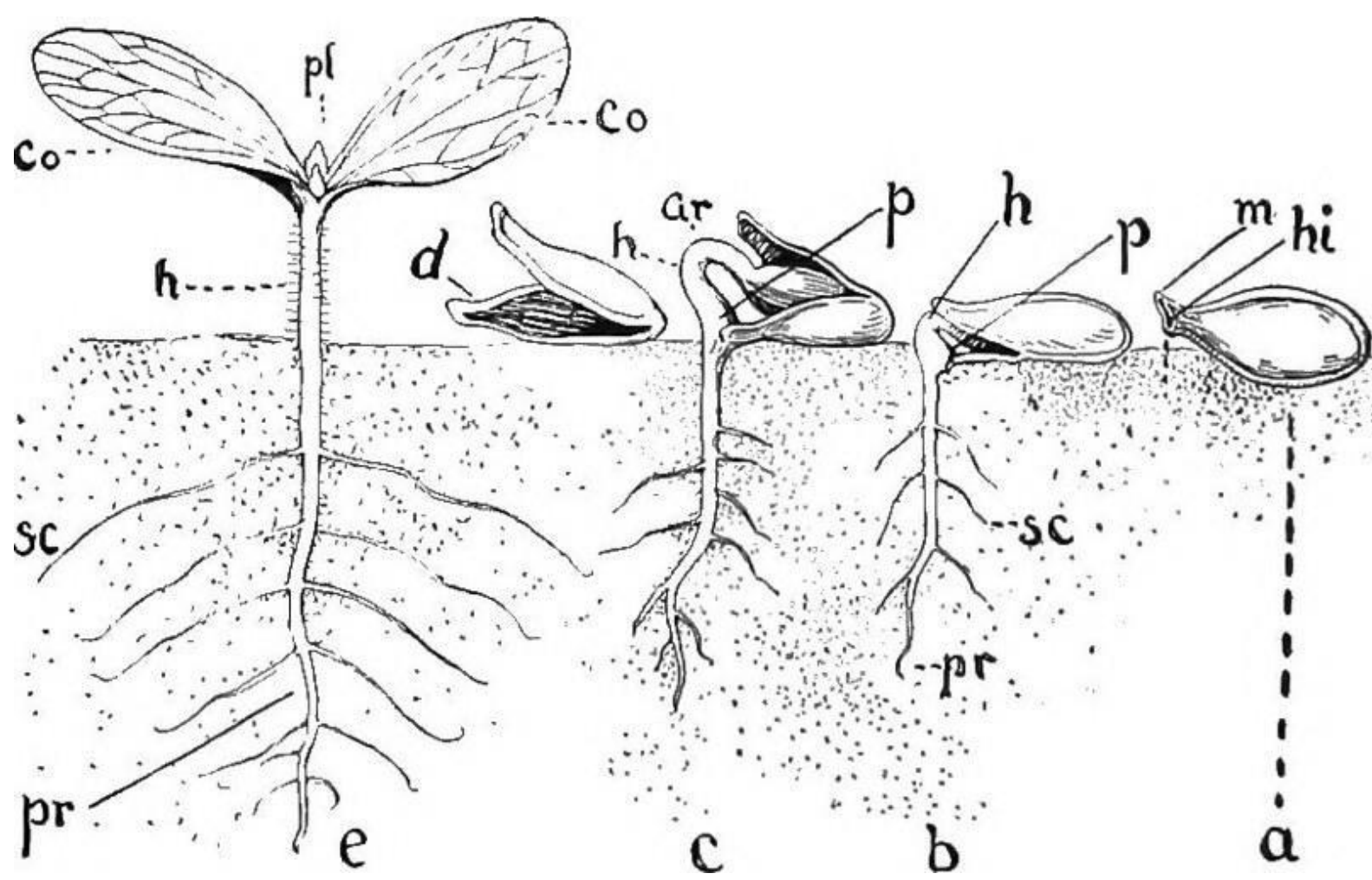
The Parts of a Seed







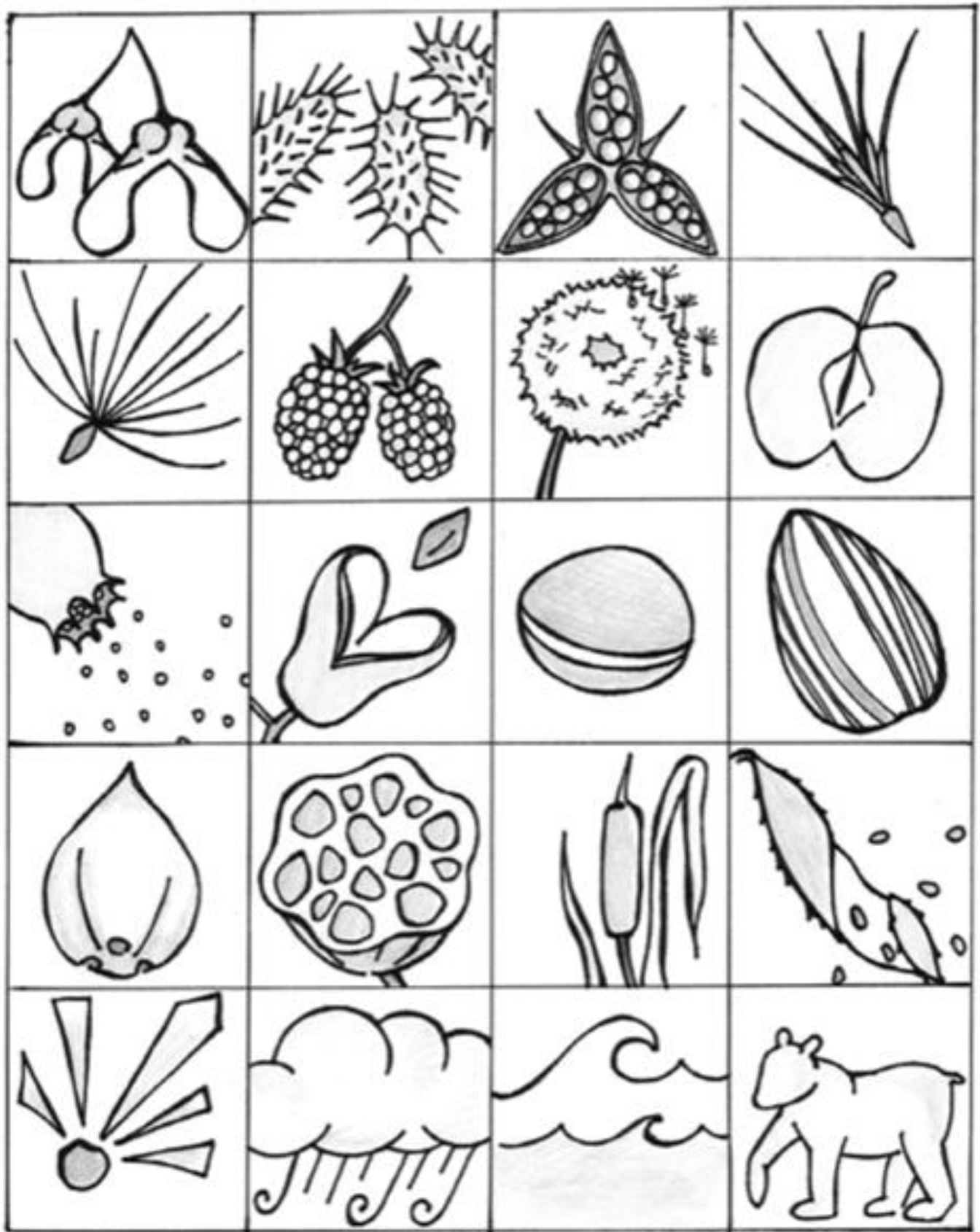








How Do Seeds Travel?



Name: _____

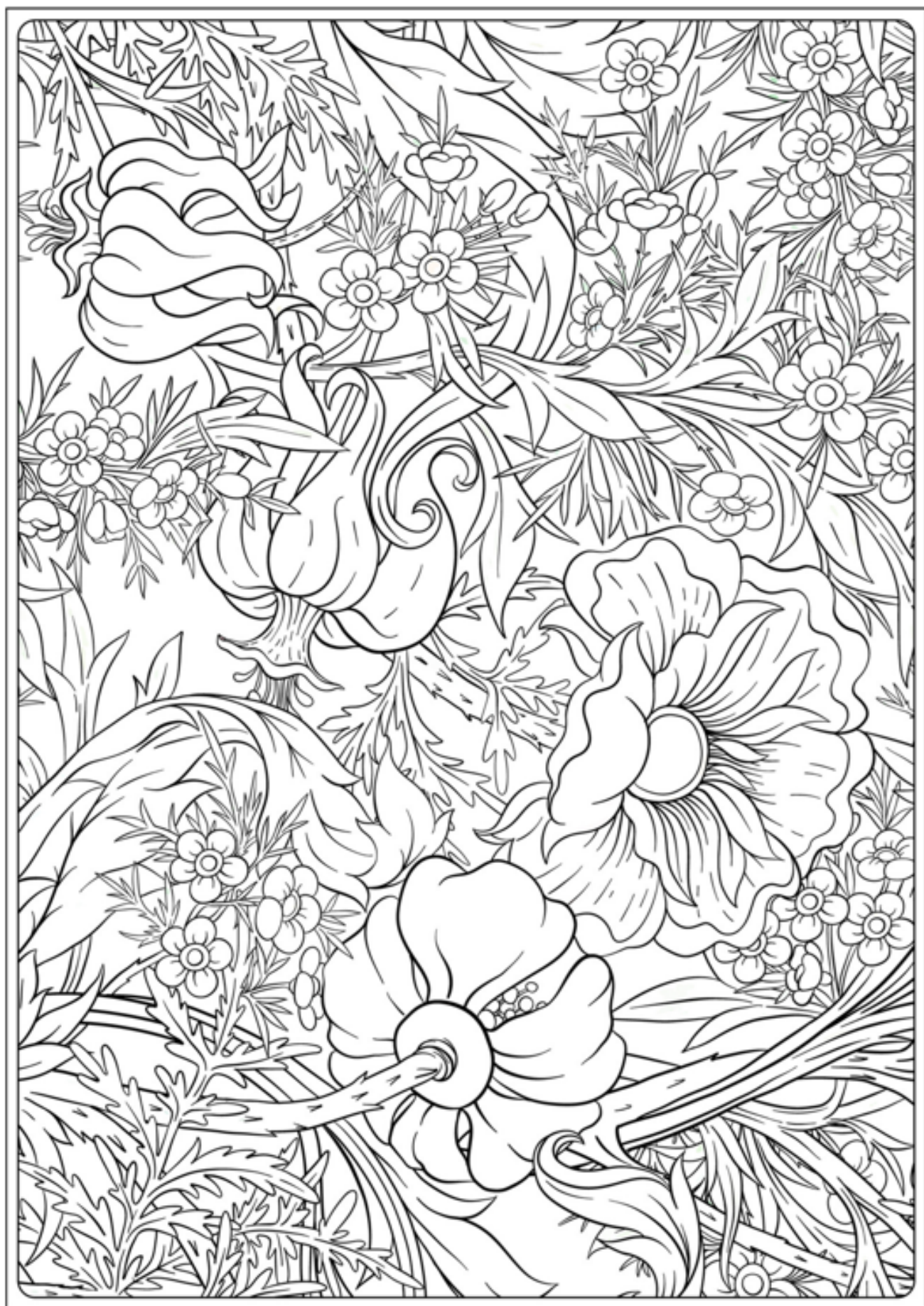
How Do Seeds Travel?

Directions: Cut out each seed square on the sheet provided and assemble the images under the way the seed travels in the columns below.

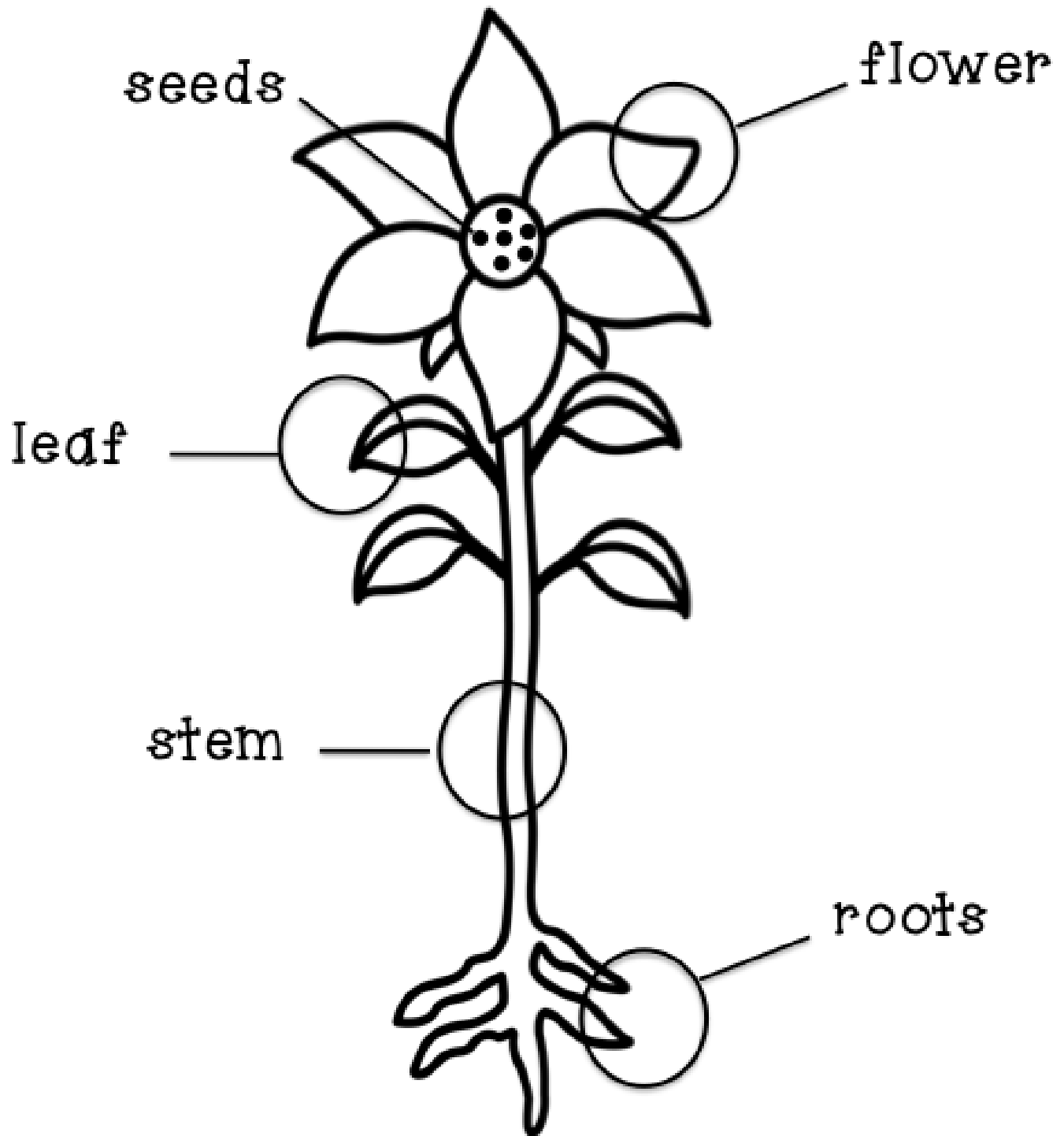
By Wind	By Animals	By Water	By Bursting

Plant Resources





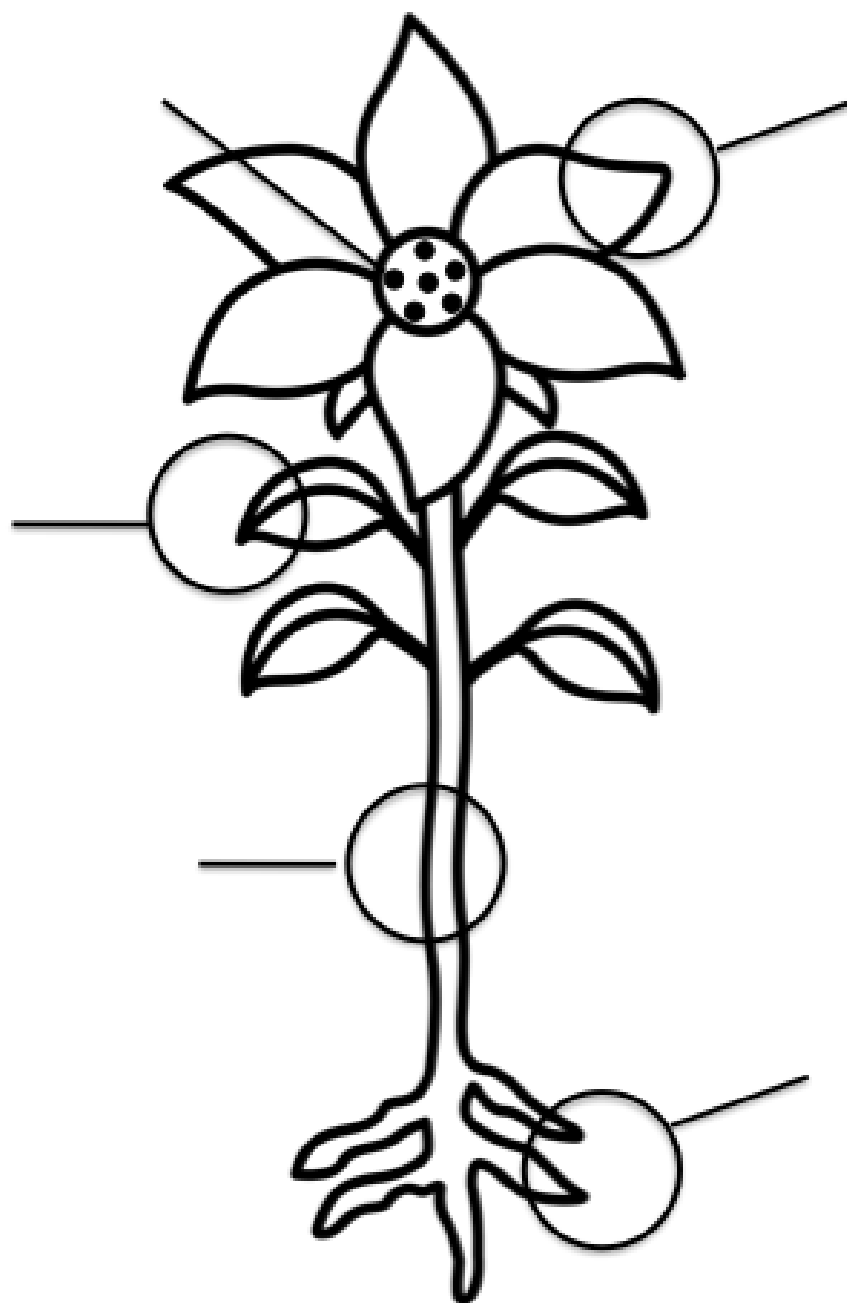
parts of a plant



name: _____

Parts of a Plant

Directions: Cut and paste the labels to the correct part of the plant.



© Jeanette Turner, www.awoladventure.blogspot.com

Roots

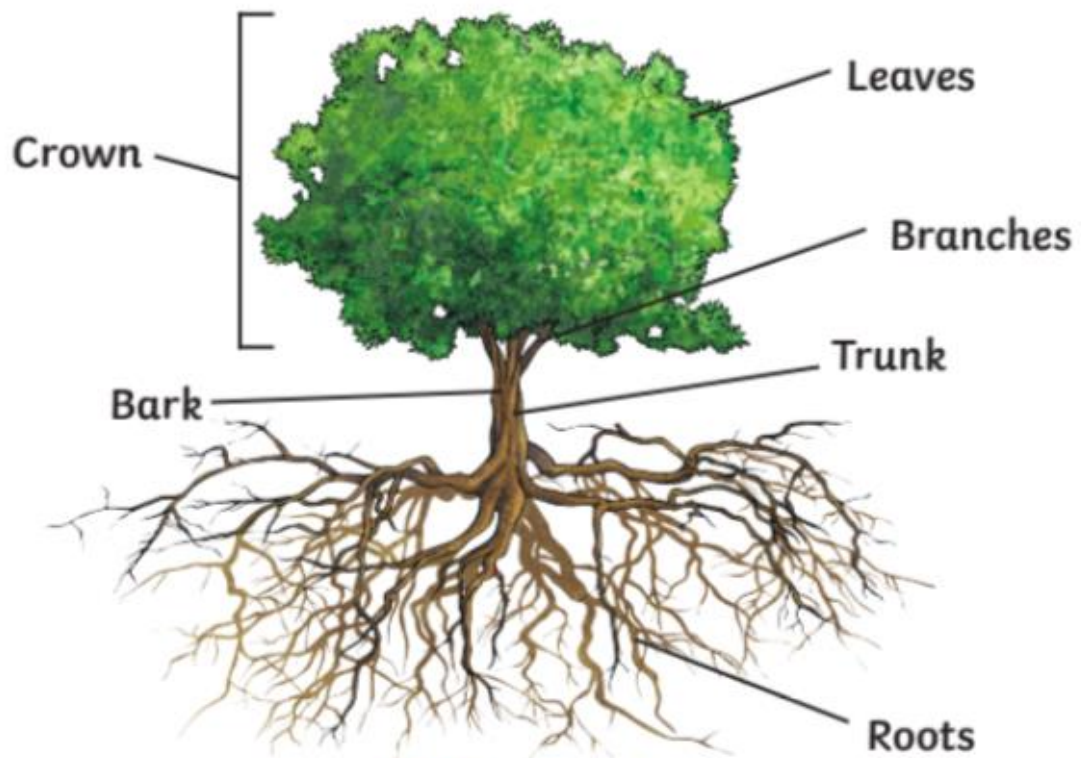
Stem

Leaf

Seeds

Flower

Parts of a Tree



FUNNY FACE PLANTER

Materials:

- Plastic Foam Cup
- Crayons/ Markers
- Soil
- Grass Seed
- Water
- Scissors



Procedure:

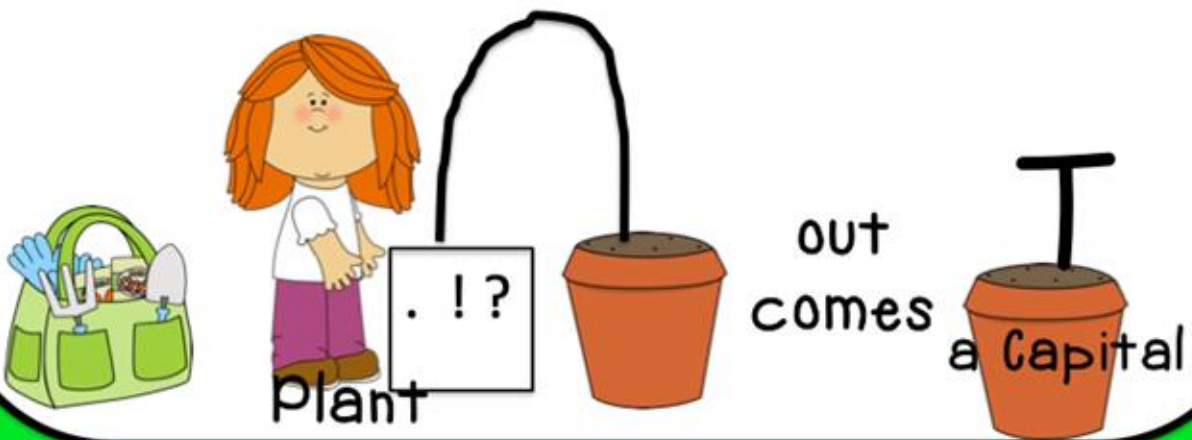
- Design a funny face on cup.
- Fill cup with soil and sprinkle grass seed on top of soil.
- Water seeds regularly so that soil is moist but not soaking wet.
- When grass sprouts continue to water, and in a few days you may need to style the hair.



I love to write! It
is fun!

I planted my period.

Now I'm growing my capital.



Created by Maria Miller 2016



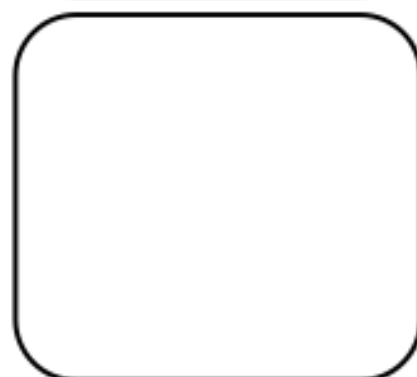
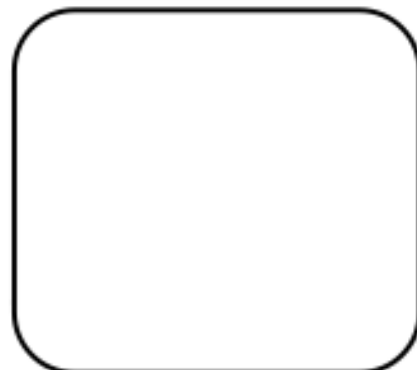
How to grow a Flower

First, _____

Next, _____

Then, _____

Last, _____



By Lea DiVincent



How to grow a Flower

This image shows a full page of white paper with horizontal black lines, resembling notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Name: _____

How Does a Plant **GROW?**

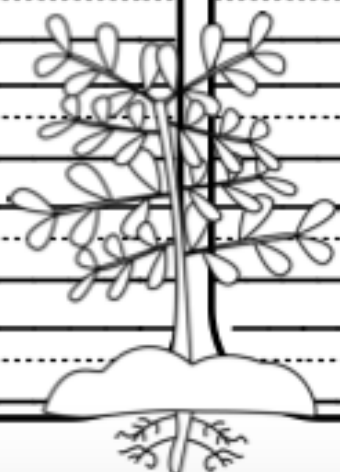
Write about what happens when a plant grows. Make sure to include all the steps.

First,

Next,

Then,

Finally,



Nombre: _____

¿Cómo crece una

PLANTA?

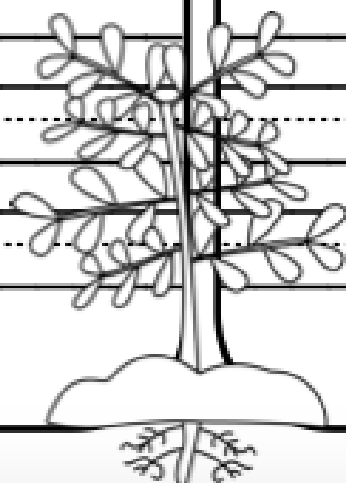
Escribir sobre lo que sucede cuando una planta crece. Recuerda de incluir todos los pasos.

Primero,

Después,

Luego,

Por último,



Experimental planting

FOR
THE BIG
KIDS!

1. Discuss how light, water, nutrients and space impact plant growth.
2. THEN HAVE YOUR CHILD EXPERIMENT WITH THE AMOUNT OF LIGHT OR WATER THEIR PLANTS RECEIVE.
3. Have your child predict plant growth for both the control and experimental plants.
4. THEY SHOULD RECORD RESULTS EACH WEEK AND TAKE PICTURES!
5. Discuss how this type of experiment could simulate human impact on an ecosystems.

Experimental planting

Growing Conditions How the seed will be planted	Prediction How will plant will grow?
CONTROL PLANT The seed will be given <u>water</u> and <u>sunlight</u>	I THINK ...
EXPERIMENTAL PLANT The seed will <u>not</u> be given (choose one) 	I THINK...

FOR THE BIG KIDS!

Science. Teacher. Mom

OBSERVATIONS & Data Collection

Control Plant

Control Plant	Observation	Measurement	Drawing/Picture
Week 1			
Week 2			
Week 3			
Week 4			
Week 5			

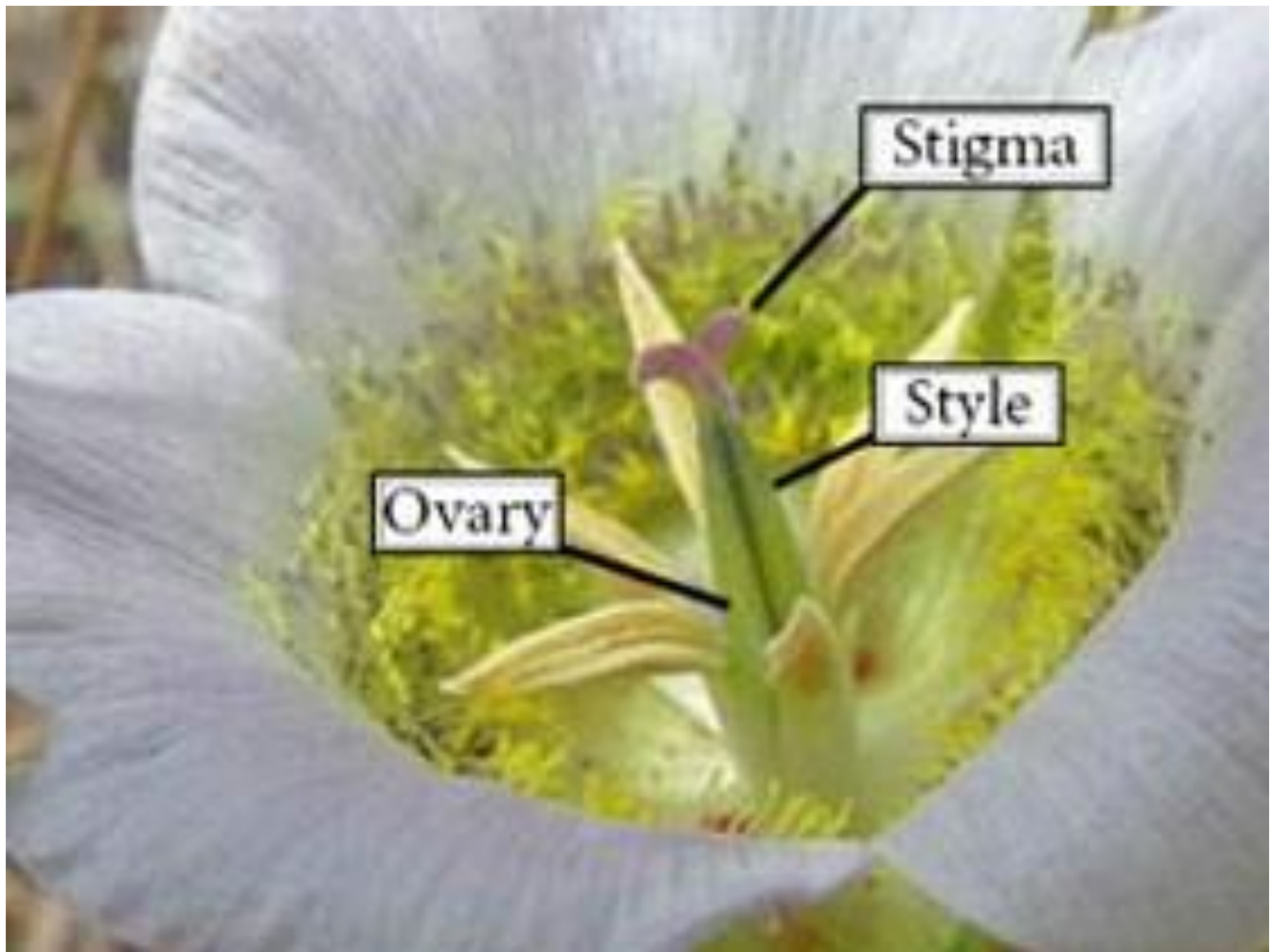
FOR THE P...

OBSERVATIONS & Data Collection

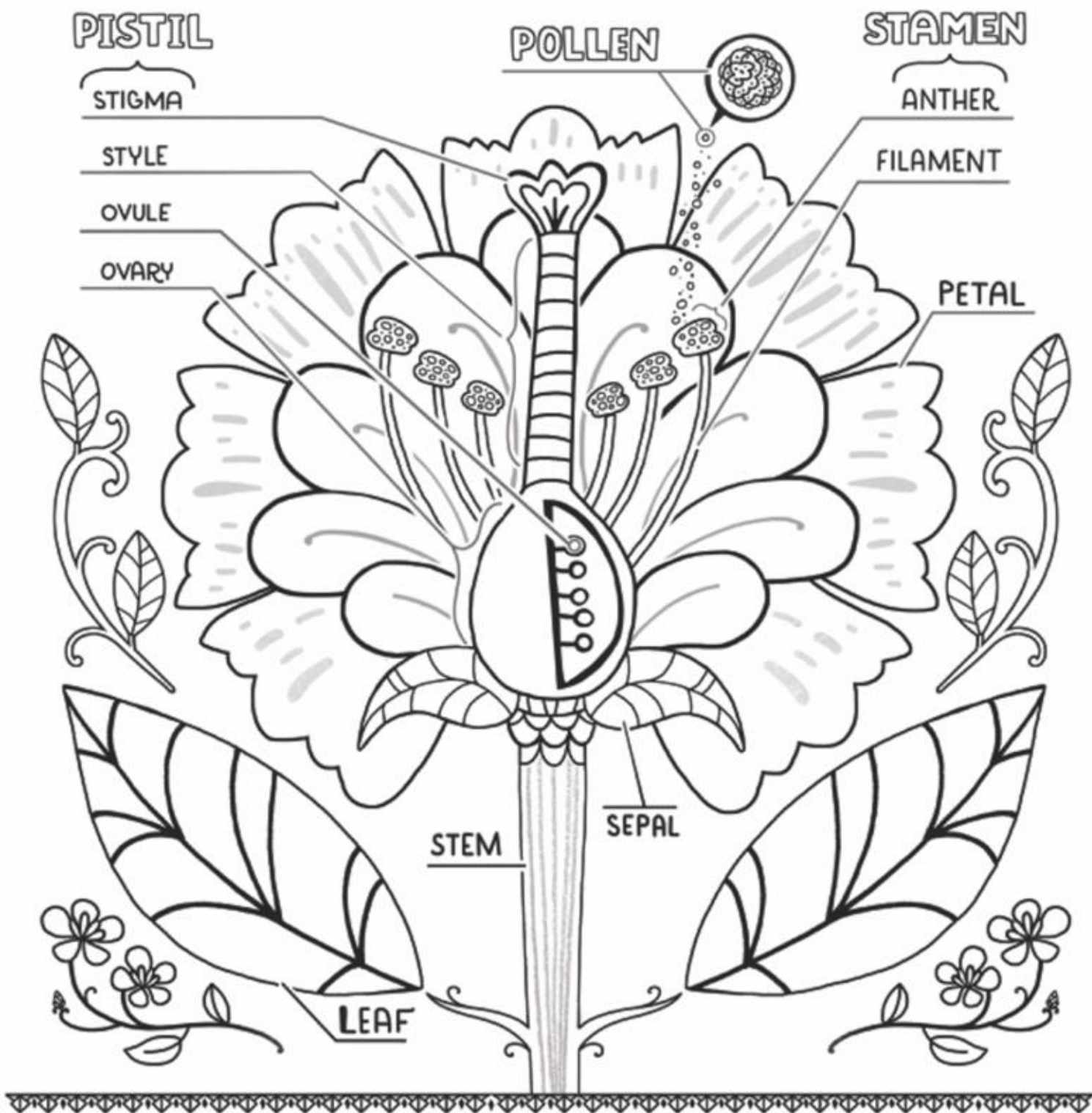
Experimental Plant

Experimental Plant	Observation	Measurement	Drawing/Picture
Week 1			
Week 2			
Week 3			
Week 4			
Week 5			

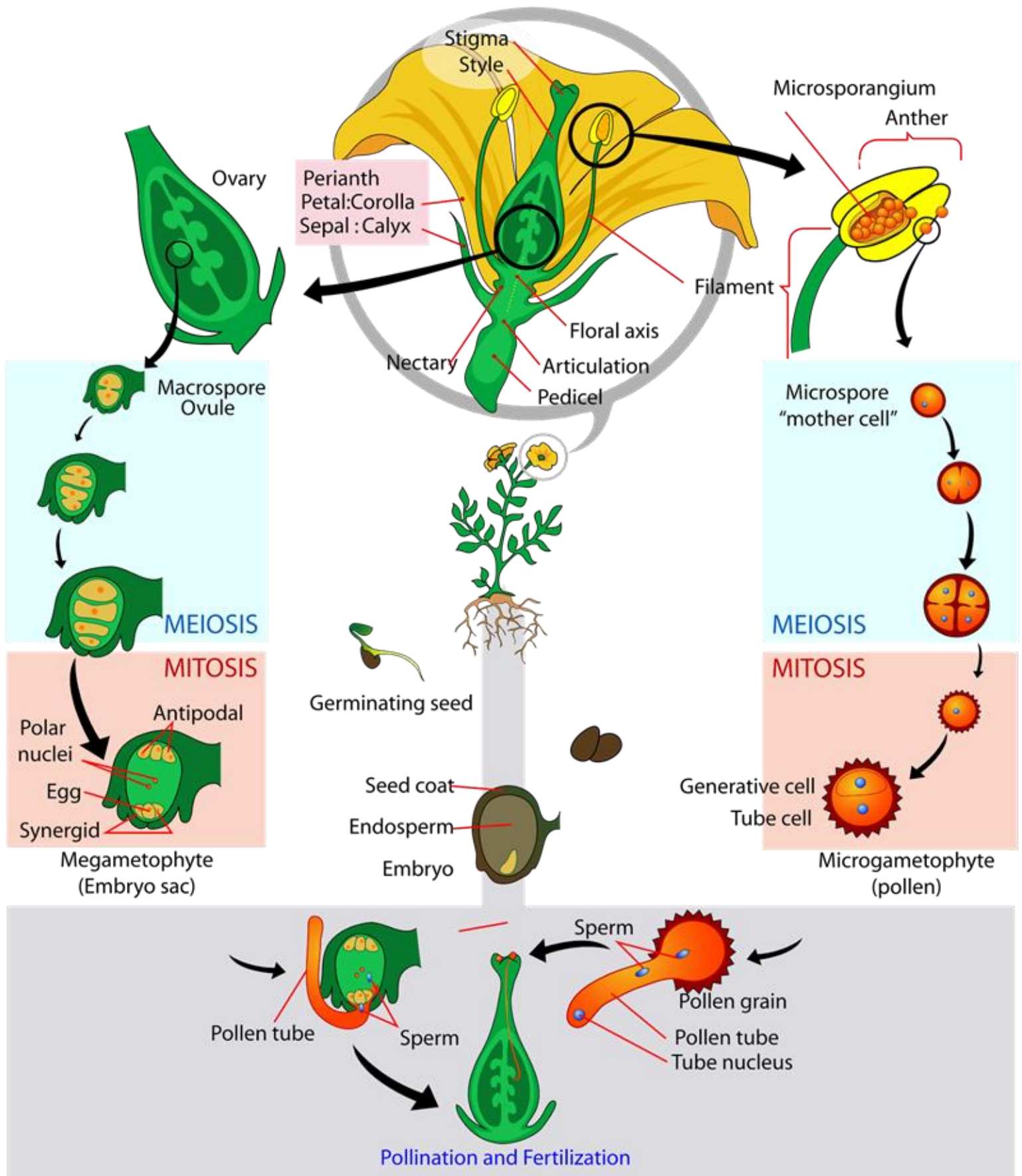
Flower Diagram



WHAT'S INSIDE A FLOWER?

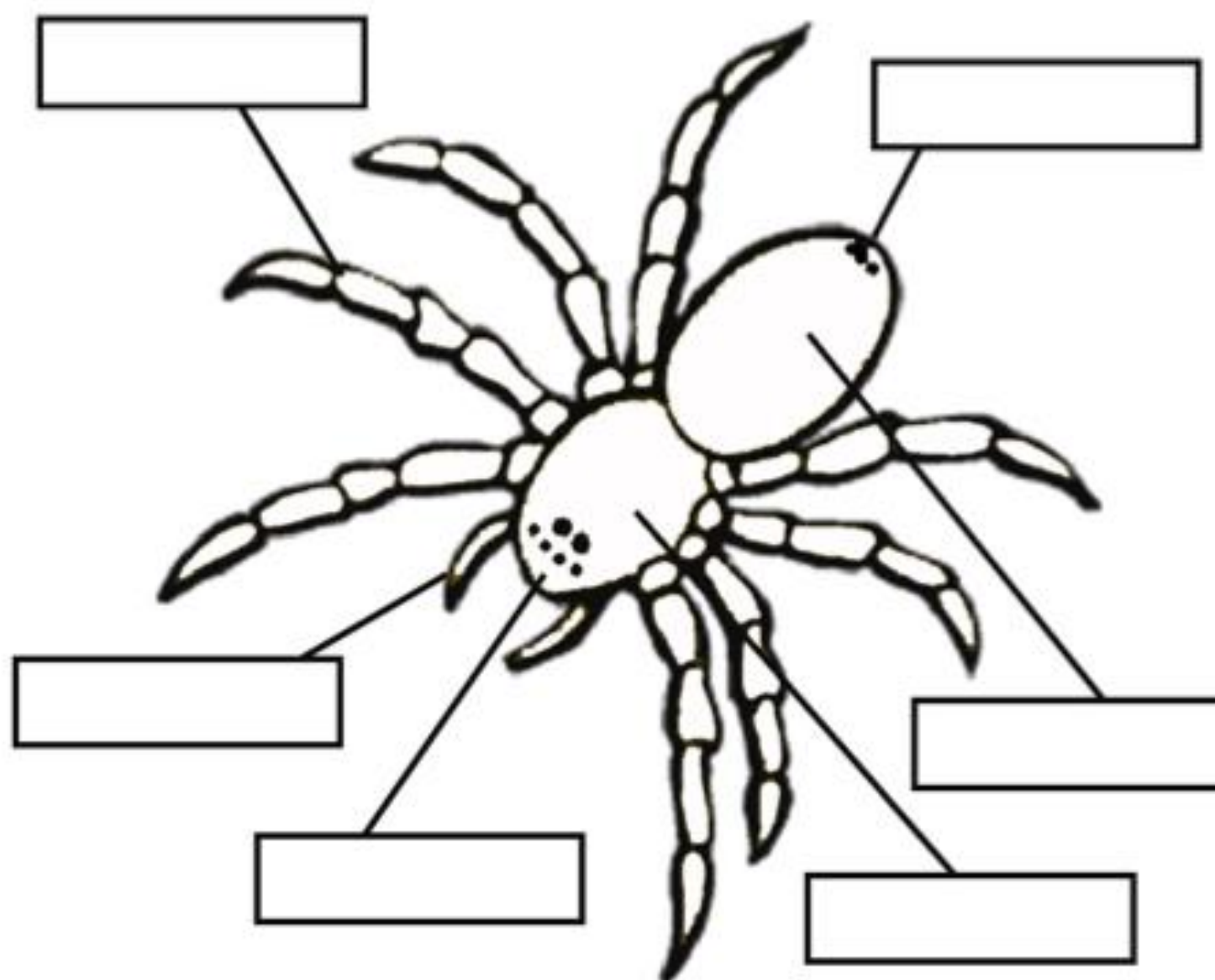


How Flowers Pollinate



Spider Resources

[spider facts](#)



Eyes

Abdomen

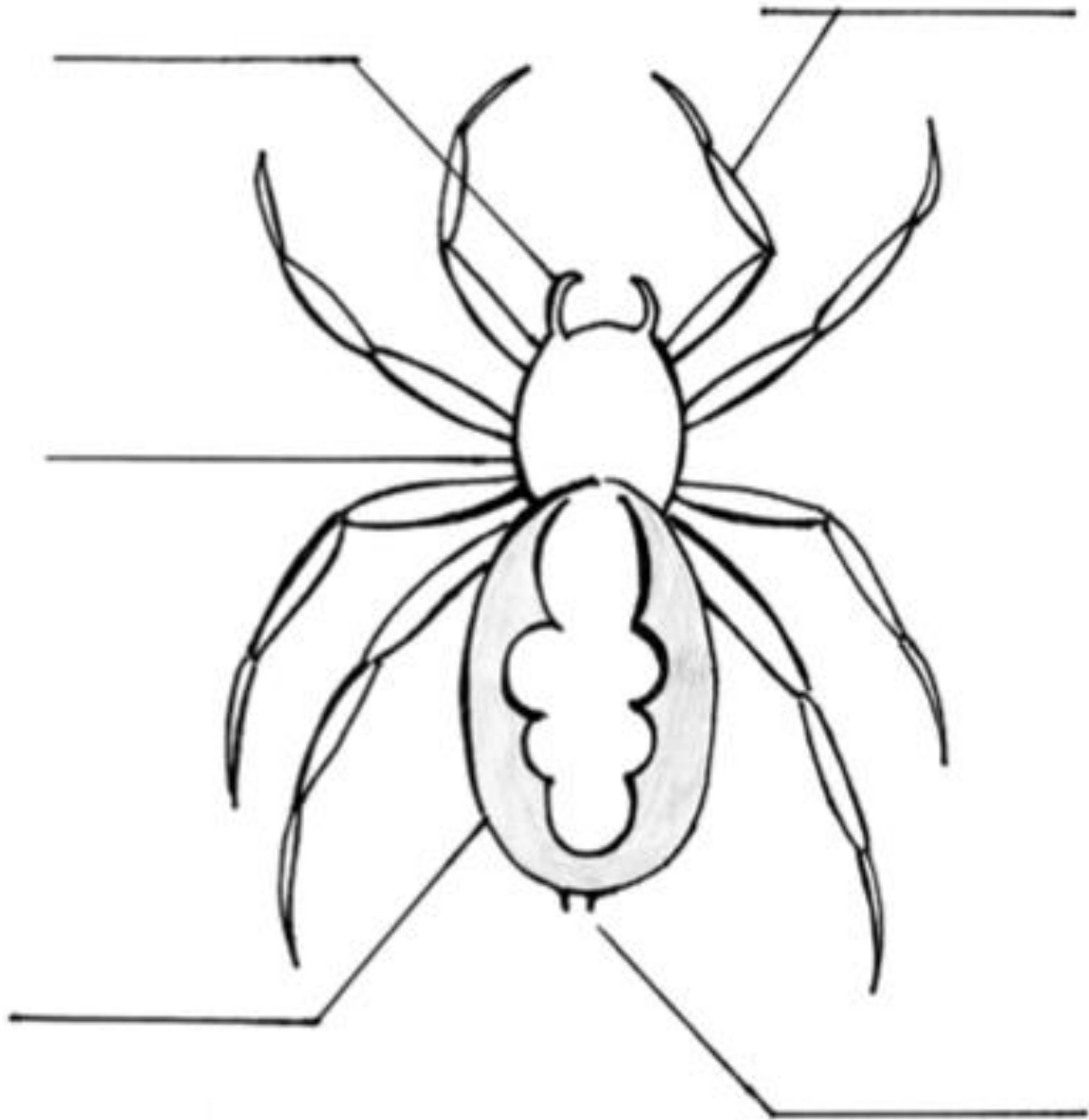
Spinnerets

Legs

Head

Feelers

Parts of a Spider



Name: _____

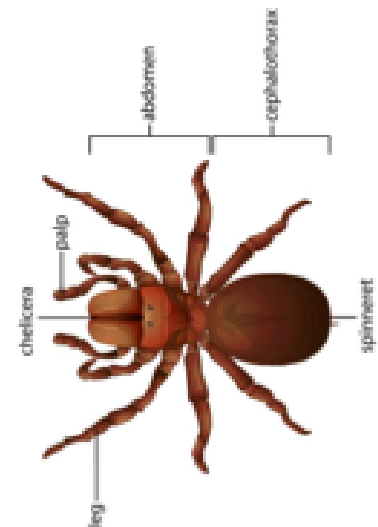
What are spiders?

Spiders are arachnids. Spiders are not insects. There are 40,000 species of spiders.

Where do spiders live?

Spiders live on every continent except Antarctica in a variety of habitats.

How do spiders look?



spiders

How do spiders catch prey?

Spiders catch prey in many different ways. They use webs, trapdoors, and jump on prey.

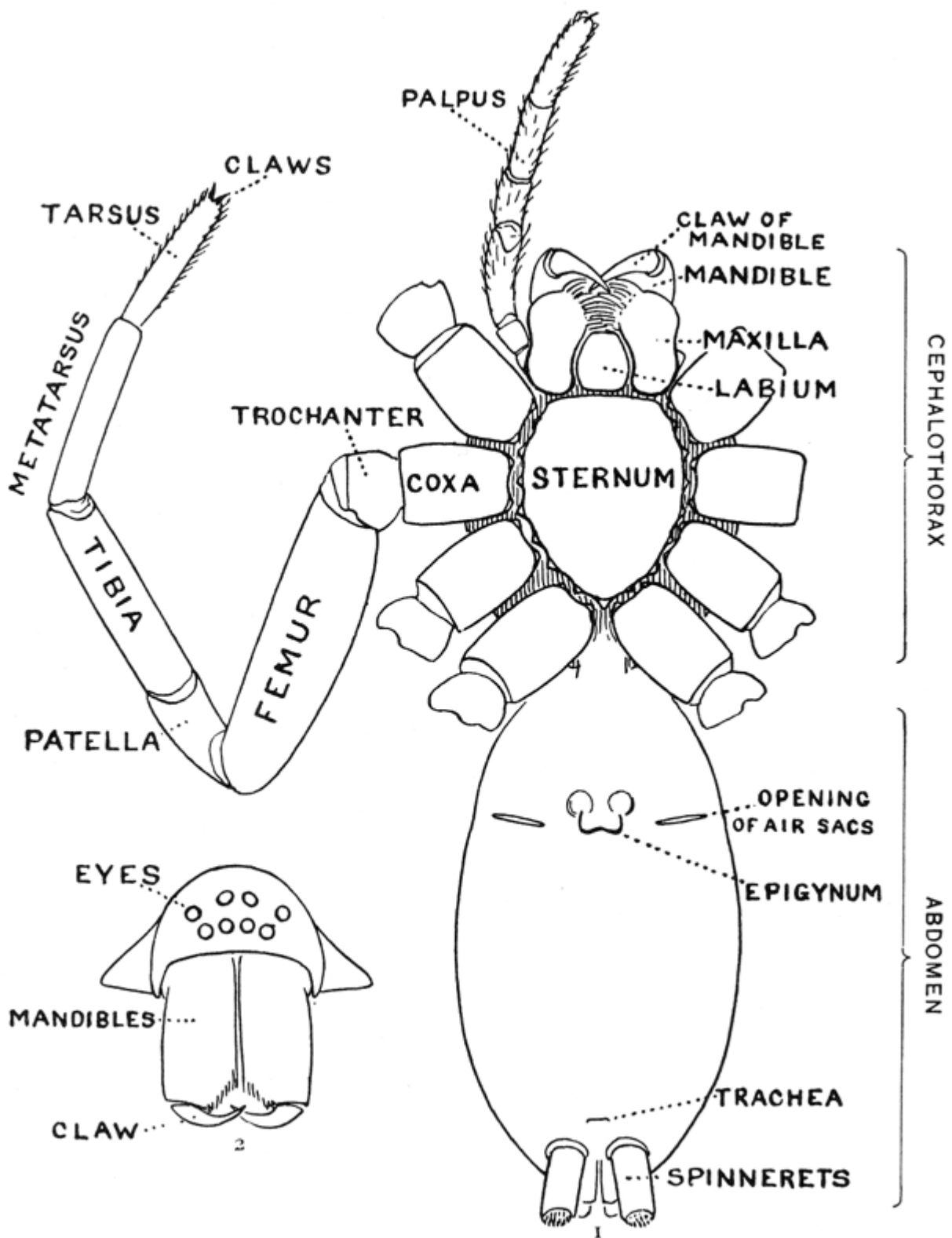
What do spiders eat?

Spiders eat insects, plant nectar, small animals, birds, and fish.

Why are spiders important?

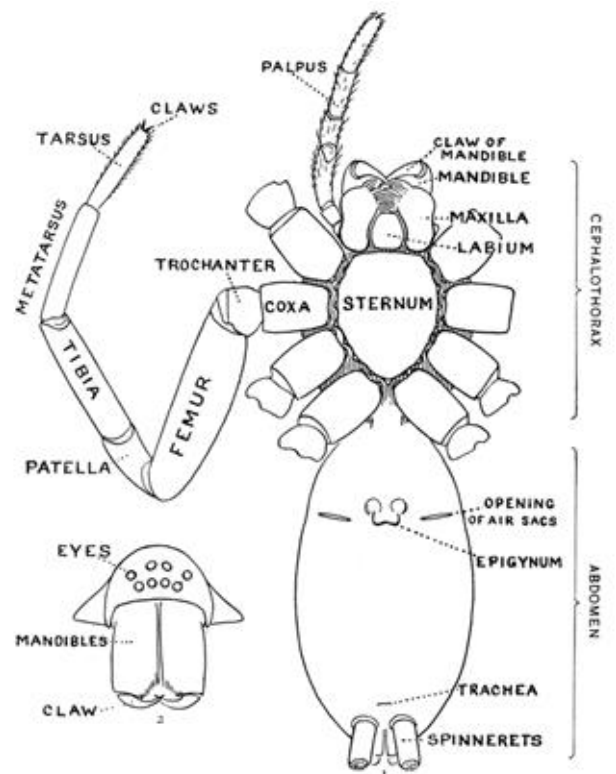
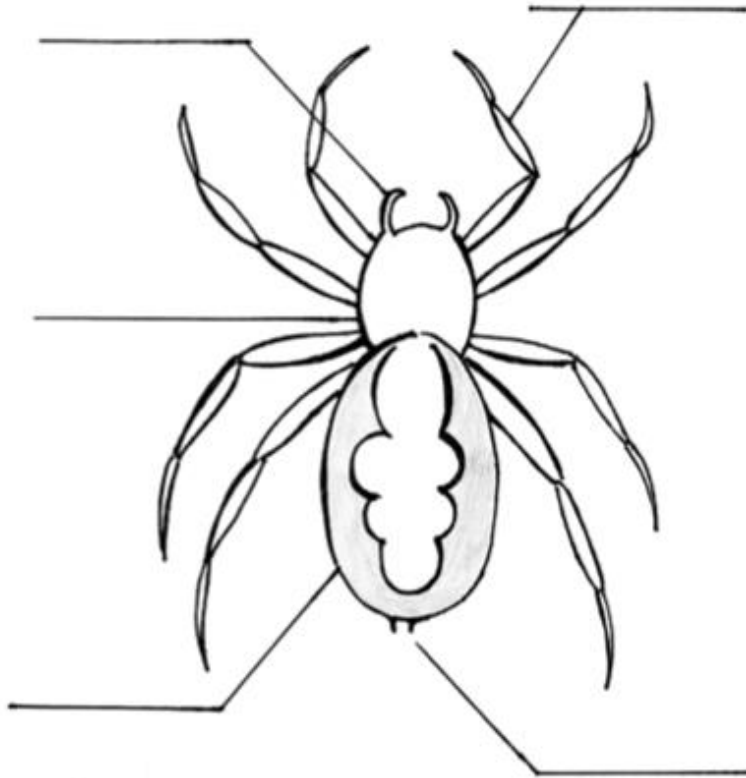
Spiders are important because they eat insects that carry disease and eat crops.

Spider Anatomy



Name: _____

Record your learning with pictures and words.





Yellow Garden Spider



Black Widow Spider



Wolf Spider



Woodlouse Spider



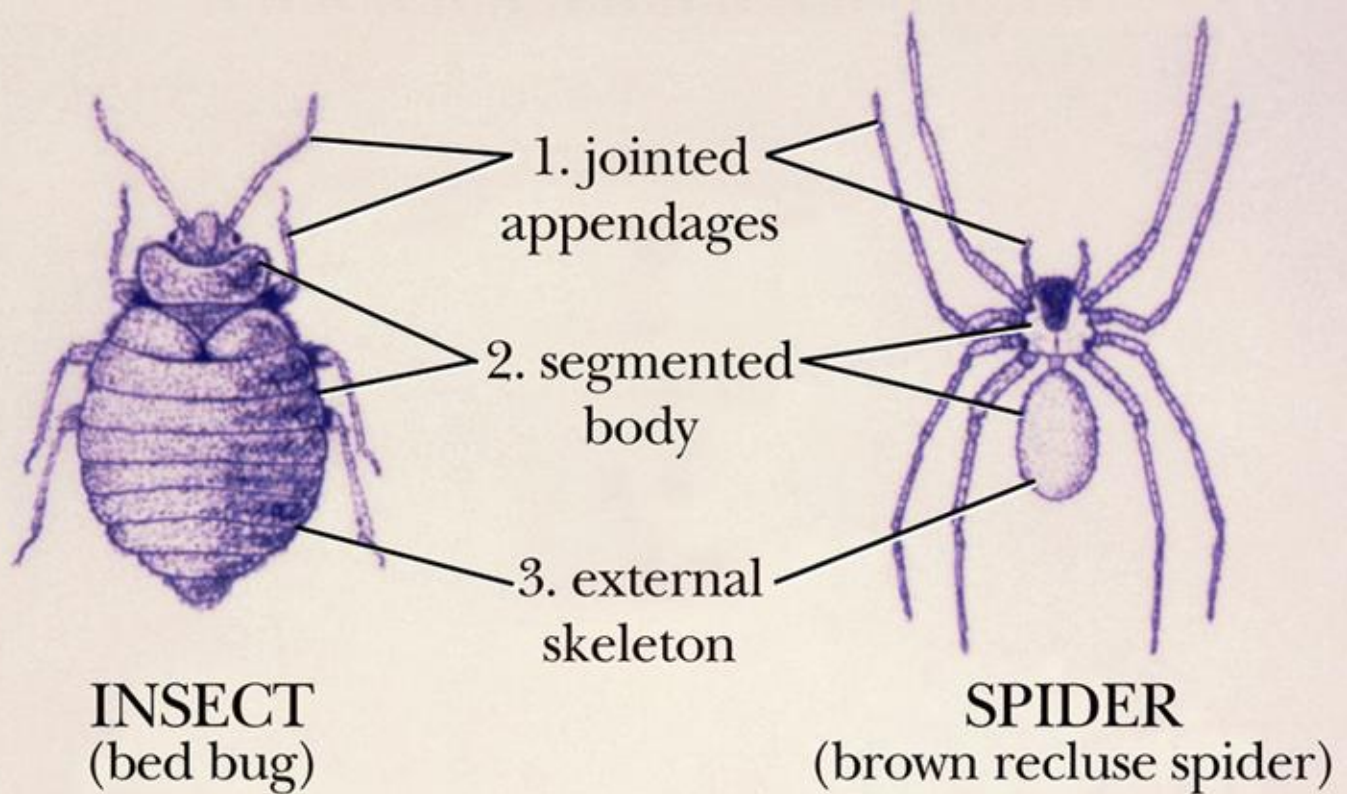
Cross Orb Weaver



Brown Recluse

Similarities between Insects and Spiders

Three Basic Characteristics of Arthropods (Insects and their Relatives)



Predator vs. Prey Resources



Predator and Prey Images







Name: _____

Predator and Prey

Ladybug	Honeybee	Mouse	Ant	Yellow Jacket
Butterfly	Aphid	Coyote	Snail	Garden Spider
Moth	Falcon	Praying Mantis	Salamander	Robin
Mosquito	Bat	Beetle	Centipede	Mole
Frog	Swallow	Grasshopper	Earthworm	Slug

Predator vs. Prey Game

Instructions:

1. Laminate your game tags so they can be reused many times. Animal tags can be laminated and taped on or put in convention tag holders for protection and easy use (available at office supply stores).
2. Assign each of your students an animal from the list in the game to learn about. They can draw them and find out what they eat.
3. Take the kids out to the school sports field or gym. Each child takes on an animal identity when they put on their tag. They can stand in a circle and each tell who they are and what they eat. The “what do I eat?” list below can help you there. Plant tags are for teachers and volunteers to wear so they can supervise and still take part in the game (and be eaten).
4. Explain that they can chase their prey and tag them, saying I EAT YOU! Emphasize here that they are not to hit, bite or push. Just tag.
5. When they are all ready, say: GO EAT! After about 10 - 15 minutes they can report how many prey they “caught.”
6. Then they should switch tags with another student. If they were a predator, they should play a prey to see how it feels to be the other side of the hunt.

This activity is meant to familiarize kids with what animals eat and how they are interdependent in a food web. It has the added benefit of getting the kids outside and moving.

What Do I Eat?

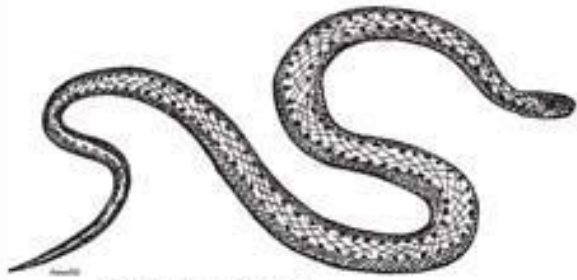
mouse — grass, plants, mushrooms, berries

deer — grass, plants, mushrooms, berries

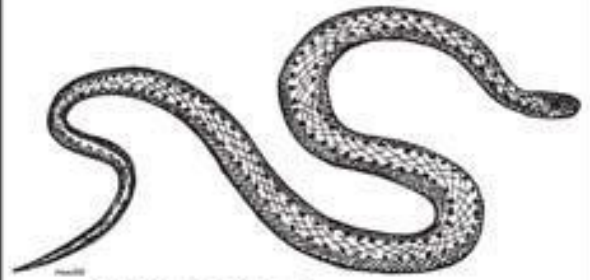
grasshopper — grass, plants, berries

rabbit — grass, plants, mushrooms, berries, tree buds

chipmunk — grass, plants, mushrooms, berries, nuts and cones



SNAKE



SNAKE

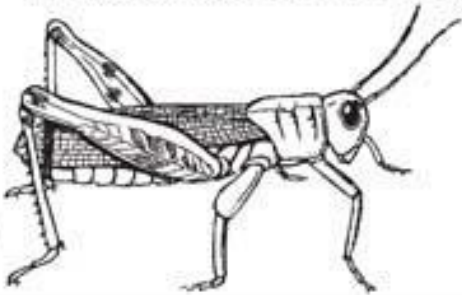
BERRIES



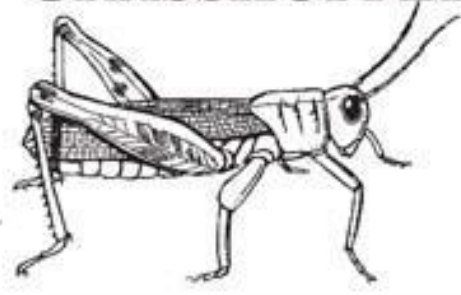
MOSQUITO



GRASSHOPPER



GRASSHOPPER



MUSHROOMS



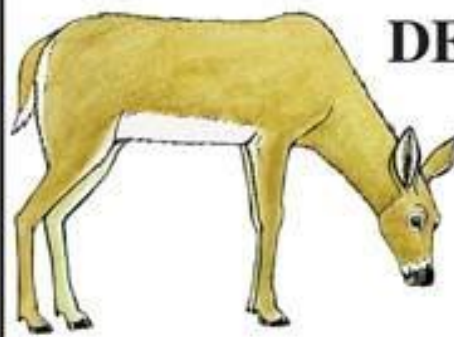
GRASS



BEAR



DEER



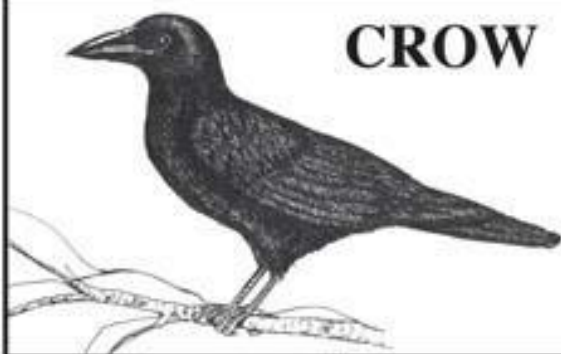
RACCOON



RACCOON



CROW



OWL

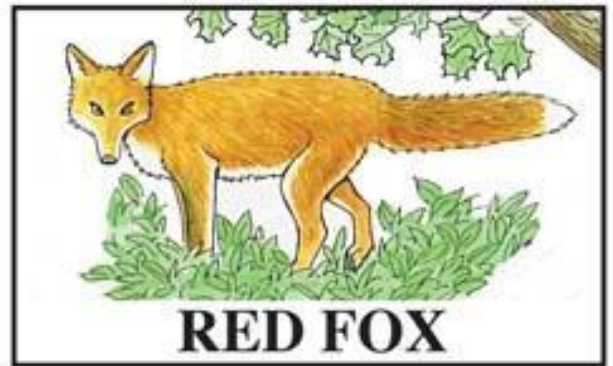
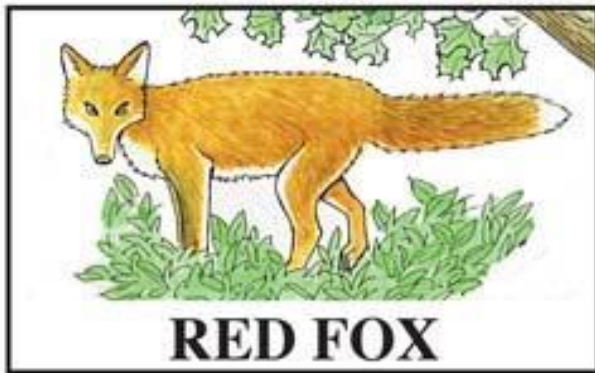


BOBCAT

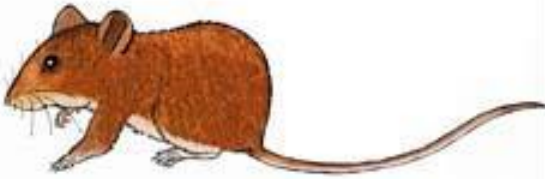


WEASEL

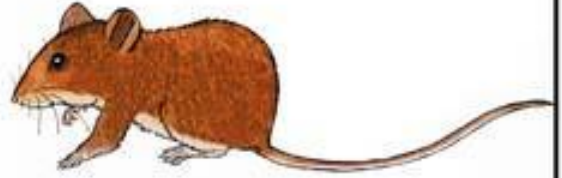




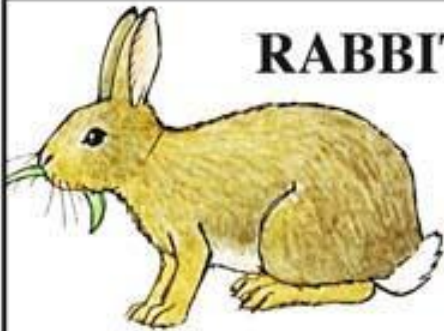
MOUSE



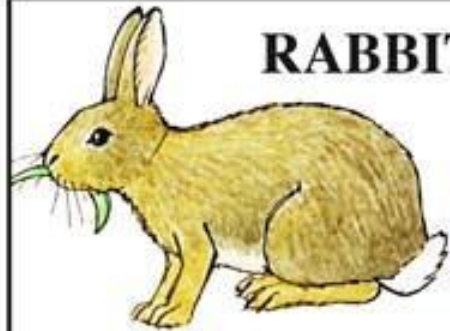
MOUSE



RABBIT



RABBIT



SQUIRREL



SQUIRREL



CHIPMUNK

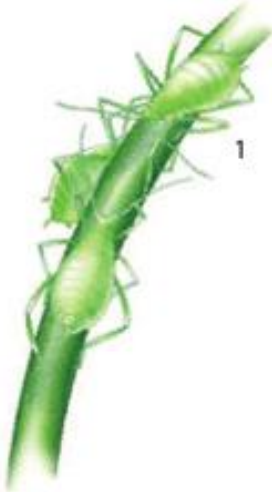


CHIPMUNK



Beneficial Vs. Non Beneficial Insects

Non Beneficial Insects

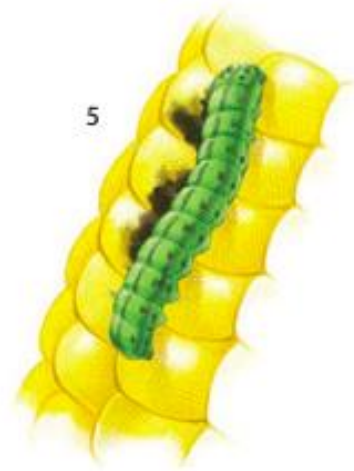


1 Aphids

Learn how to control a colony of aphids by attracting beneficial insects, learning organic pest control, and being able to recognize aphid damage as soon as it appears.

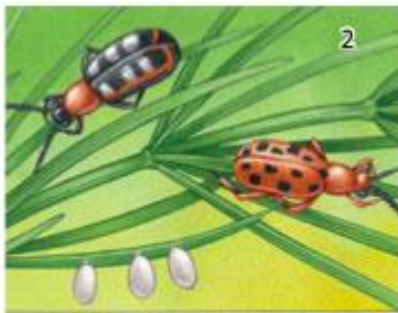
2 Asparagus Beetle

If your asparagus patch looks weak and unhealthy, chances are the asparagus beetle has struck again. Protect your crop with organic pest control methods, such as attracting beneficial insects and spraying neem. Plus, learn to recognize asparagus beetle damage before it's too late.



3 Cabbageworm

Cabbage worms beat brassicas and consume cauliflower like nobody's business. To defeat this garden pest, you must first learn how to identify it and then invite its natural enemies to live in your garden. Trust us, these neighbors won't get along.

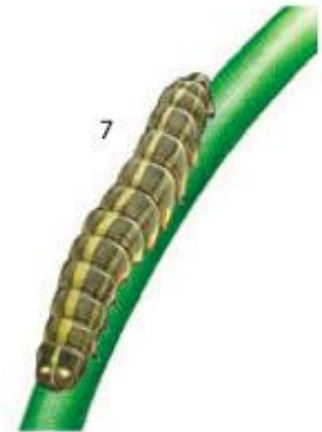


4 Colorado Potato Beetle

You can protect precious nightshade vegetables from Colorado potato beetles by learning how to attract beneficial insects to your organic garden, and by utilizing crop rotation and floating row covers.

5 Corn Earworm

If you see small green worms wriggling around on your corn, chances are they're corn earworms. Learn how to prevent corn earworm damage and naturally treat infected crops.



6 Cucumber Beetle

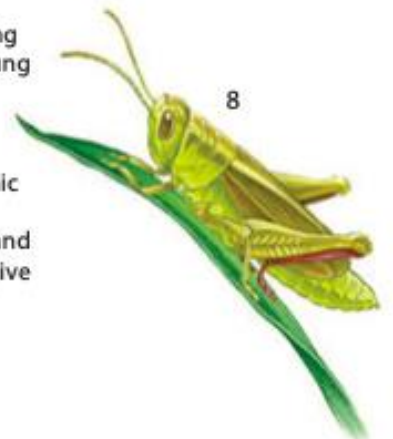
As soon as cucumber family crops become available, the cucumber beetles find them and begin to feed. This is your cue to bring out the artillery; row covers and kaolin clay should be your first line of defense.

7 Cutworm

Cutworm collars made from plastic drinking cups or cardboard tissue rolls help protect young seedlings from cutworm damage.

8 Grasshopper

Grasshopper damage can devastate organic gardens, particularly in areas with hot, dry weather. Learn how to use floating row covers and other organic gardening techniques for effective grasshopper control.





9

9 Japanese Beetle

Learn how to use organic pesticides and attract natural Japanese beetle predators such as the Tiphia wasp to control the Japanese beetle population in your garden.

10 Mexican Bean Beetle

Create habitat for beneficial insects such as spined soldier beetles, tachinid flies and parasitic wasps to help with organic Mexican bean beetle control.



10

11 Slug

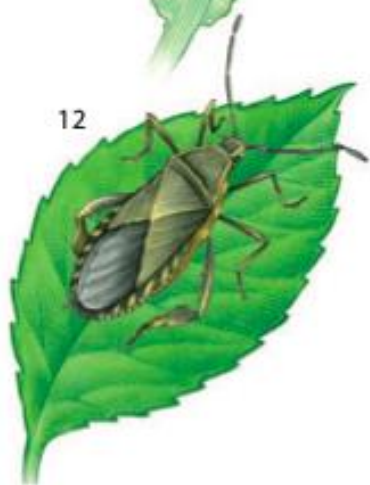
Garden slugs chew irregular holes with smooth edges in plants, and the damage often appears overnight. Try these slug control techniques to protect your crops.



11

12 Squash Bug

Squash bugs love pumpkins and squash, and they will sabotage the leaves, stems and fruits of these autumn favorites. For a pest-free squash patch, follow these expert tips for organic squash bug control, including handpicking and installing row covers.



12

13 Squash Vine Borer

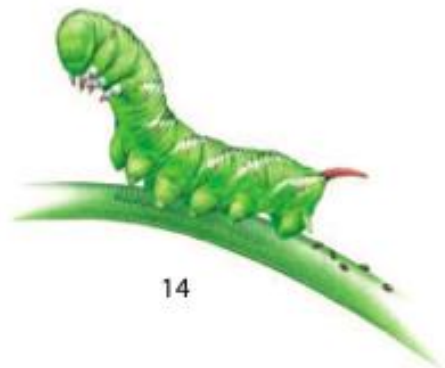
Squash vine borer damage can be devastating to pumpkins and squash. Protect your patch by learning how to recognize damage before it's too late, and by handpicking and using row covers.



13

14 Tomato Hornworm

Many beneficial insects enjoy feasting on young tomato hornworm caterpillars, including yellow jackets, lady beetles and green lacewing larvae. By attracting these helpful insects and implementing additional controls, such as handpicking and row covers, pesky tomato hornworms could soon be a thing of your gardening past.



14

15 Whitefly

Wilting leaves in your garden may be a sign of whitefly damage. Learn how to implement controls such as yellow sticky traps, reflective mulch, and insecticidal soap.



15



Beneficial Insects

By MOTHER EARTH NEWS Editors

Day and night, pesticide-free organic gardens are abuzz with activity, much of it life-and-death struggle between predators and prey. We seldom see much of this natural pest control, in which tiny assassins patrol their surroundings in pursuit of their next meal. Assassin bugs aren't picky: They will stab, poison and devour a wide range of garden pests, including caterpillars, leafhoppers and bean beetles. Soldier and ground beetles work the night shift, emerging after dark from beneath rocks, mulch and other daytime hiding places to feast upon soft-bodied insects and the eggs of Colorado potato beetles. Aphid lions (the larvae of the lacewing) have a hooked jaw that helps them dispatch huge numbers of aphids, caterpillars, mites and other pests.

Learning about the beneficial insects in your garden will

make it a more fascinating place, and help you tweak it in ways that intensify the work done by wild garden allies. This is often a simple matter of avoiding the use of pesticides (including organic ones) and growing plenty of flowers to provide beneficial insects with pollen and nectar. In greenhouses or other special situations, you may even decide to purchase and release certain lab-raised beneficial insects. This will not be necessary with the beneficial insects described here, because all will naturally gravitate toward a diversified organic garden.

Below we feature the best beneficial insects for your garden, each one beautifully illustrated. Get to know these garden helpers individually and make a plan for how you can incorporate them into your garden as part of your natural pest control strategy.



1 Braconid Wasp

Braconid wasps play an important role in controlling insect pests. Braconids are beneficial insects that lay their eggs inside or on host insects, and then the maggot-like wasp larvae weaken the host pest.

2 Ground Beetle

The busy ground beetles' diet can help control slugs, asparagus beetles, caterpillars, Colorado potato beetles, corn earworms, cutworms, squash vine borers and tobacco budworms.





3 Honeybee

Have you ever wondered, "What do honeybees eat?" If so, and if you'd like to attract these beneficial insects to your garden, this piece crammed full of honeybee information is a good place to start.



4 Hover Fly

Hoverfly larvae eat mealybugs and small caterpillars, and are especially helpful with organic aphid control. Adult hoverflies feed on nectar and pollen, and you can attract them to your garden with flowering plants.



5 Lacewing

Beneficial lacewing larvae prey on aphids, cabbage worms, caterpillar eggs and more. Learn how to attract these garden helpers.



6 Lady Beetle

Lady beetles feed on all sorts of garden pests, including aphids, small caterpillars and insect eggs. They even feed on powdery mildew. Learn how to attract them to your organic garden for natural pest control.



7 Mason Bee

The mason bee is a great pollinator and can work blossoms at a lower temperature than honeybees. Mason bees are named because they pack mud into their nests, like brick masons.

8 Praying Mantis

The praying mantis is a beneficial predatory insect that provides grasshopper control and more. Learn to create an inviting praying mantis habitat.



9 Predatory Bugs

If your goal is to squash garden pests naturally by attracting beneficial insects, then welcome assassin bugs with open, dirt-covered arms.



10 Soldier Beetle

Brush up on your soldier beetle facts, including what soldier beetles eat, where they live, and how to attract this beneficial insect to your organic garden.



11 Spider

Pest outbreaks could be rare if you have lots of beneficial insects and spiders in the garden. Learn how to attract various types of garden spiders.



12 Tachinid Fly

The Tachinid or "Diptera" species is well worth inviting to your organic garden because of its ferocious appetite for garden pests such as Japanese beetles and grasshoppers.



13 Trichogramma Wasp

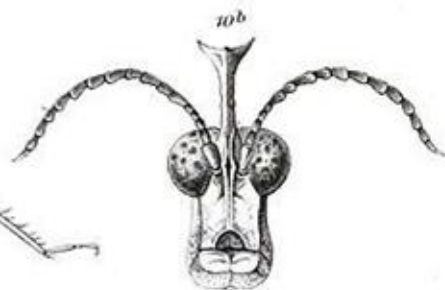
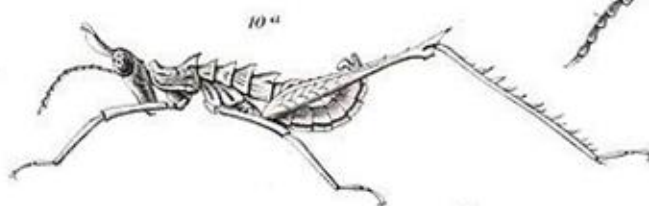
Itty-bitty trichogramma wasp larvae develop inside of and eat insect eggs, especially those of cabbage worms, codling moths and European corn borers.



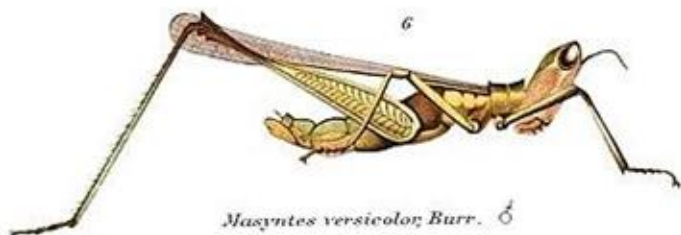
14 Yellow Jacket

Yellow jacket wasps feed their young liquefied insects, with caterpillars, flies and spiders comprising the largest food groups during most of the summer. The effect: Adios, garden pests!

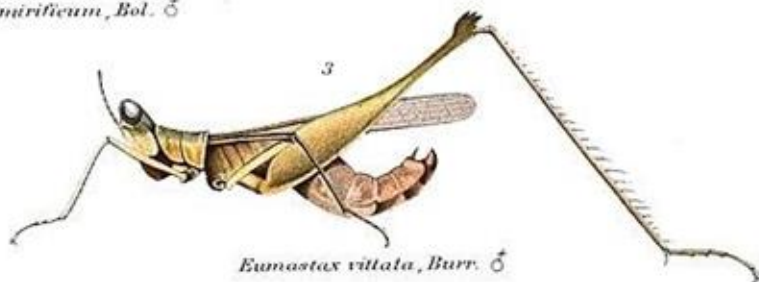




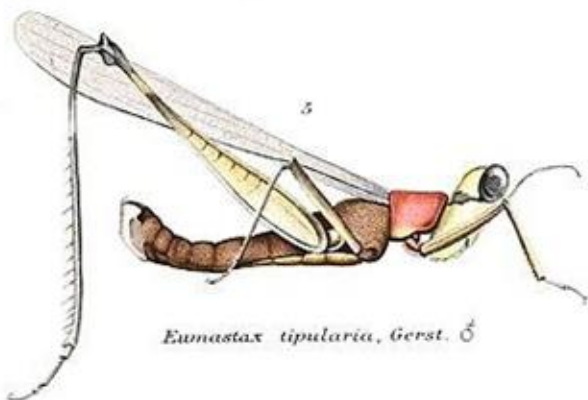
Miraculum mirificum, Bol. ♂



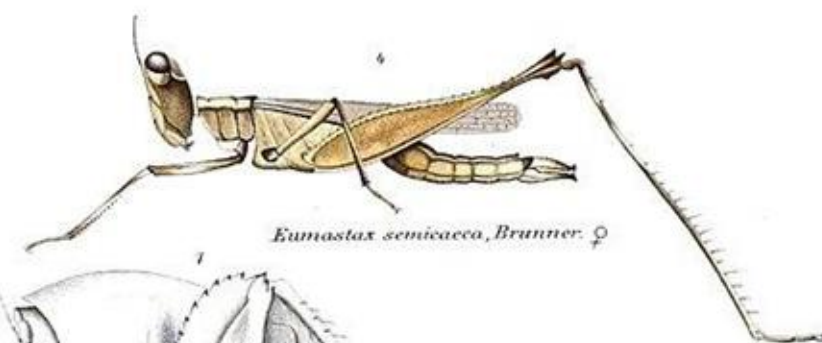
Masynthes versicolor, Burr. ♂



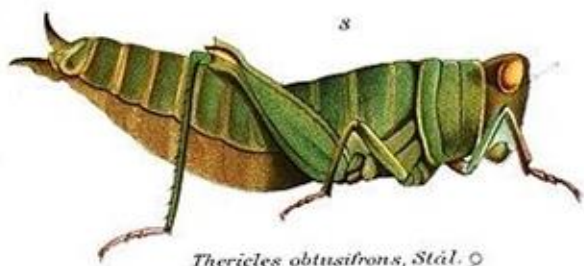
Eumastax vittata, Burr. ♂



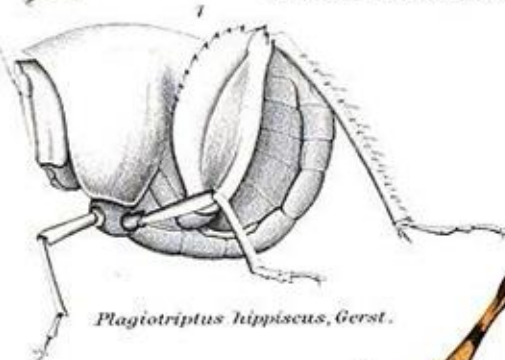
Eumastax tipularia, Gerst. ♂



Eumastax semicacca, Brunner. ♀



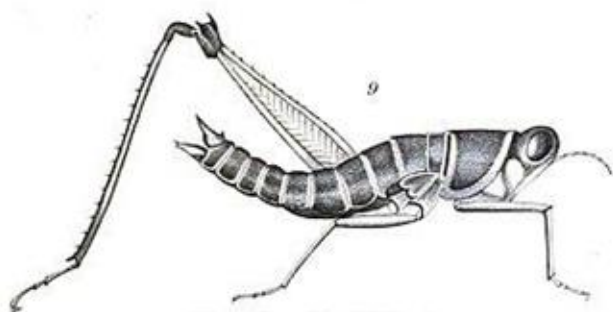
Thericles obtusifrons, Stål. ♀



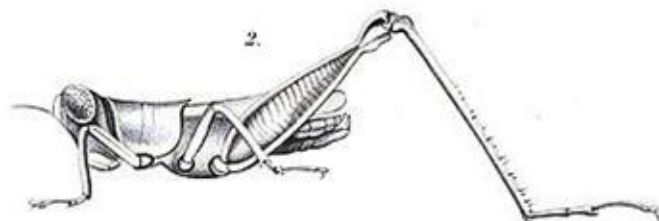
Plagiotriptus hippiscus, Gerst.



Masynthes tigris, Burr. ♂



Thericles zebra, Gerst. ♀



Thaumastax monstrum, Burr. ♂

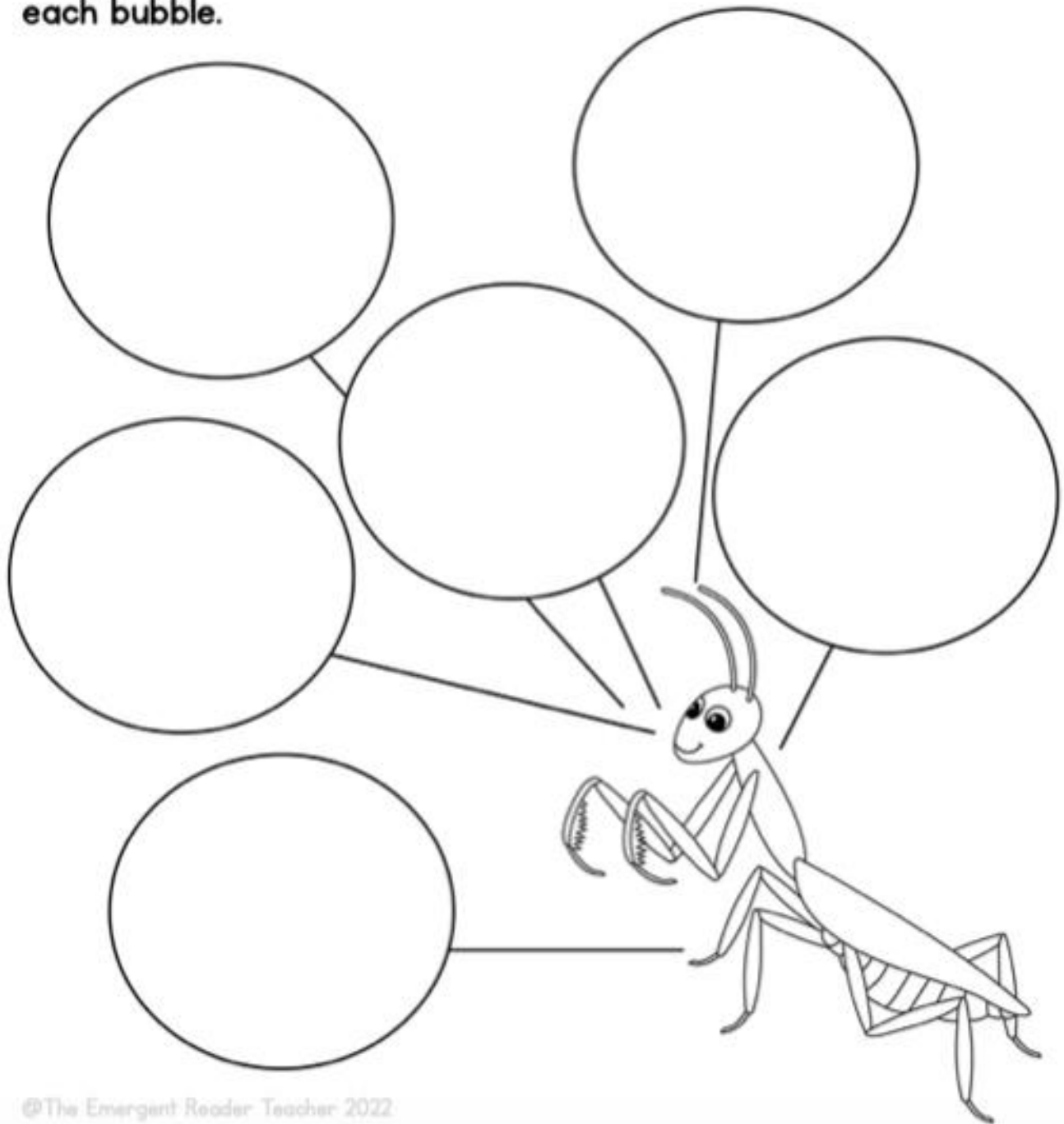
FAM. EUMASTACIDÆ

Praying Mantis Resource

PRAYING MANTISES: WHAT DO YOU KNOW?

Name: _____

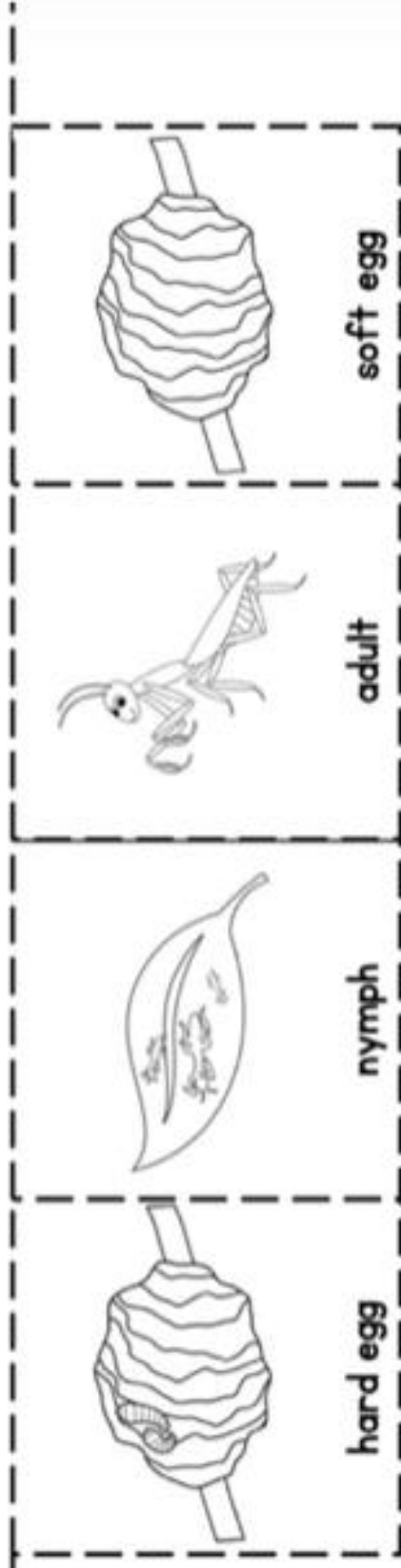
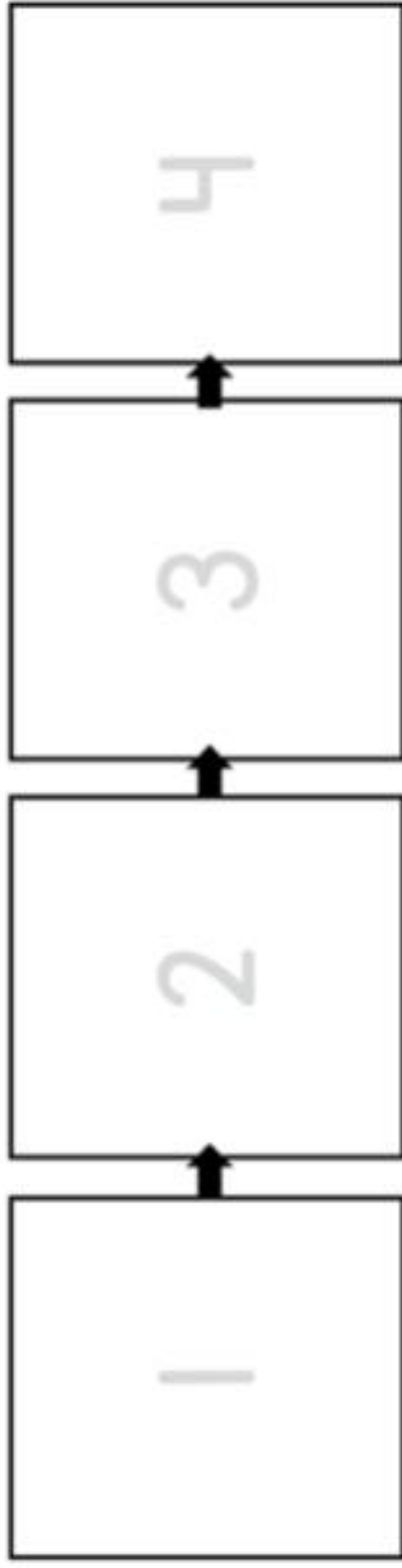
Directions: Write something about praying mantises in each bubble.



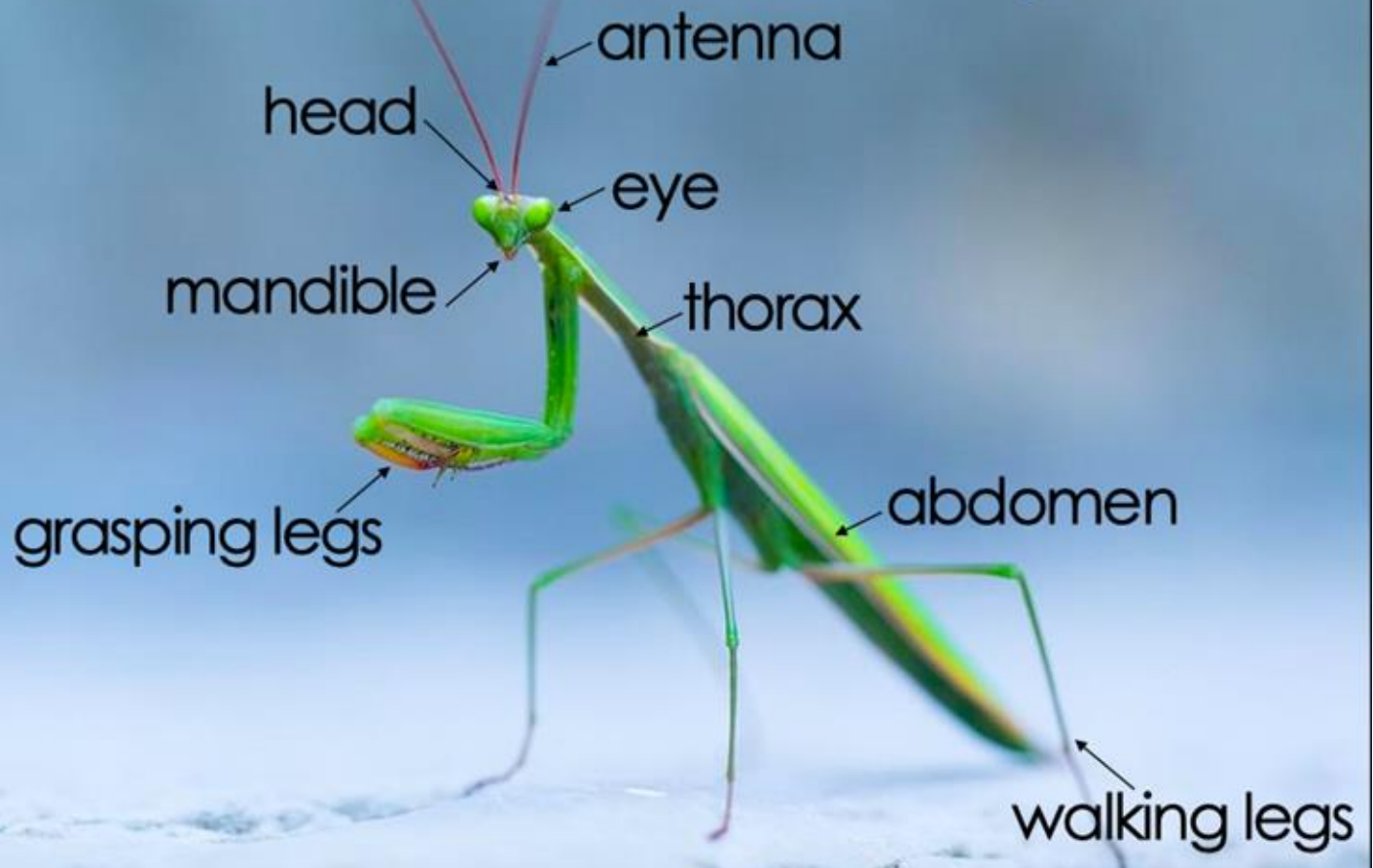
Sequence the Praying Mantis Life Cycle

Name: _____

Directions: Cut and glue the pictures to sequence the life cycle of the praying mantis.

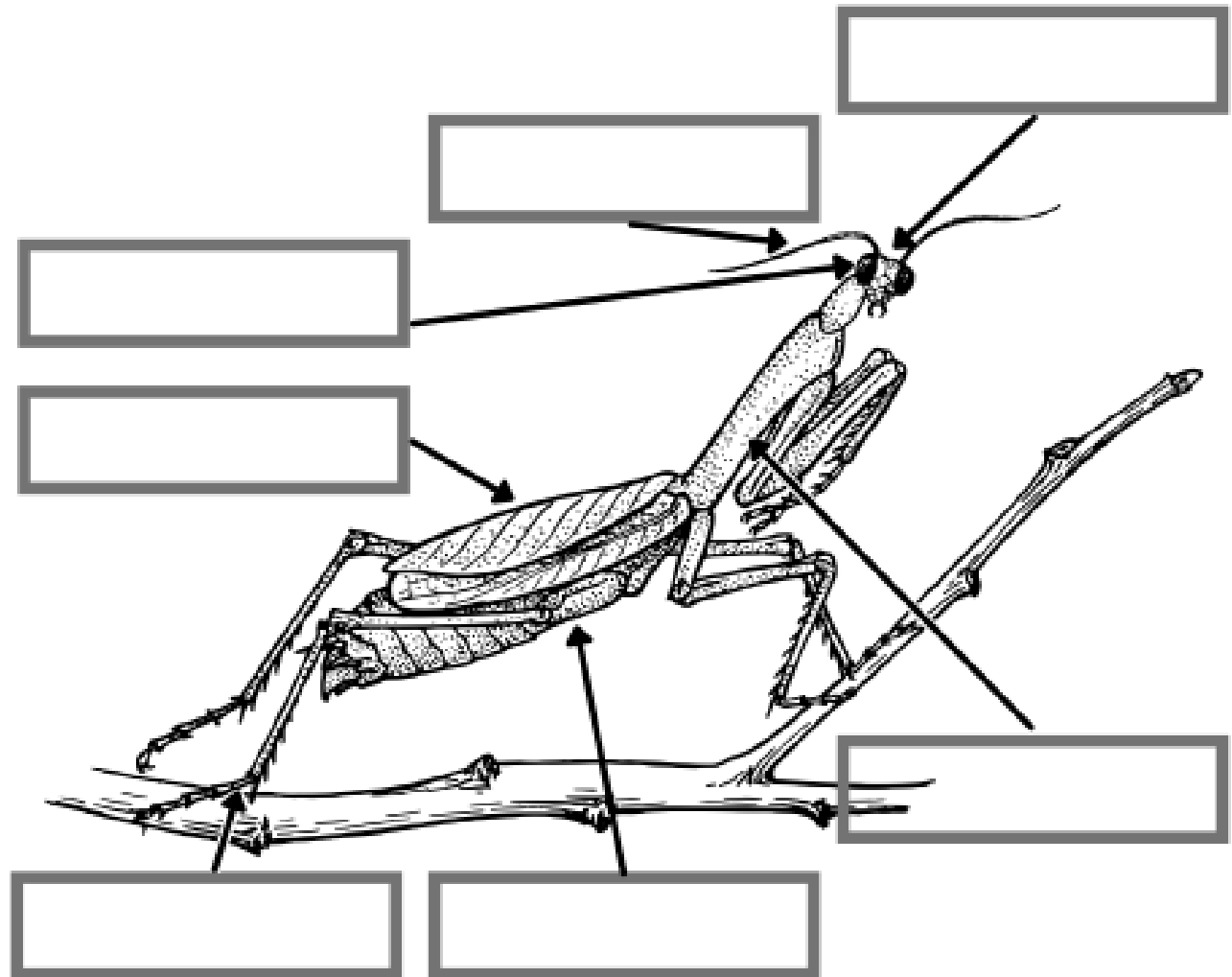


praying mantis diagram



Name:

LABEL THE Praying Mantis



© Sân Narmvhanh - Get Curious



leg

eye

head

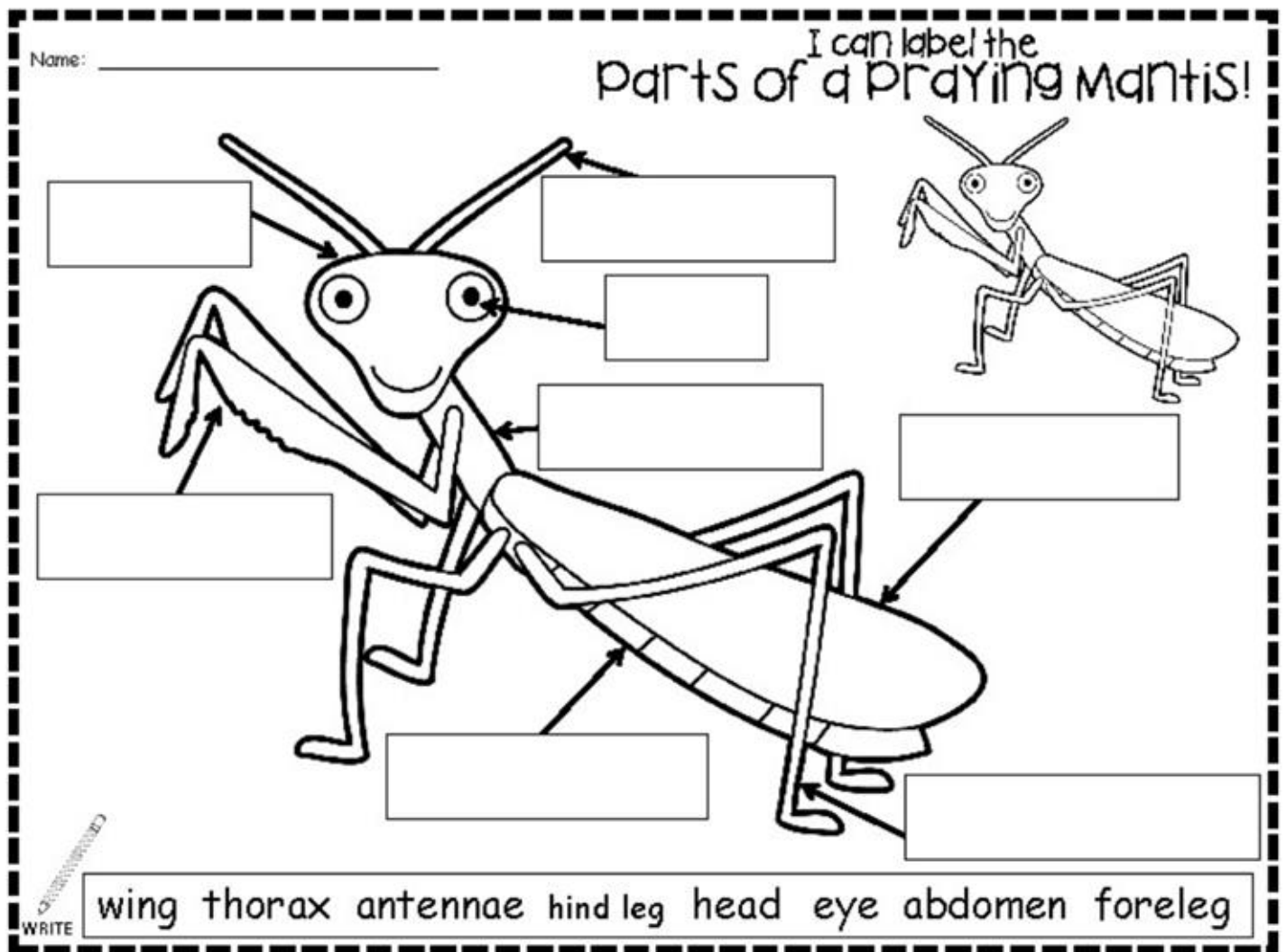
antenna

thorax

abdomen

wings

Anatomy of a Praying Mantis



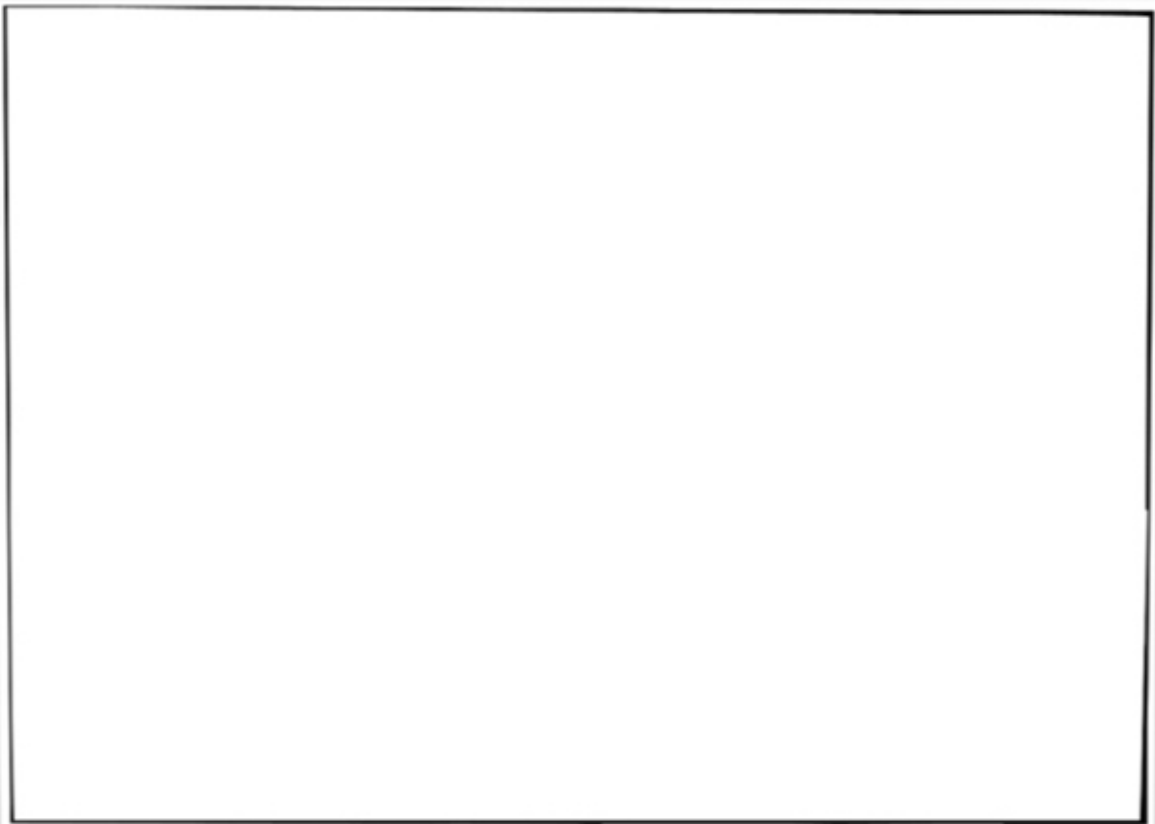


STEM Challenge: Camouflage Praying Mantis

Make a praying mantis to camouflage with its environment. When you have finished, take a photograph and glue to this page.

Resources: You can use play doh, foil, paper, piper cleaners or anything else you can find.

Don't forget to add in all the details! Use some of the pictures in this booklet to help.

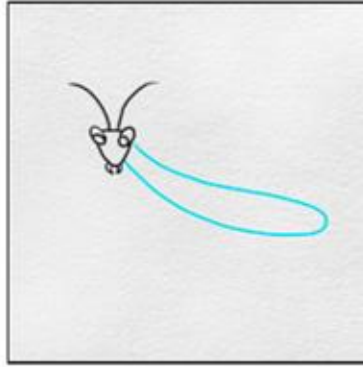




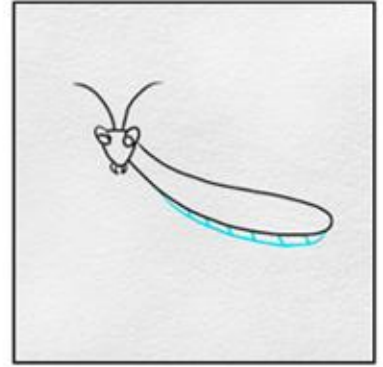
Praying Mantis Drawing



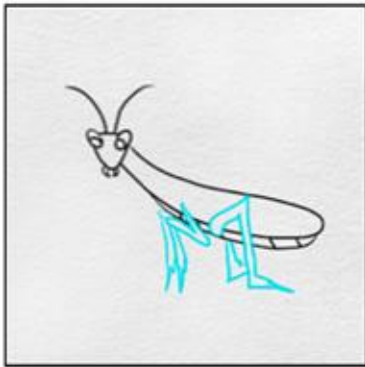
①



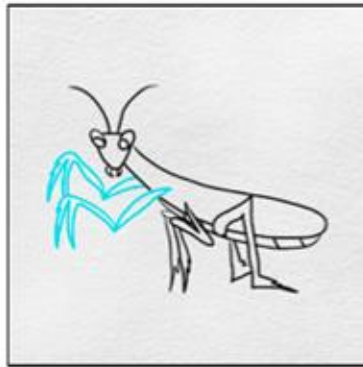
②



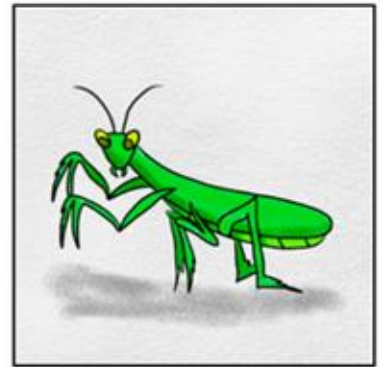
③



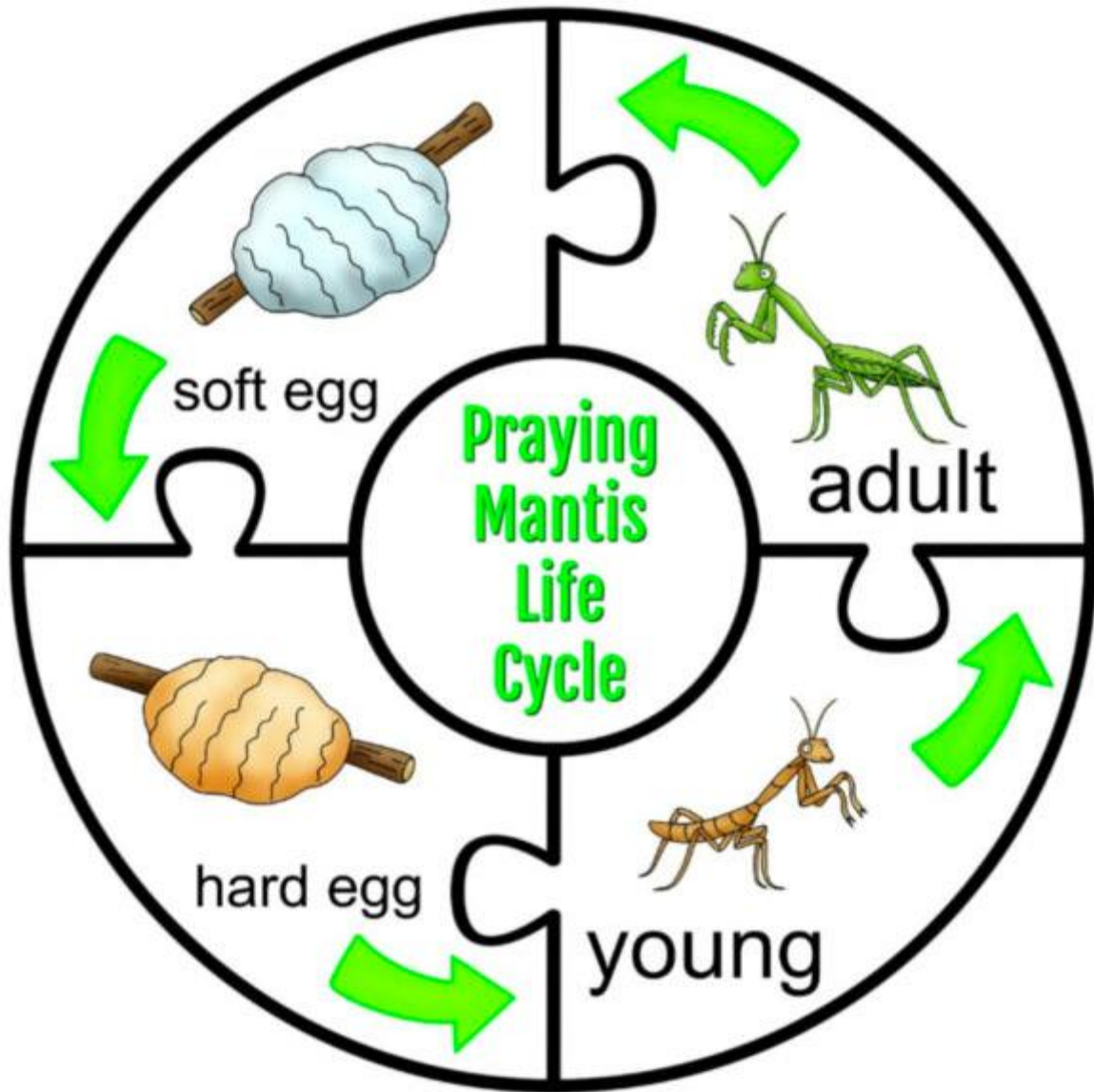
④



⑤



⑥



Stages of a Praying Mantis Molting



Praying Mantis growth stages

Ladybug Resources

Seven Spotted Ladybug Native to BC



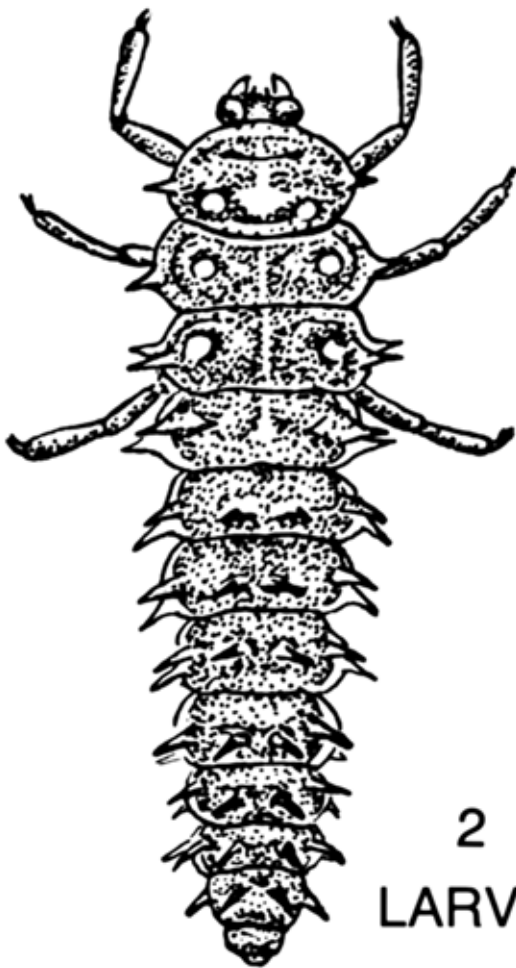
**Asian Lady
Beetle
Invasive to BC**



**Ladybug
Larva**



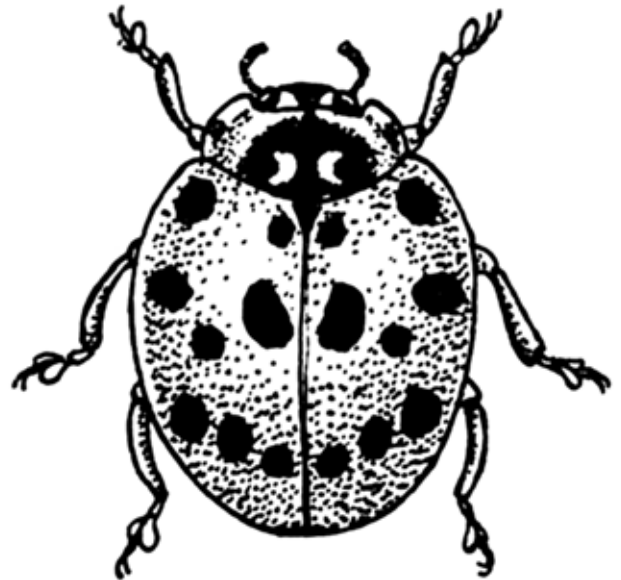
Lifecycle of the Ladybug



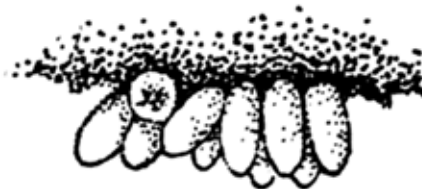
2
LARVA



PUPA
3



ADULT
4



1
EGGS

LIFE CYCLE OF A LADYBUG

EGG



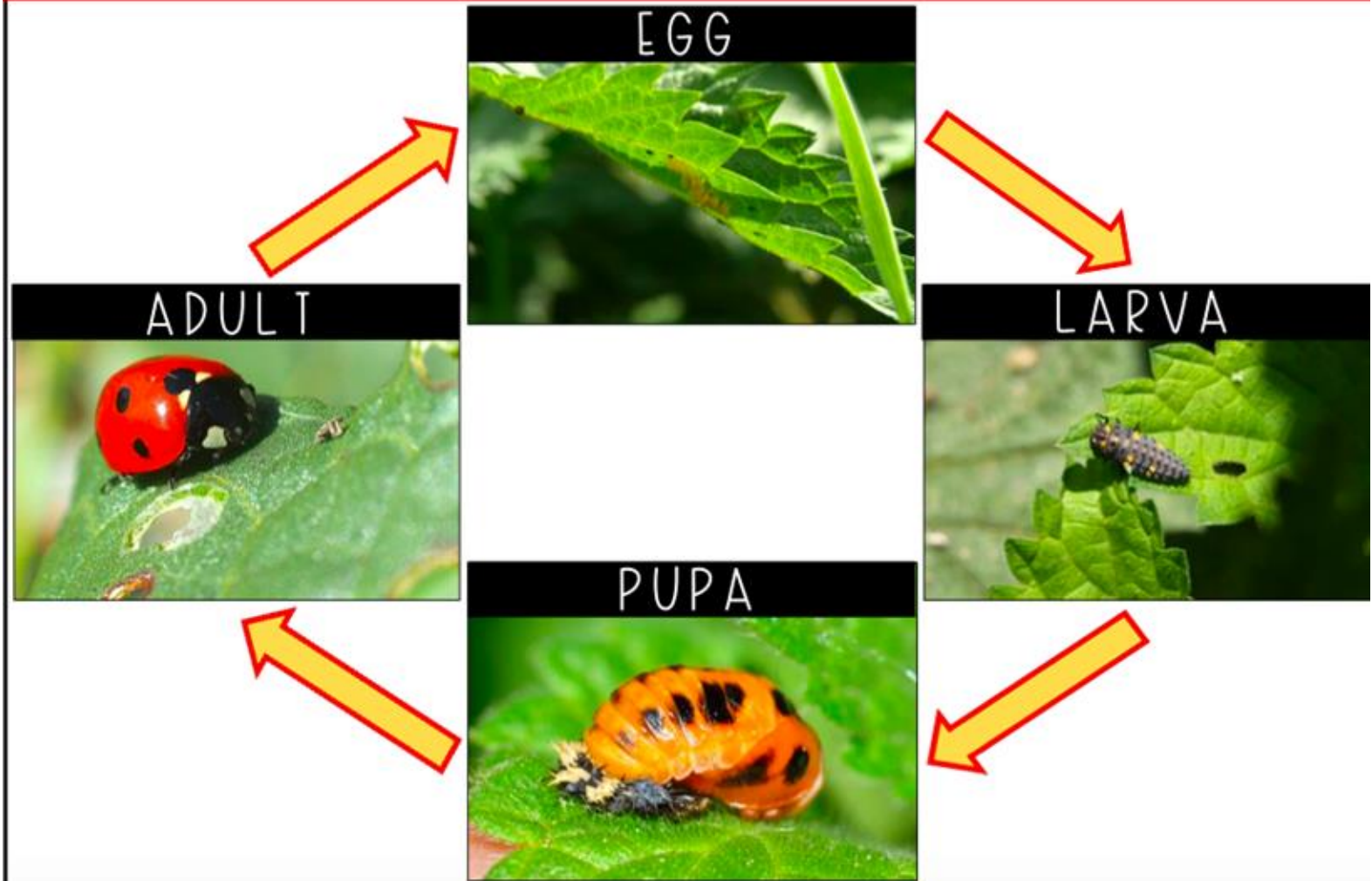
ADULT



LARVA



PUPA



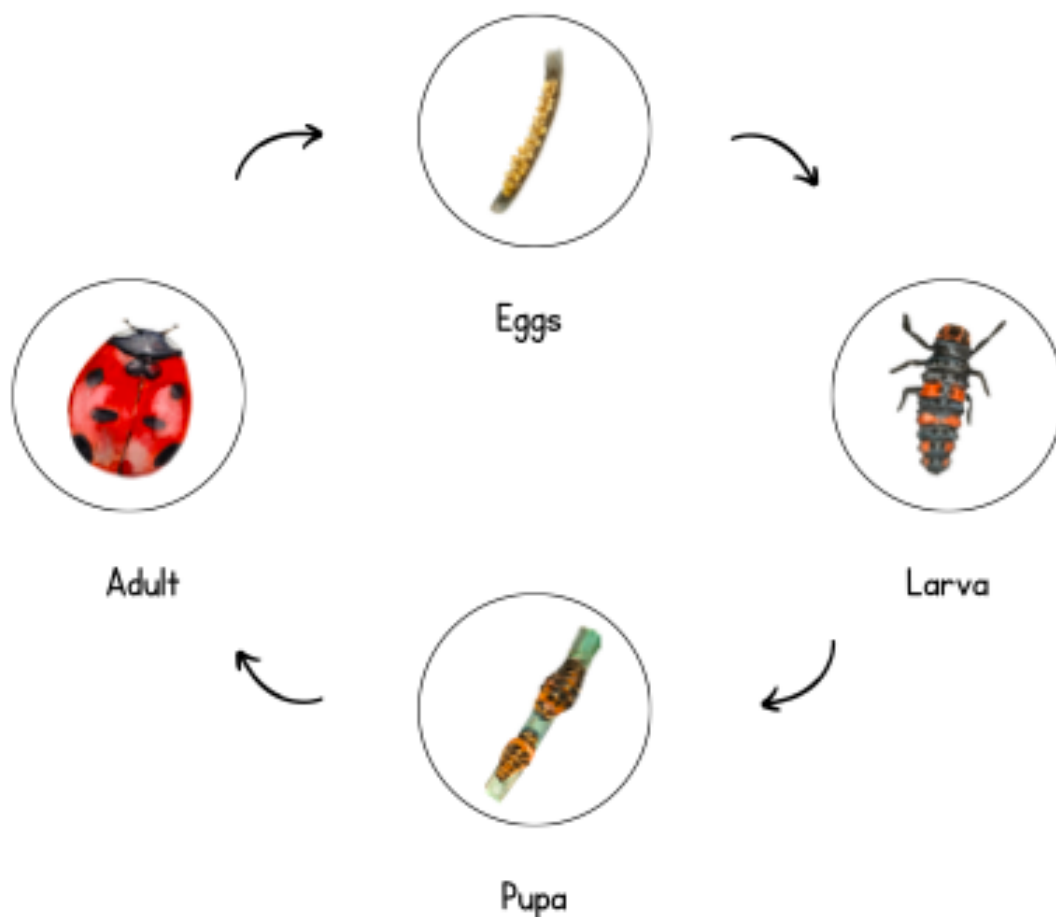
The Lifecycle or Metamorphosis of a Ladybug

Metamorphosis is the process a creature goes through to become an adult.

An adult ladybug can lay 5-50 eggs at one time.

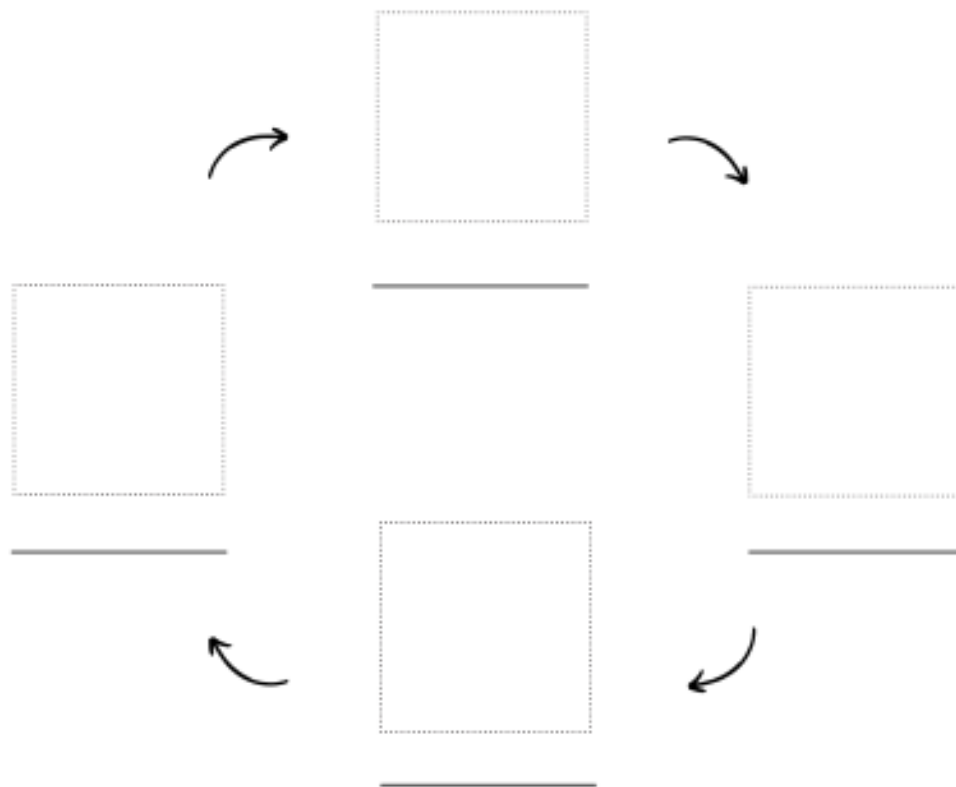
The tiny, yellow eggs lie in clusters on leaves till they hatch. The larvae hatch from the eggs. Over time it grows, sheds skin and then places itself on the underside of leaves or stems to become pupae. After a few days, the ladybugs emerge from the pupae. This completes the metamorphosis process.

Let's look at the lifecycle of a ladybug:



Complete the Metamorphosis of a Ladybug

Cut the squares at the bottom of the sheet to arrange and glue each square to the right square in the ladybug life cycle.



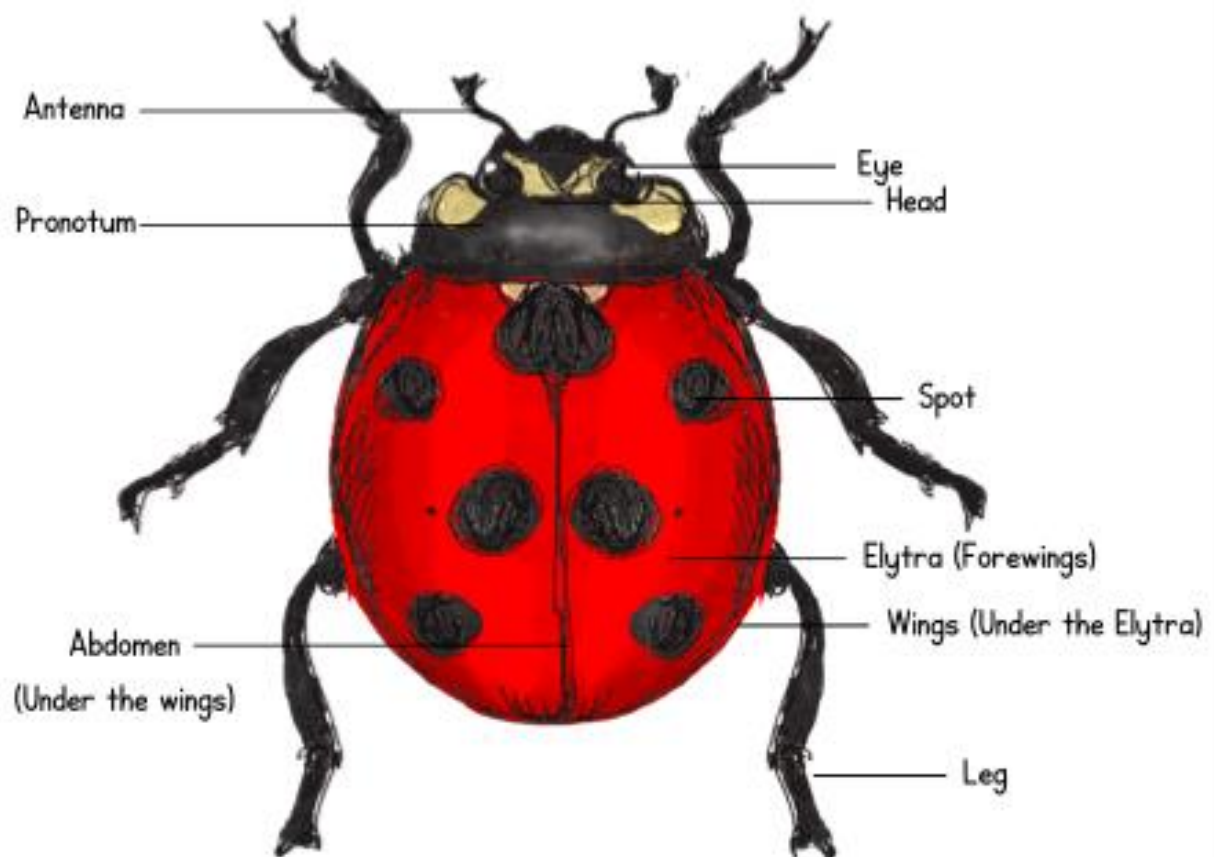
Exploring the World of Ladybugs

There are about 5000 species of ladybugs in the world.

Ladybugs are also known as lady beetles or ladybirds.

Ladybugs protect themselves by releasing a stinky fluid to scare away their predators, or pretend to play dead.

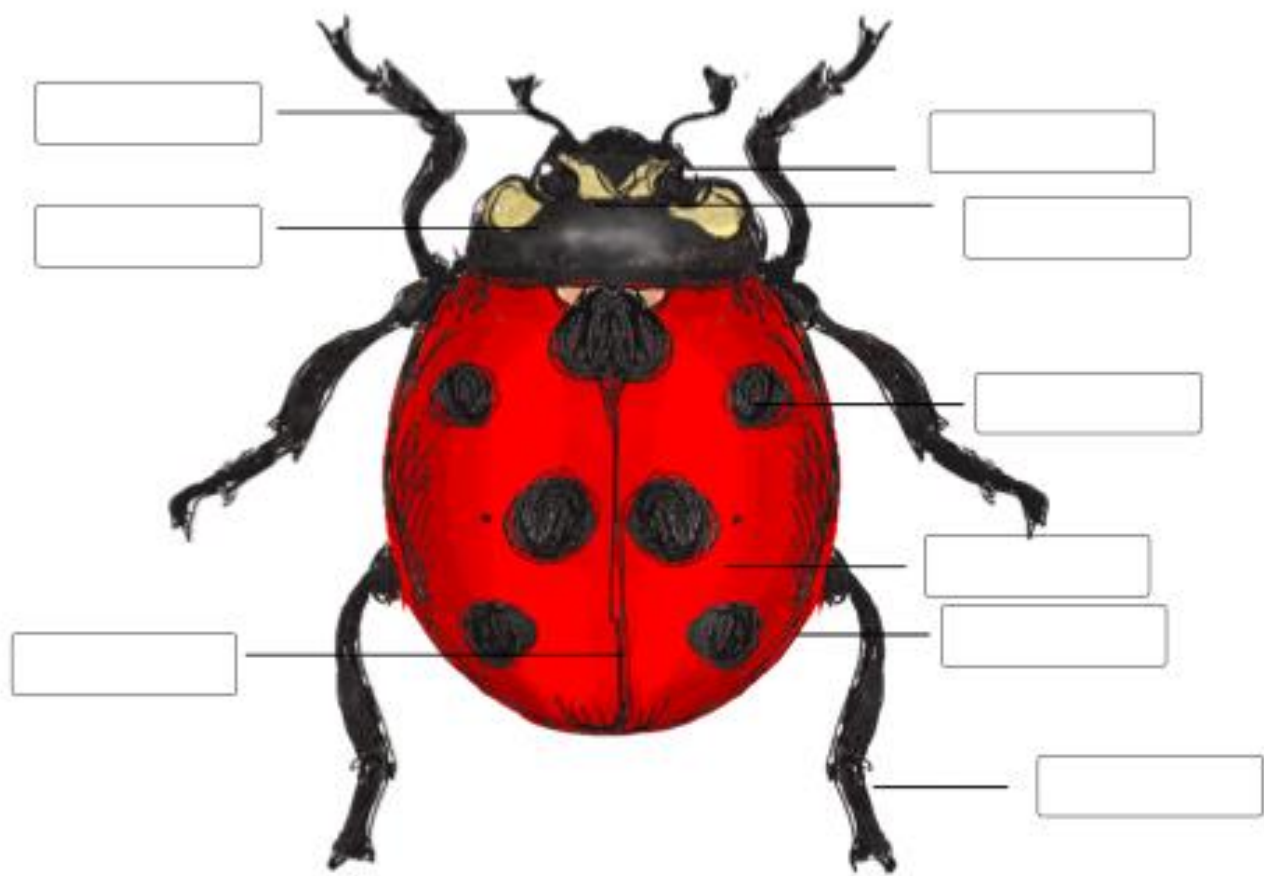
Let's look at the anatomy of a ladybug:



Label a Ladybug

Do you remember each part? Look at the parts listed below.

Fill each text box with the correct part.



Antenna

Eye

Elytra (Forewings)

Pronotum

Head

Wings (Under the Elytra)

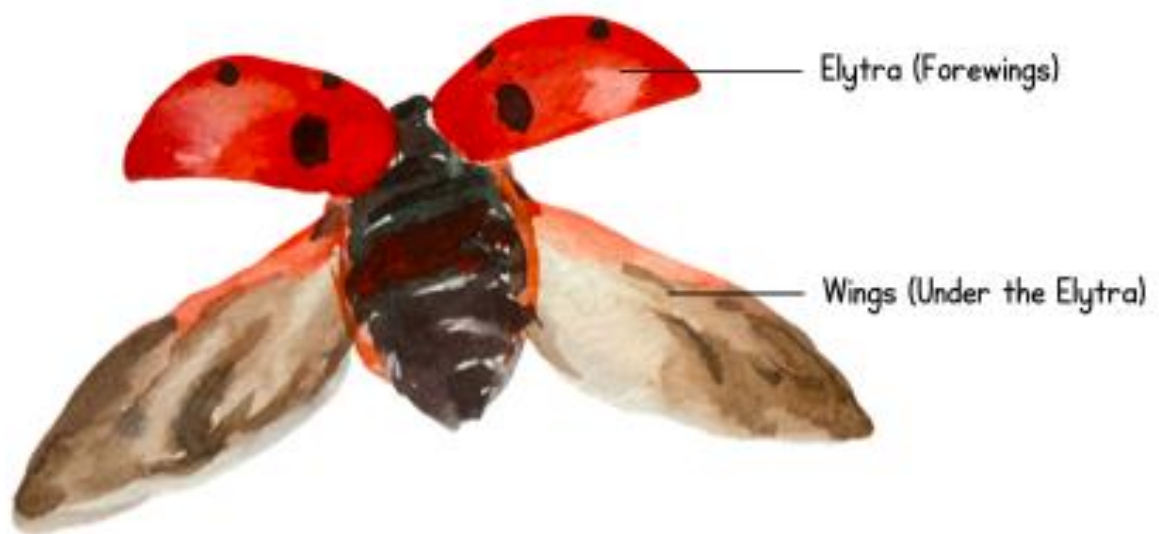
Leg

Spot

Abdomen

Interesting Ladybug Facts

- Ladybugs smell with their feet and their antennae.
- Ladybugs can fly. They have two sets of wings- the outer shell (called the Elytra) and the soft wings underneath.



- A ladybug's lifespan, after emerging from its pupa, is about one year.
- Ladybugs are active from spring to fall. When winter begins, and temperatures drop below 55 degrees, ladybugs prepare to hibernate in large groups. This act of hibernation is called diapause.
- Ladybugs breathe through openings on the sides of their abdomen and thorax. These openings are called spiracles.
- Ladybugs are the state insects of these U.S. States- Delaware, Massachusetts, New Hampshire, New York, North Dakota, Ohio, and Tennessee.
- A ladybug can flap its wings 85 times per second!

A Ladybug Anagram and a Coloring Postcard

(Print this sheet on cardstock and cut out the card to save as a postcard or bookmark)

How many words can you form from the word LADYBUG in 5 minutes?



My Ladybug Observation Report

Date: _____

This is what a ladybug looks like:

This is what the habitat looks like:

Does it have wings? ☐

Does it crawl on the ground? ☐

Does it have a shell? ☐

Does it have antennae? ☐

Does it have legs? ☐

Does it make a sound? ☐

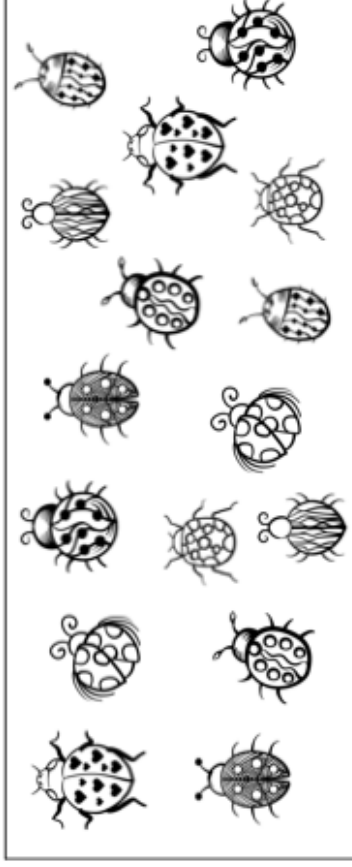
(If yes) it has ____ legs.

(If yes) it goes _____.

A new interesting fact I learned about ladybugs:

Match, Color and Learn

Find the ladybug pairs and color each pair a color of choice. Make sure no two pairs share the same colors.



Ladybugs play an essential part in a garden. They eat aphids and other plant destroying insects. An adult ladybug can eat as many as 50 aphids in a day!

Not all ladybugs are red. Some ladybugs are orange, pink, yellow, and even blue! How old are you? Draw that many ladybugs, and color them using your favorite color.

The Ladybug Life Cycle

Ladybugs are colorful insects that are beloved by many people. They have round, spotted bodies and are often red or orange in color. Ladybugs have a unique life cycle that consists of four stages.

The first stage is the egg stage. Ladybugs lay their eggs on leaves or branches near their food source, which is usually aphids. The eggs are small and yellow and look like tiny footballs. After a few days, the eggs hatch into larvae.

The second stage is the larva stage. Ladybug larvae are small and black with orange or white spots. They have long, skinny bodies and six legs. Ladybug larvae are voracious eaters and can eat up to 400 aphids in their lifetime.

The third stage is the pupa stage. During this stage, the larva transforms into an adult ladybug. The pupa stage lasts for about 7 to 10 days.

The fourth and final stage is the adult stage. Adult ladybugs emerge from their pupae with their familiar round, spotted bodies. They continue to eat aphids and mate, and the cycle starts again with the female laying eggs.

Eggs



Larva



Pupa

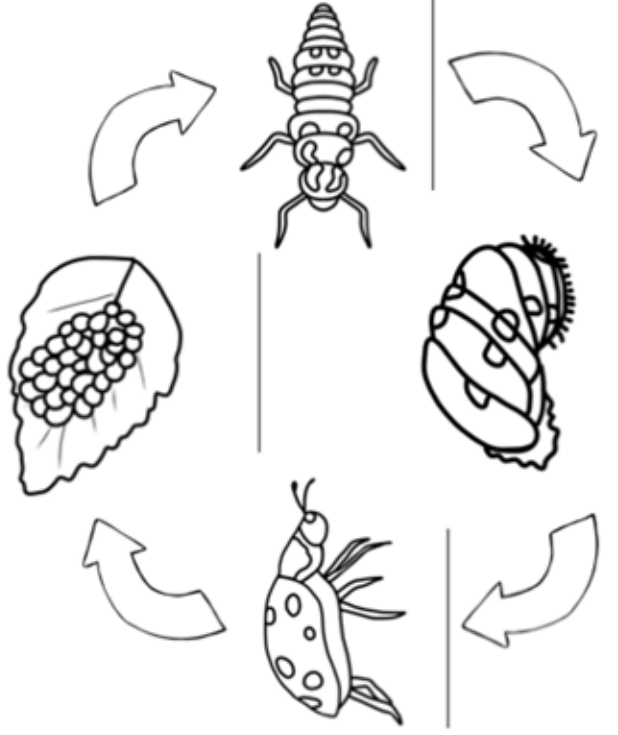


Ladybug



Name: _____

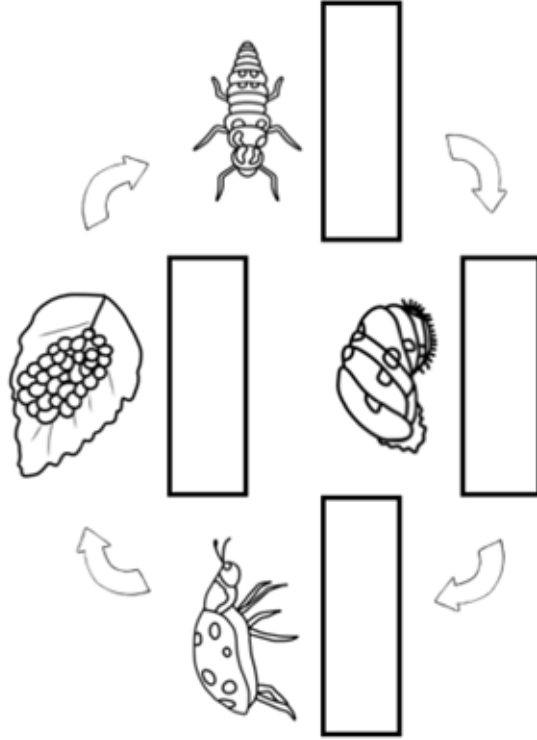
Ladybug Life Cycle



©primary playground

Name: _____

Ladybug Life Cycle



ladybug

pupa

larva

egg

©primary playground

Bee Resources

[Bees of Western Canada Field Guide](#)
[Bumble Bee Field Guide](#)

Life Cycle of the Honey Bee Control

	Egg	This is the first stage of a bee's life cycle. The bee is smaller than a grain of rice. It begins its life in a honeycomb cell.
---	------------	--

	Larva	This is the second stage of a bee's life cycle. During this stage, the baby bee looks a bit like a worm. Worker bees feed them every day for 5 days so they can grow strong.
---	--------------	---

	Pupa	This is the third stage of a bee's life cycle. The worker bee puts a wall of wax on the baby bee's honeycomb cell. The baby bee's wings, legs, and eyes develop while its inside.
---	-------------	--

	Adult	This is the last stage of a bee's life cycle. This is when the bee is fully grown and starts its job as a worker, queen, or drone.
---	--------------	--



Egg



Larva



Pupa



Adult



Pupa

This is the third stage of a bee's life cycle.

The worker bee puts a wall of wax on the baby bee's honeycomb cell.

The baby bee's wings, legs, and eyes develop while its inside.



Adult

This is the last stage of a bee's life cycle.

This is when the bee is fully grown and starts its job as a worker, queen, or drone.



Egg

This is the first stage of a bee's life cycle.

The bee is smaller than a grain of rice.

It begins its life in a honeycomb cell.



Larva

This is the second stage of a bee's life cycle.

During this stage, the baby bee looks a bit like a worm.

Worker bees feed them every day for 5 days so they can grow strong.



bee



pupa

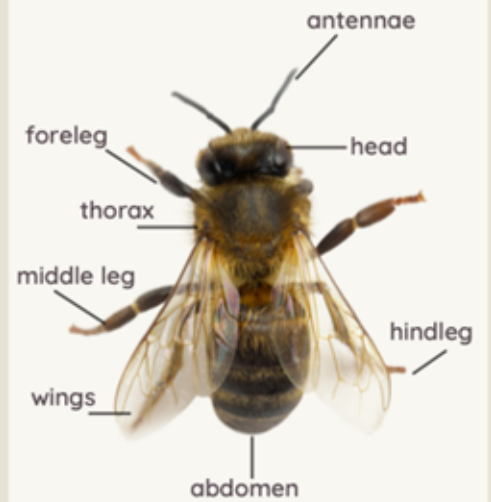


larva

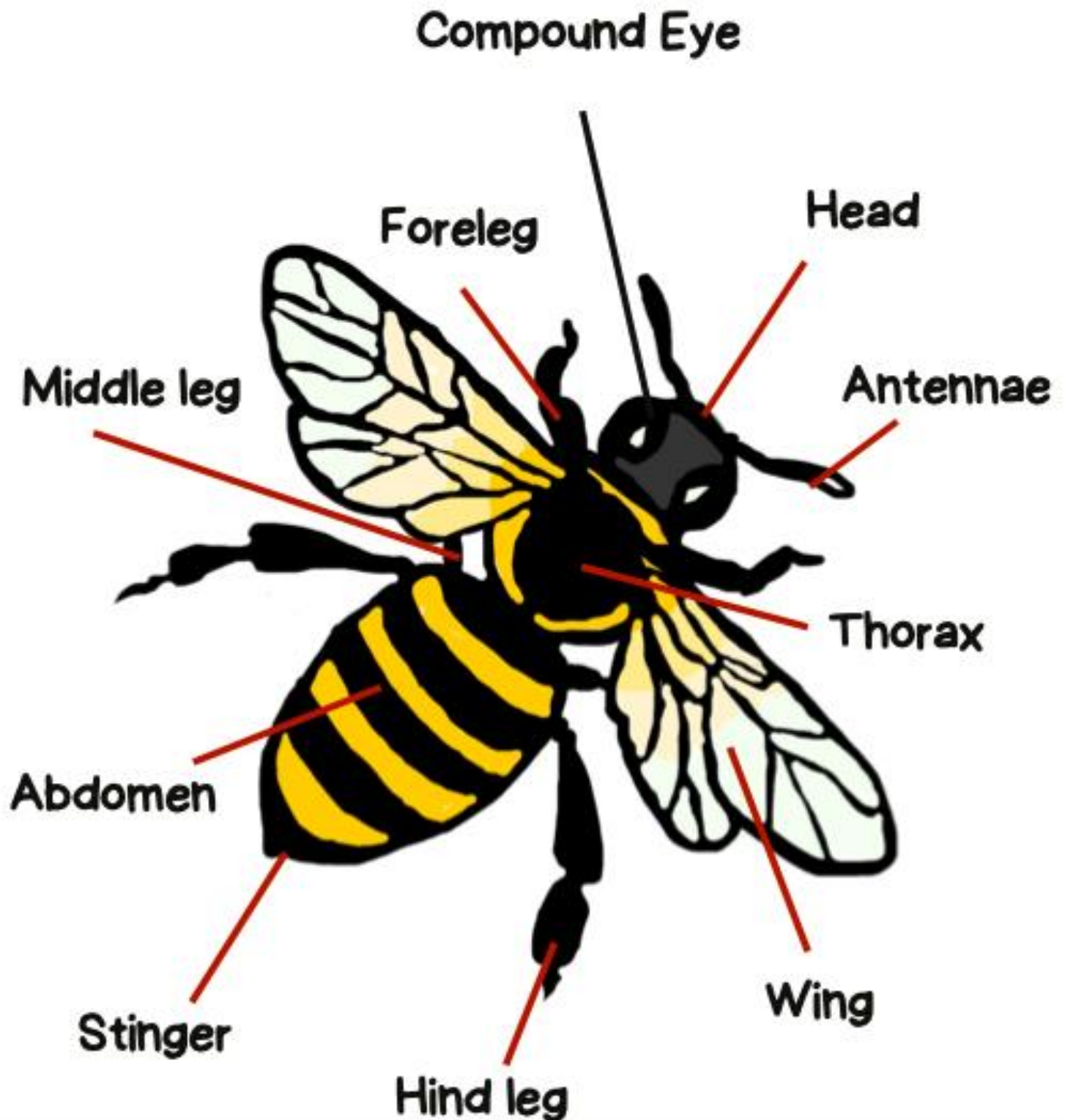


egg

Anatomy of a Bee

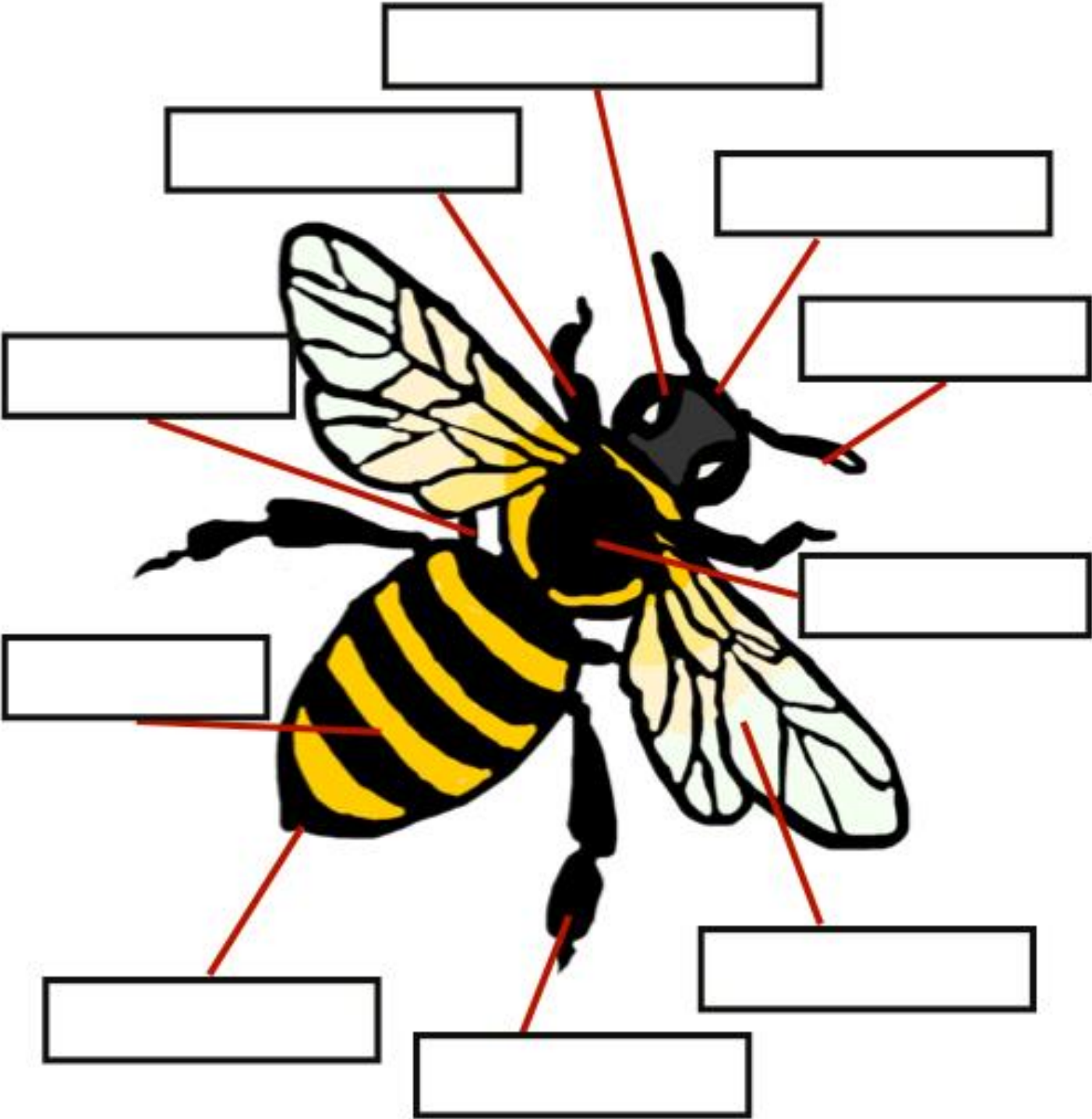


Parts of a Bee



NAME _____

Parts of a Bee



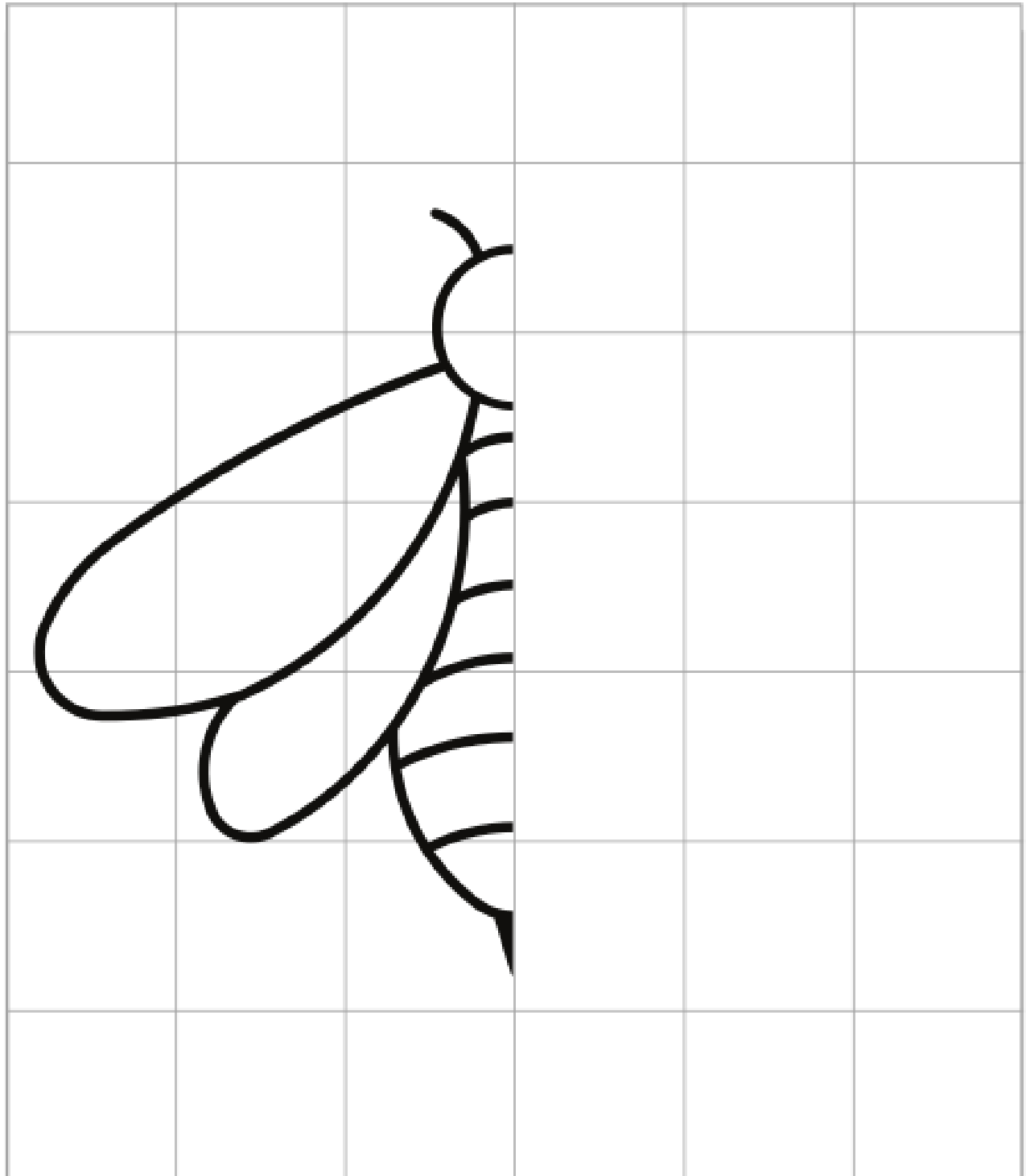
Bees Fact Sheet

- Honeybees are short haired, black and amber striped insects.
- There are three kinds of bees in a hive; queen, worker (female) and drone (male).
- The queen bee lays all the eggs, around 1,500 per day.
- The worker bee takes care of the hive; cleaning, building, repairing and feeding the baby bees. Outside the hive the worker bee collects nectar, pollen, water and propolis.
- The drone bee's job is to mate with the queen.
- Drones do not have stingers but the worker's and queen bees do.
- The honeybee has a 4 stage lifecycle; Egg, larva, pupae and adult.
- Honeybees live in a hive made out of beeswax
- The comb is formed and shaped by the worker bees into hexagonal cells

NAME _____

Symmetry Drawing

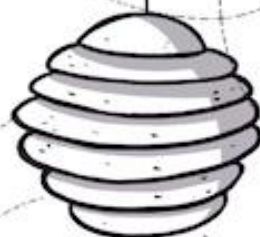
Use the grid to draw the other side of the bee



A beehive keepers hat

hello!

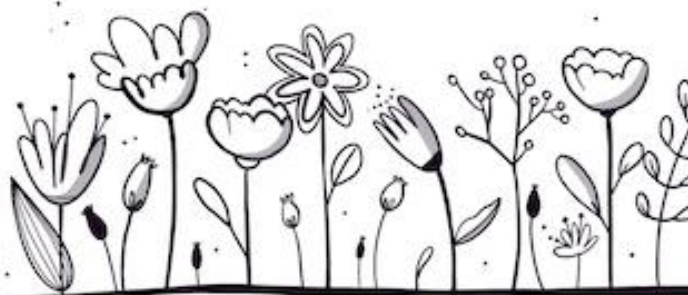
Bees are very important for pollinating flowers, vegetables, fruits and trees! This means they carry pollen from one plant to help another plant grow.



Beehive



Sam & the Bees



honey

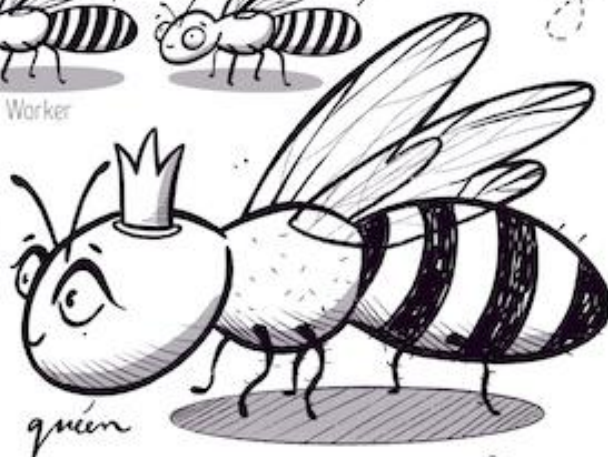


gold

Honey is one of our superfoods! It is good for our bodies and can be used in many different ways. It has antibacterial and antiseptic properties. These help in strengthening our immune system. A strong immune system gives us energy and keeps us healthy.



Worker



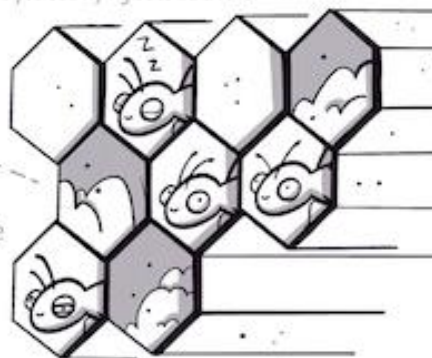
queen

The Queen Bee is the most important bee in the beehive. She runs the hive and lays over 2500 eggs a day in the summer. The Worker Bees (all female) are some of the busiest insects on Earth. These are the bees you see flying outside of the beehive looking for food and spreading pollen.

Beehive



Larvae are baby bees. They are fed pollen by the Worker Bees until they are big enough to leave the hive. Drones are also part of the hive. They are the male bees.



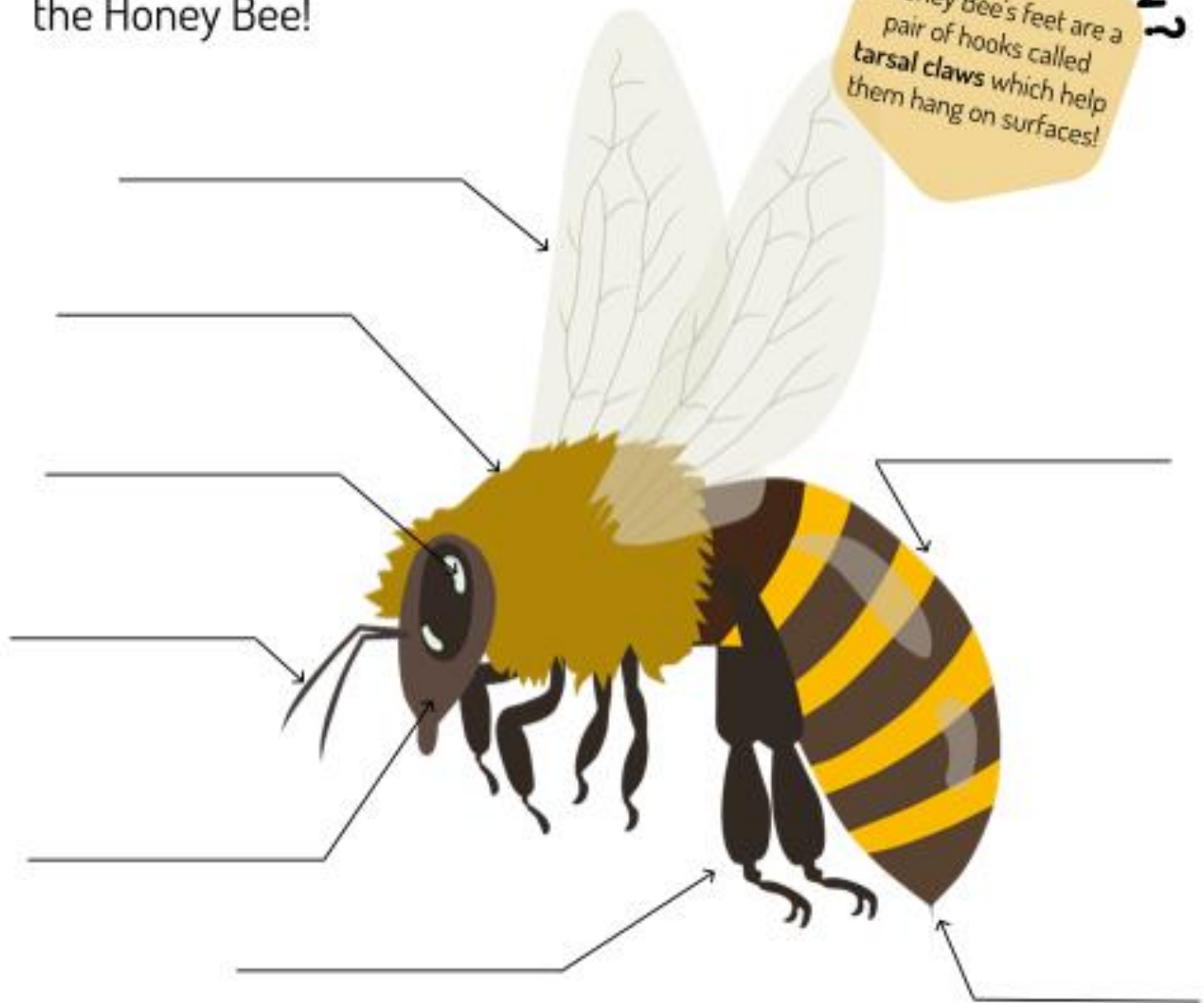
Honeycomb



Label the Honey Bee!

Use the words in the box below to label the Honey Bee!

Did you know?
A Honey Bee's feet are a pair of hooks called **tarsal claws** which help them hang on surfaces!



Antennae Thorax Stinger Eyes
Legs Head Abdomen Wings

Find more fun activities at TheHoneyBeeSociety.org



Name _____

Date _____

Reading Comprehension

Directions: Read the passage carefully, then answer each question using evidence from the story to support your answers.

Saving the Bees

In a town not too far away, three friends named Ethan, Jason, and Cali were in second grade. They loved exploring the outdoors together. One sunny day, while playing in the park, they noticed something strange. "Hey, where are all the bees?" Ethan asked, furrowing his brow. Jason, who always had a curious mind, said, "I heard bees are important for flowers and stuff. Maybe we should find out why they're missing."

Cali, who loved animals, nodded eagerly. "Yeah, let's be bee detectives and solve this mystery!"

So, the three friends set off on their adventure, determined to save the bees. They asked their teacher, Mrs. Charles, who told them that bees were disappearing because they didn't have enough flowers to feed on. "We have to do something!" Ethan exclaimed, his eyes wide with determination. Jason, who was good at making plans, suggested, "Why don't we plant flowers around the park to help the bees?" Cali, who had a green thumb, agreed. "And we can ask our families to help too!"

With a plan in place, they gathered flower seeds and gardening tools. They spent the whole weekend planting flowers in the park, making sure to choose ones that bees loved, like lavender and wildflowers. As they worked, they talked about how important bees were for the environment. They learned that bees pollinate flowers, which helps fruits and vegetables grow. Without bees, there would be fewer delicious foods to eat!

After a few weeks, their hard work paid off. The park was filled with colorful flowers buzzing with bees. Ethan, Jason, and Cali watched with pride as the bees happily went from flower to flower, collecting pollen. "We did it!" Cali cheered, clapping her hands.

Jason grinned. "We may be small, but together, we can make a big difference!"

Ethan nodded, feeling a warm sense of accomplishment. "We're the Bee **Brigade**, defenders of flowers and friends of bees!"

From that day on, Ethan, Jason, and Cali made a promise to always protect the bees and their beautiful flower-filled home. For in their hearts, they knew that even the smallest acts of kindness could make the world a better place.



Brigade-special team or group of friends who work together to accomplish something important

Name_____

Date_____

Reading Comprehension

Directions: Read the passage carefully, then answer each question using evidence from the story to support your answers.

The Mystery of Missing Bees

Bees are amazing little insects that help make the world a better place! They buzz around, collecting pollen from flowers and making delicious honey. But did you know that bees have been disappearing? It's like they're playing hide-and-seek, but they're not coming back!

Scientists are trying to solve this big mystery. They call it "Colony Collapse Disorder." Imagine a big bee family living together in a hive. Well, in some places, whole bee families are disappearing! Scientists are worried because bees are super important. They help flowers make seeds and fruits grow, and they also help farmers grow fruits and vegetables.

There are a few reasons why bees might be disappearing. One reason is a problem called **pesticides**. These are chemicals that some farmers use to keep bugs away from their crops. Sometimes, these chemicals can make bees feel sick or confused, so they can't find their way back home to the hive.

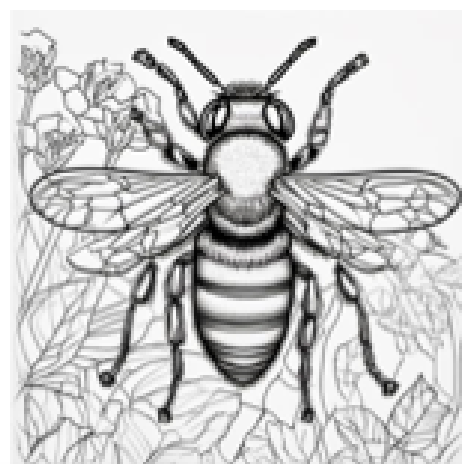
Another reason is something called **habitat loss**. This means that bees are losing their homes. People are cutting down trees and building houses and roads, which takes away the places where bees like to live and find food.

But don't worry! People are working hard to help the bees. They're planting more flowers for bees to eat and making special places called **"bee sanctuaries"** where bees can live safely. They're also being careful about using pesticides, so they don't hurt the bees.

We can help the bees too! We can plant flowers in our gardens and not use chemicals on them. We can also learn more about bees and tell our friends and family how important they are.

Let's all work together to solve the mystery of the missing bees and help these buzzing friends come back home!

BrainSpark



Name _____

Date _____

Reading Comprehension

Directions: Read the passage carefully, then answer each question using evidence from the story to support your answers.

The Amazing World of Bees

Bees are incredible little insects that do big jobs to help us every day! Let me tell you why they're so important.

First, bees are like garden helpers. They fly from flower to flower collecting something called pollen. This helps flowers make seeds so new plants can grow. Without bees, many flowers and plants we love wouldn't make new seeds, and they might go away!

Bees also help farmers grow tasty fruits and veggies. When bees visit flowers, they move pollen from one flower to another, helping fruits and veggies grow big and strong. So, next time you eat an apple or carrot, thank the bees!

Did you know bees make something special called beeswax? It's like a natural glue they use to build their homes, called hives. Inside hives, bees make honey, store food, and take care of baby bees called larvae.

Bees not only help plants grow and make yummy food, but they also give us honey and beeswax! Beeswax is used to make candles, lip balm, and even furniture polish. We rely a lot on these busy little insects!

Bees are super important to us. They help plants grow, make delicious fruits and veggies, give us honey, and provide us with beeswax. Let's give a big cheer for bees and all the amazing things they do for us!

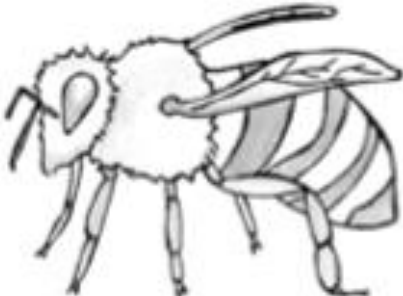
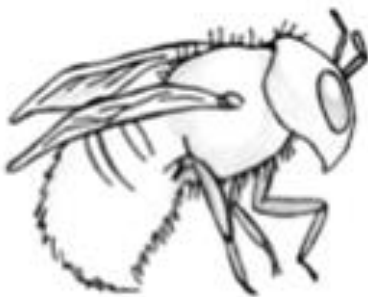


Comprehension Questions

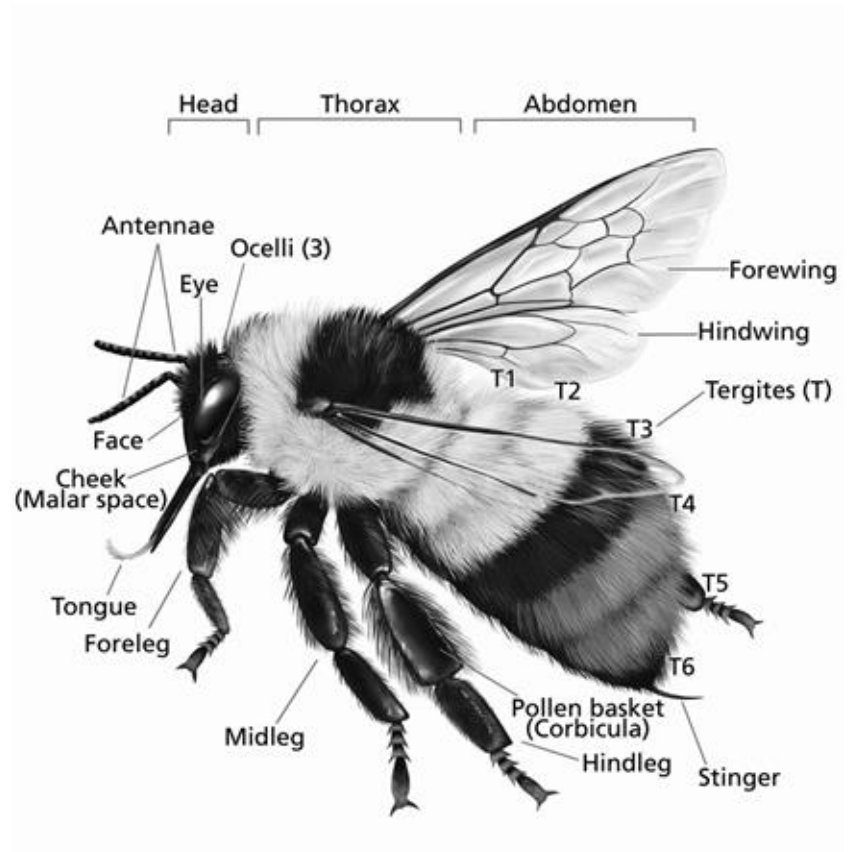
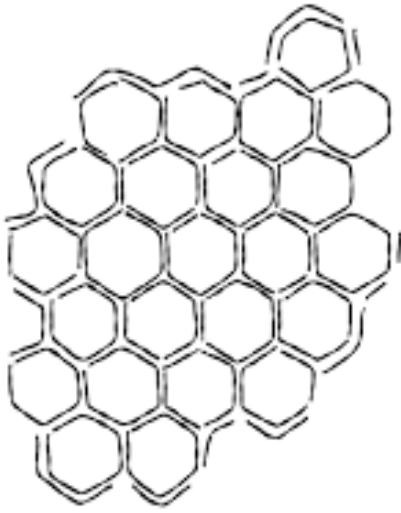
1. What do bees collect from flowers to help them make seeds?

Name: _____

Pollinators in the Garden

Honey Bee 	Flower Colors Visited:
	Red
Bumblebee 	Orange
	Yellow
Leafcutter Bee 	Blue
	Pink
Mason Bee 	Purple
	White

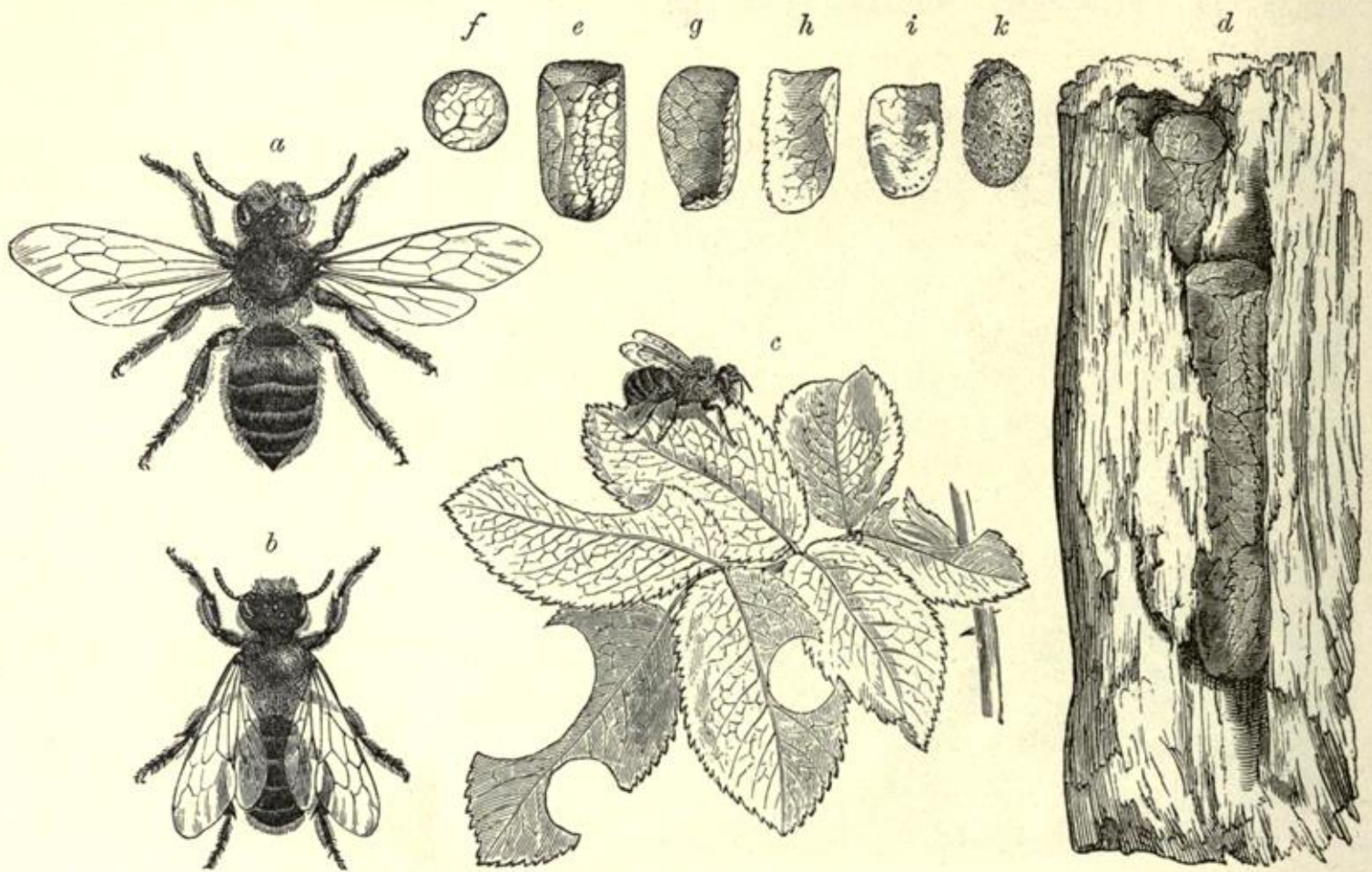
Record your learning with pictures and words



Mason Bee



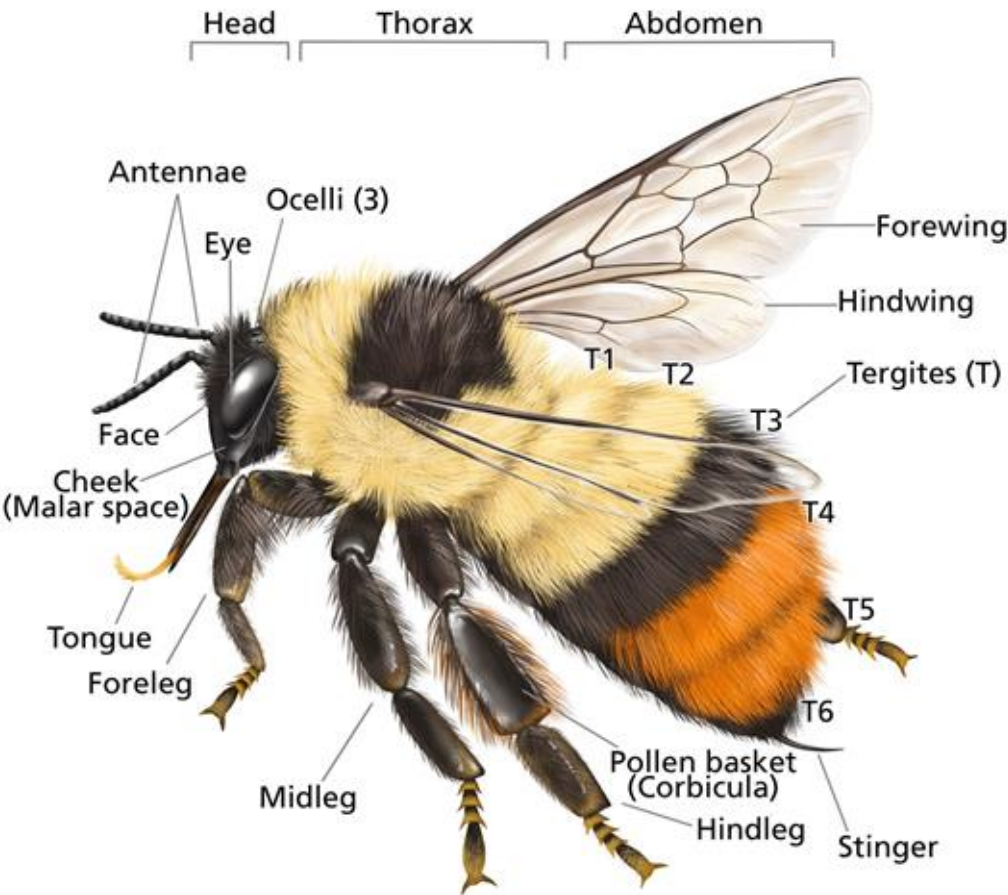
Leafcutter Bee



COMMON LEAF-CUTTER BEE. *a, b*, Female and male (enlarged); *c*, Rose-leaves with several pieces clipped out and a bee at work; *d*, Nest in a willow stem; *e*, A single cell; *f*, The lid of same; *g-h*, Pieces of leaf; *i-k*, Side pieces.



Bumblebee



Honeybee



Various Stages of the Larva



Bee Pollen



Beeswax



Honey Comb



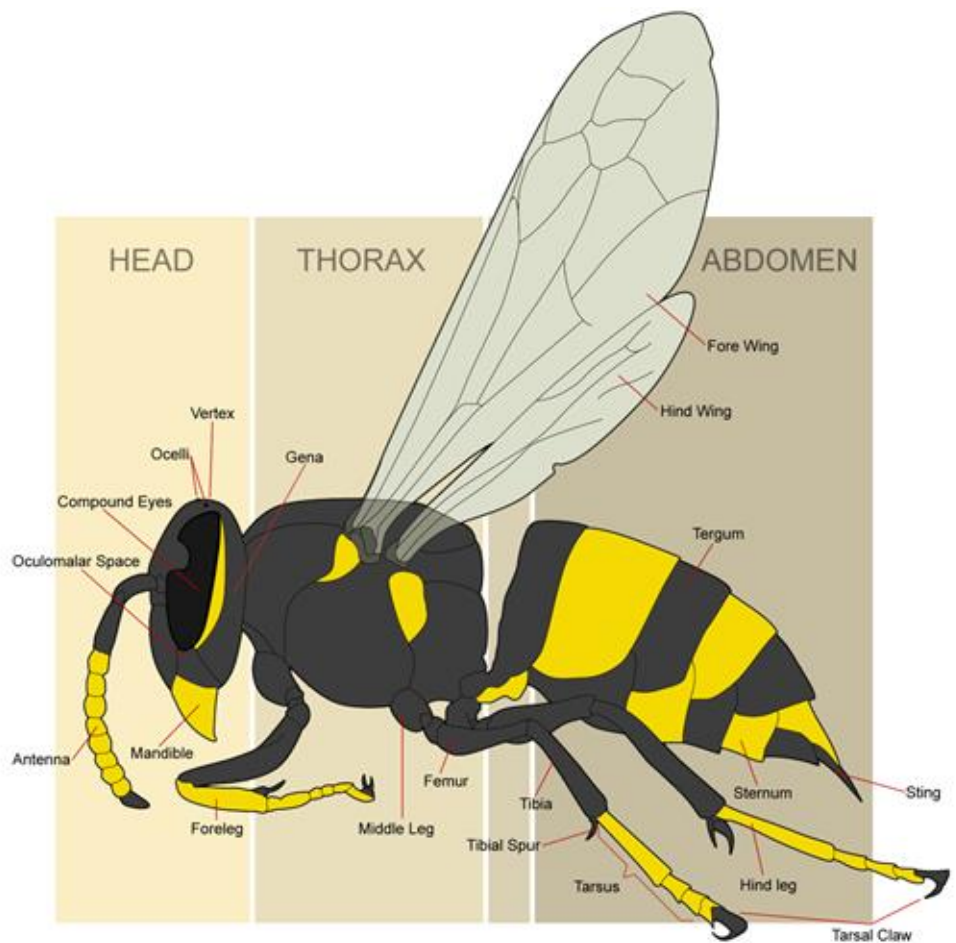
Pollen Sack



Wasp



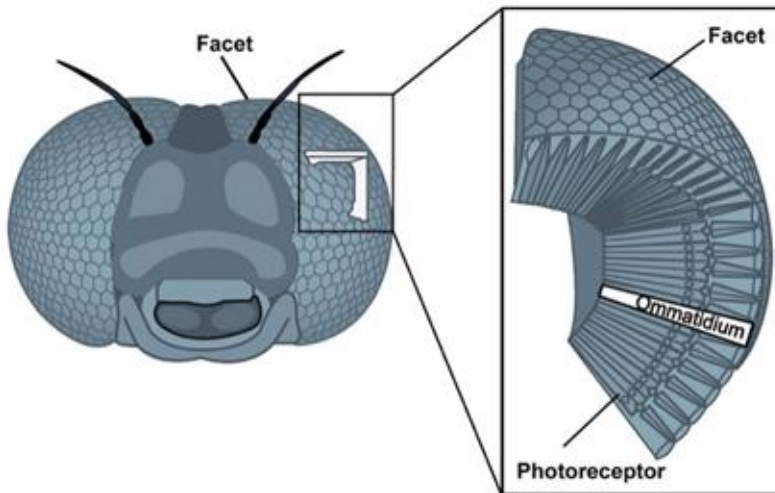
Diagram of a Wasp



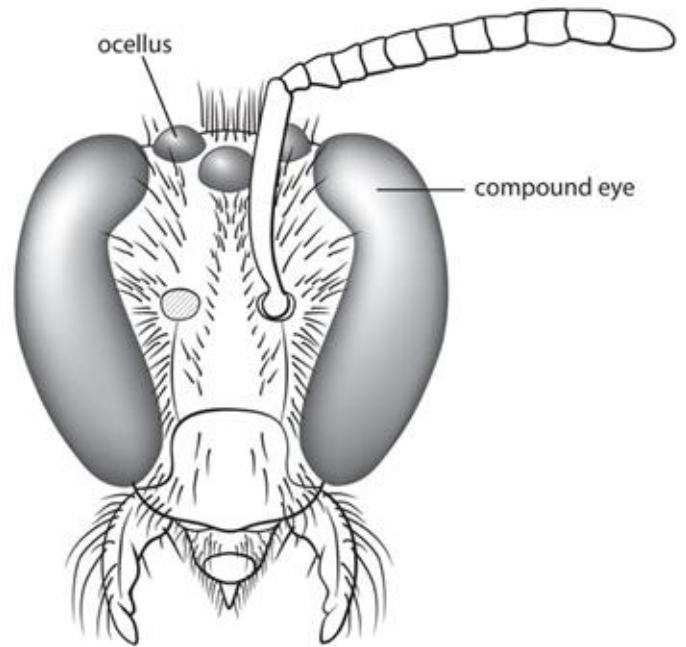
Bee's compound eyes: Bees and hoverflies have two sets of eyes – compound eyes and simple eyes. The compound eyes are the big, noticeable eyes at the side of the insect's head, and they're made up of lots of tiny photoreceptor cells (light detecting organs)



Bee Eyes



Details of a bee's compound eye.



Positions of the light-sensing ocelli on the top of a bee's head.

Bees have very different spectral sensitivity from humans. We see from the red to violet range, but bee vision is shifted to slightly longer wavelengths, including ultraviolet.

Bees and Butterflies

- Bees and butterflies are both insects.
- They both have wings and six legs.
- Bees and butterflies both drink nectar.
- Bees are social insects that live together in a hive.
- Butterflies are solitary insects, they are usually alone.
- Butterflies do not collect pollen like bees do.
- Bees can sting but butterflies cannot.

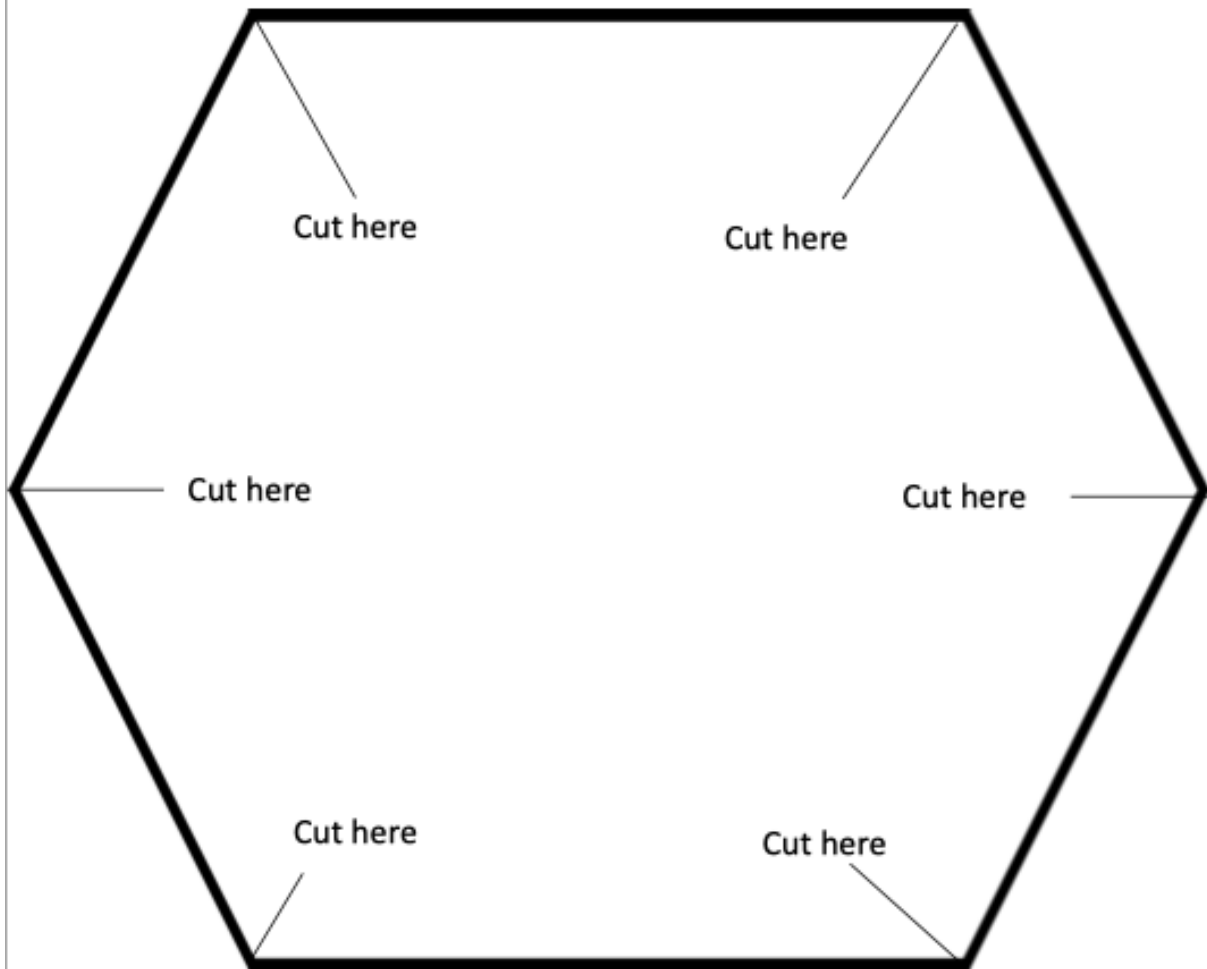


LIFE CYCLE of a **bee**

HONEYCOMB WRITING



Trace the pattern below onto yellow paper to make the honeycomb 3- dimensional. Just cut a small slit, then fold the edges up and tape. Glue the writing piece in the center after assembling.



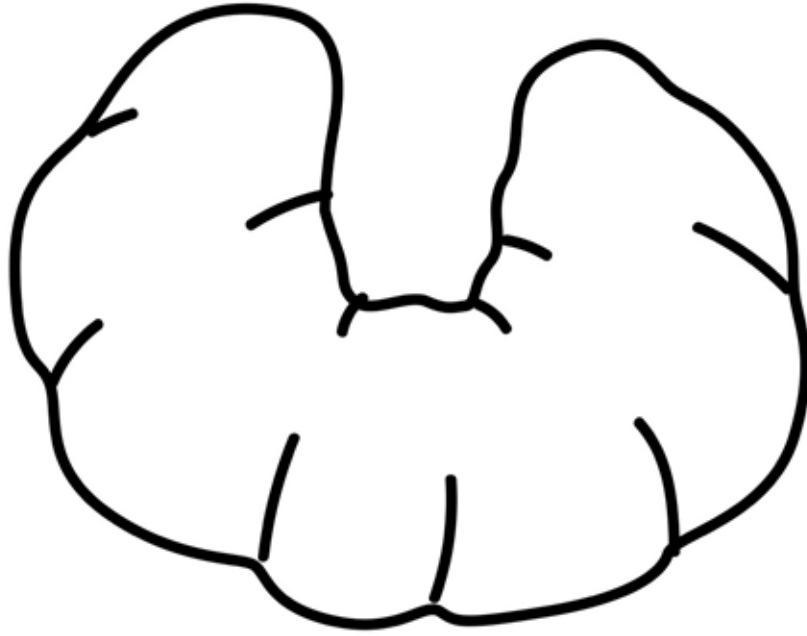
The Buzz About Bees

The Buzz About Bees

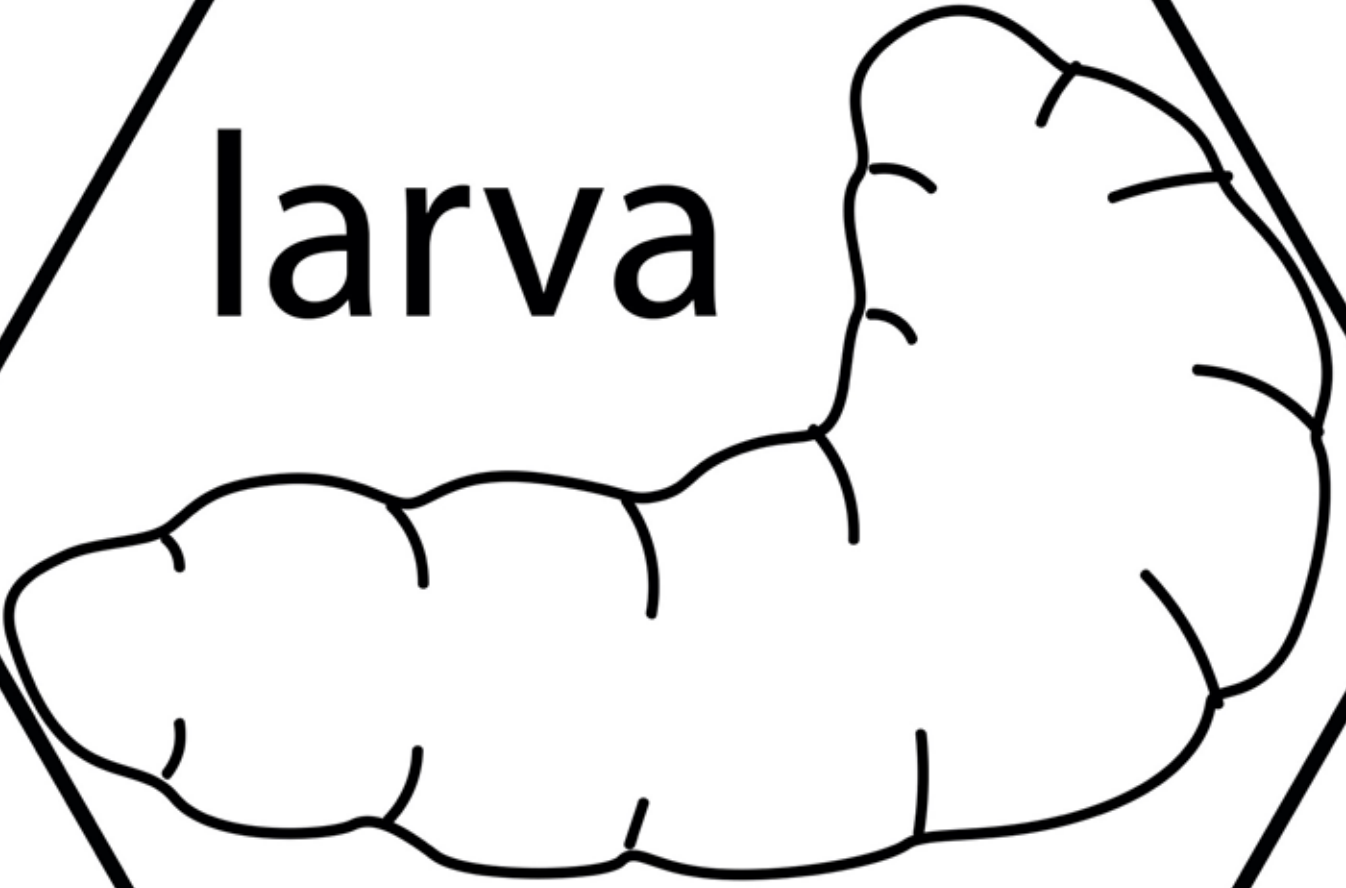
egg

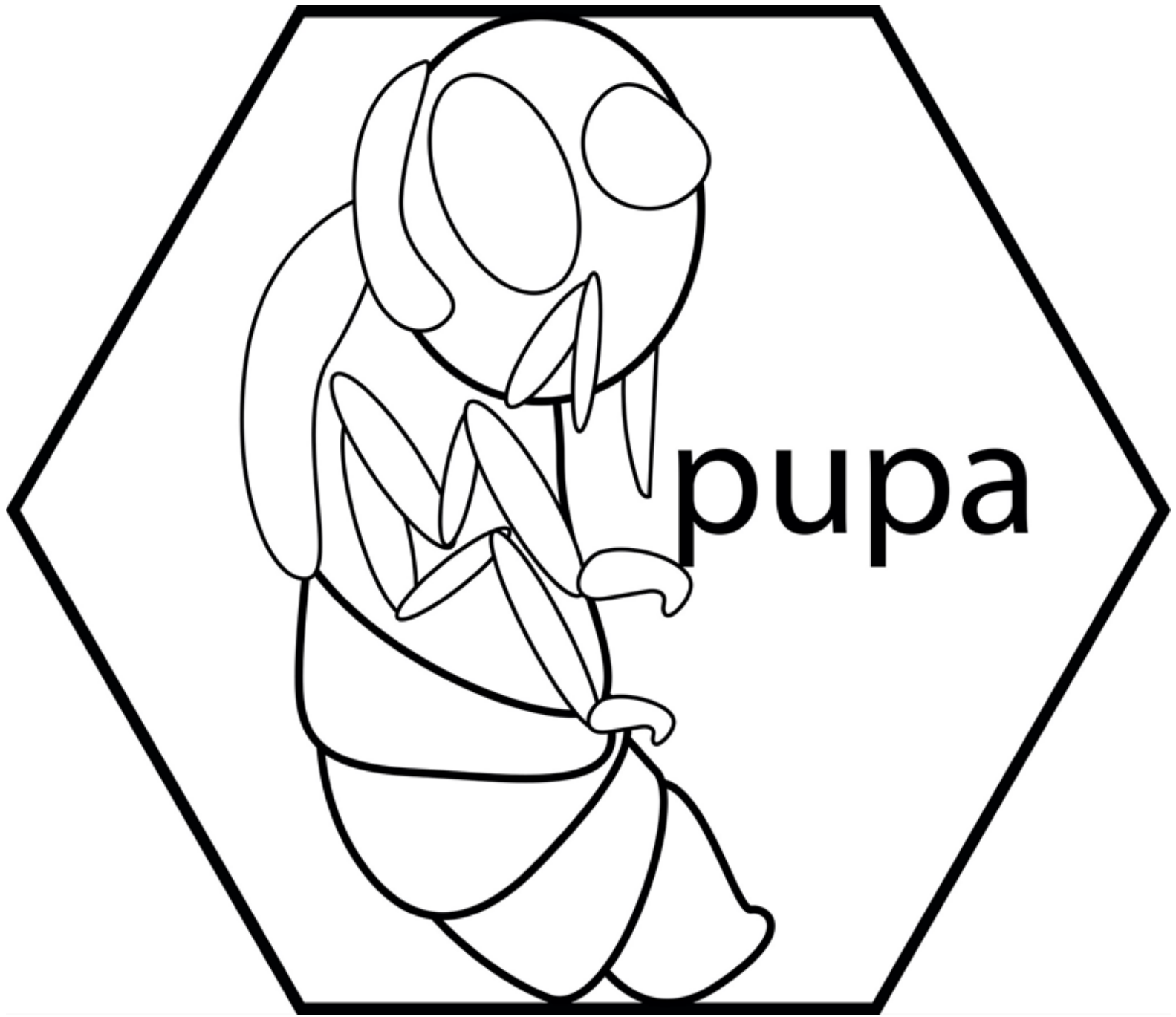


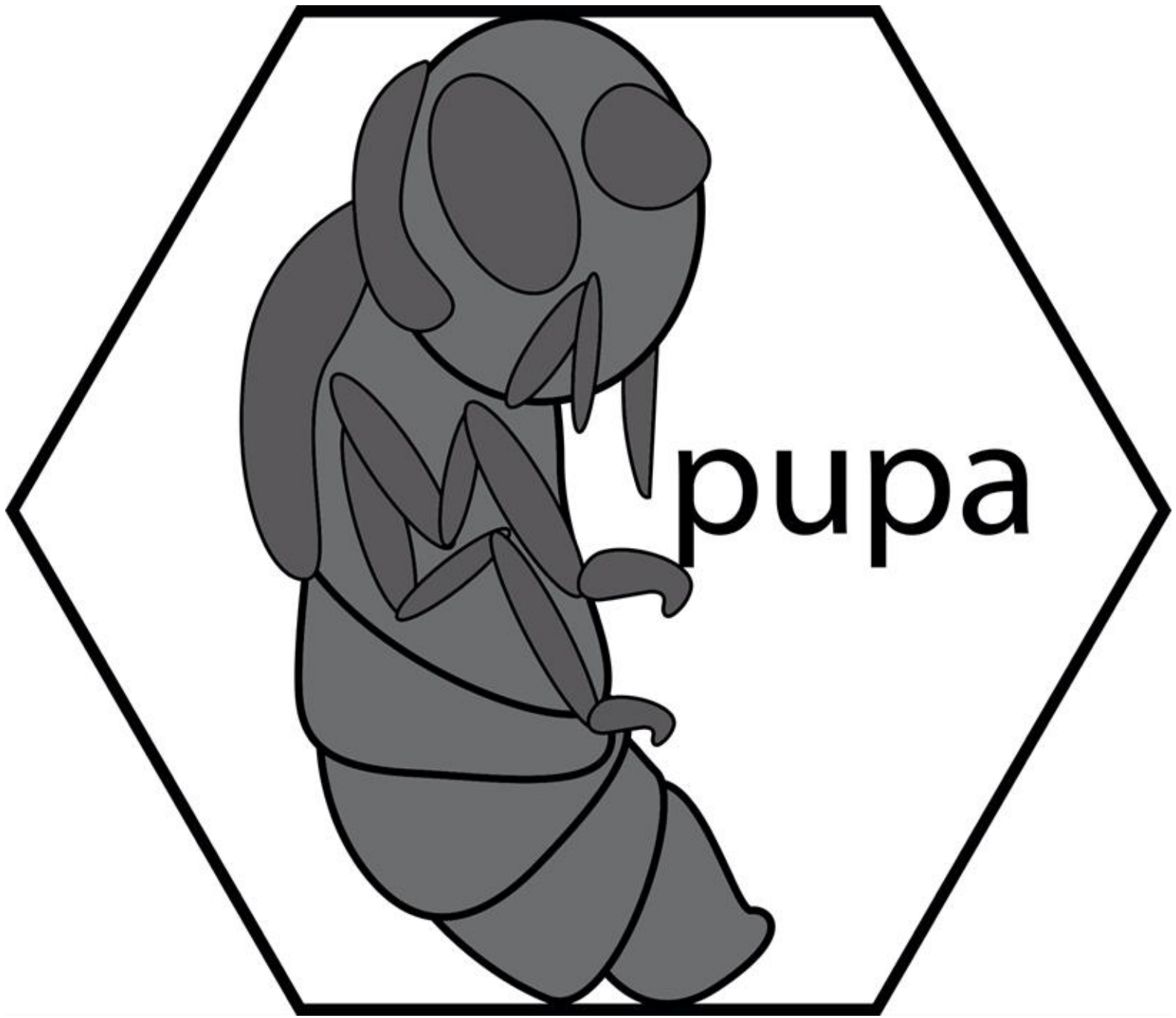
larva



larva

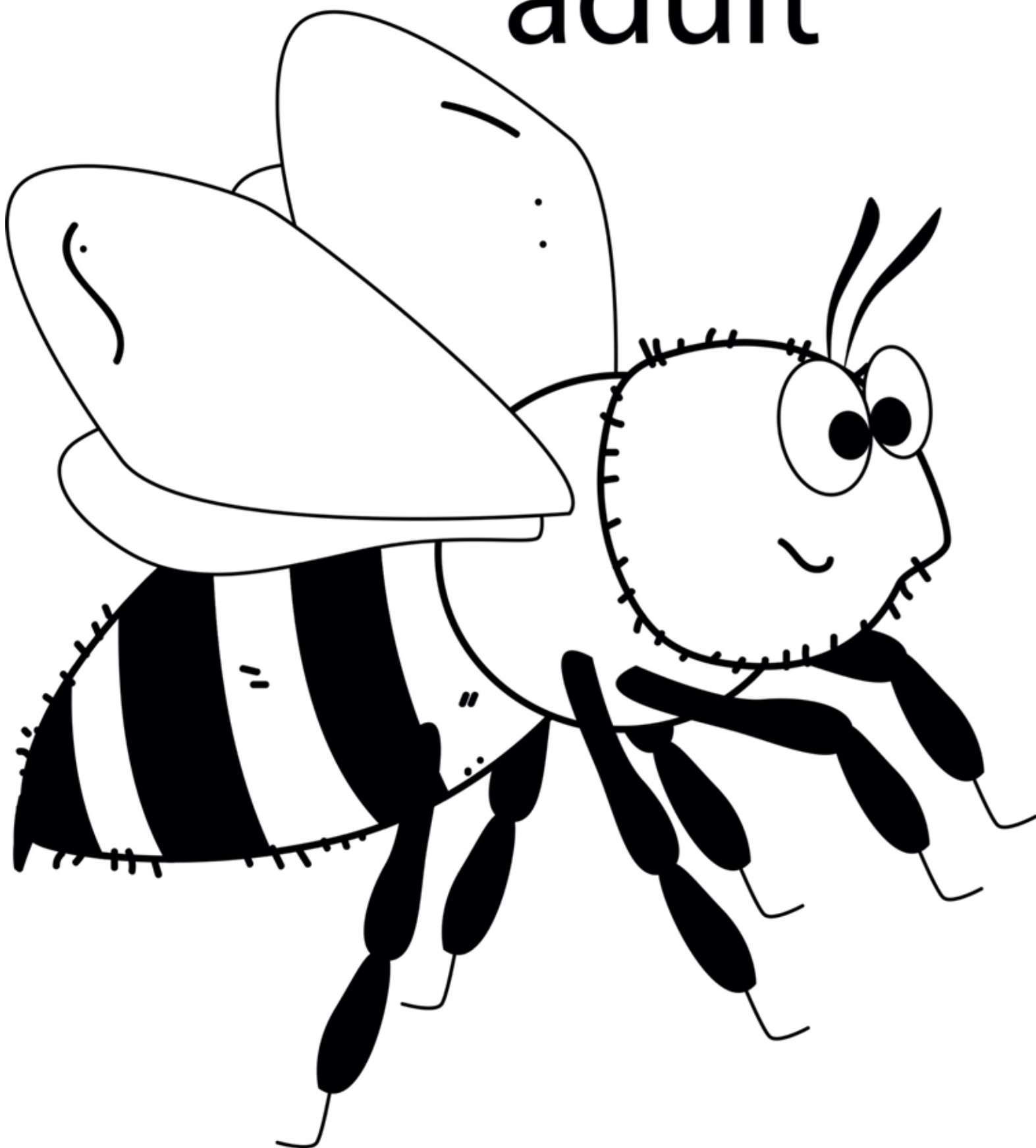


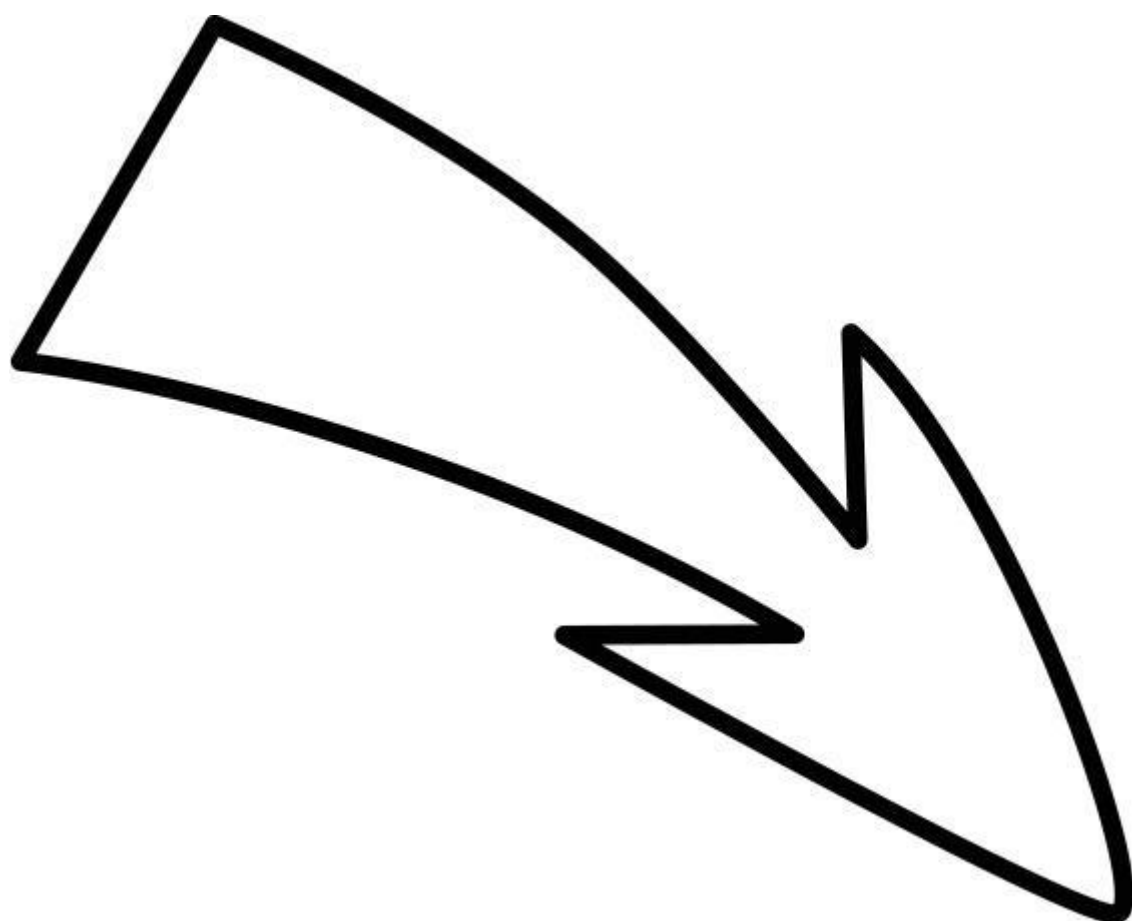




pupa

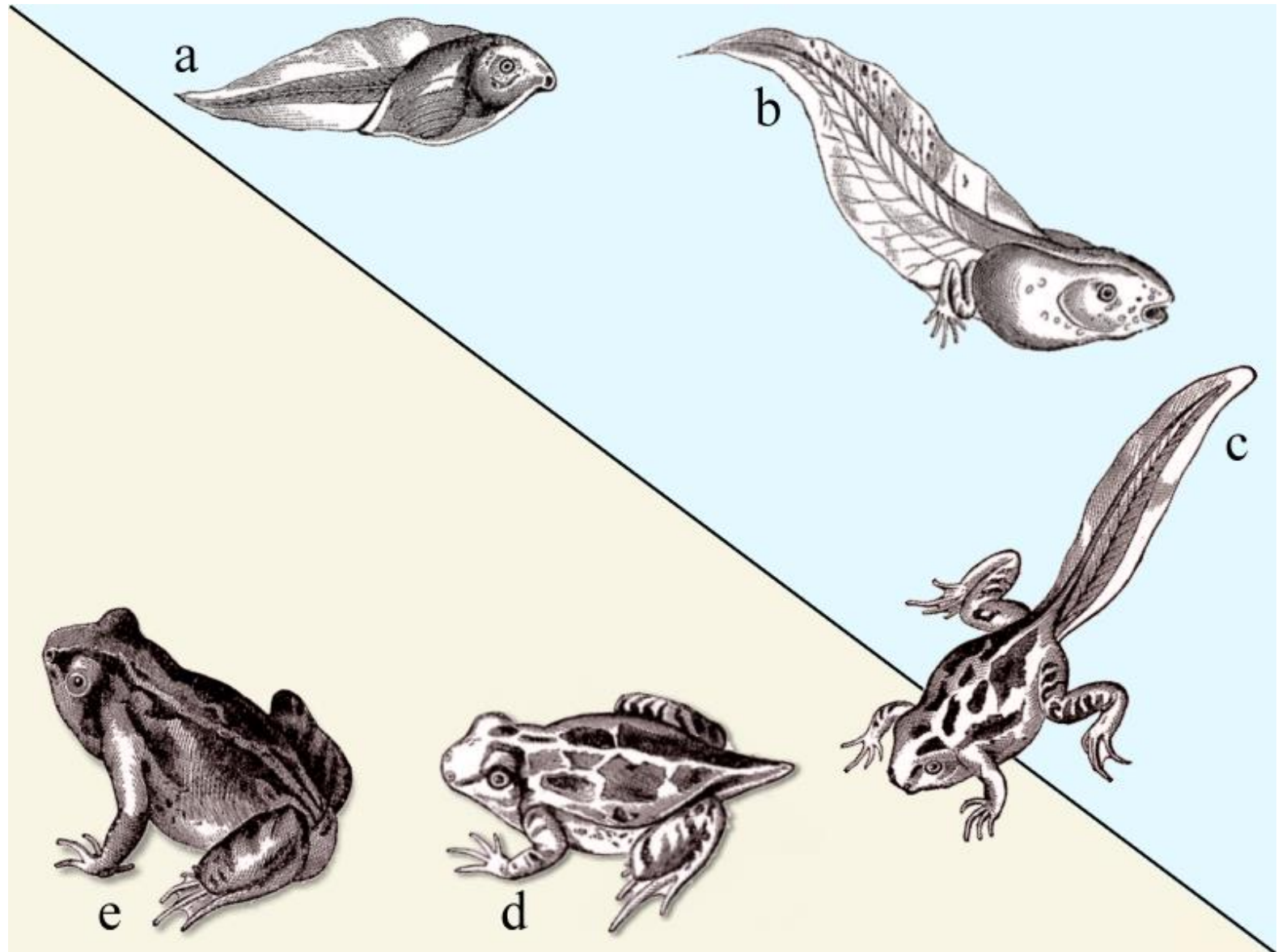
adult





Frog Resources

Life Cycle of a Frog



A.

B.

C.

D.

E.



FROGS & TOADS OF BC'S SOUTH COAST

Does the frog have...

- many tough warts and
- a light-coloured line down its back?

Western Toad

Anaxyrus boreas

- Lives on land in sheltered areas like forests.
- Swarms of tiny toadlets migrate in the spring.



Warts and line

NO

- prominent adhesive toepads on the front feet and
- a bandit-like eye mask?

Pacific Chorus Frog

Pseudacris regilla

- Lives everywhere, even urban environments.
- Vocal frog whose colour ranges from brown to bright green.



[Frogs and Toads of BC](#)

Tree Frog

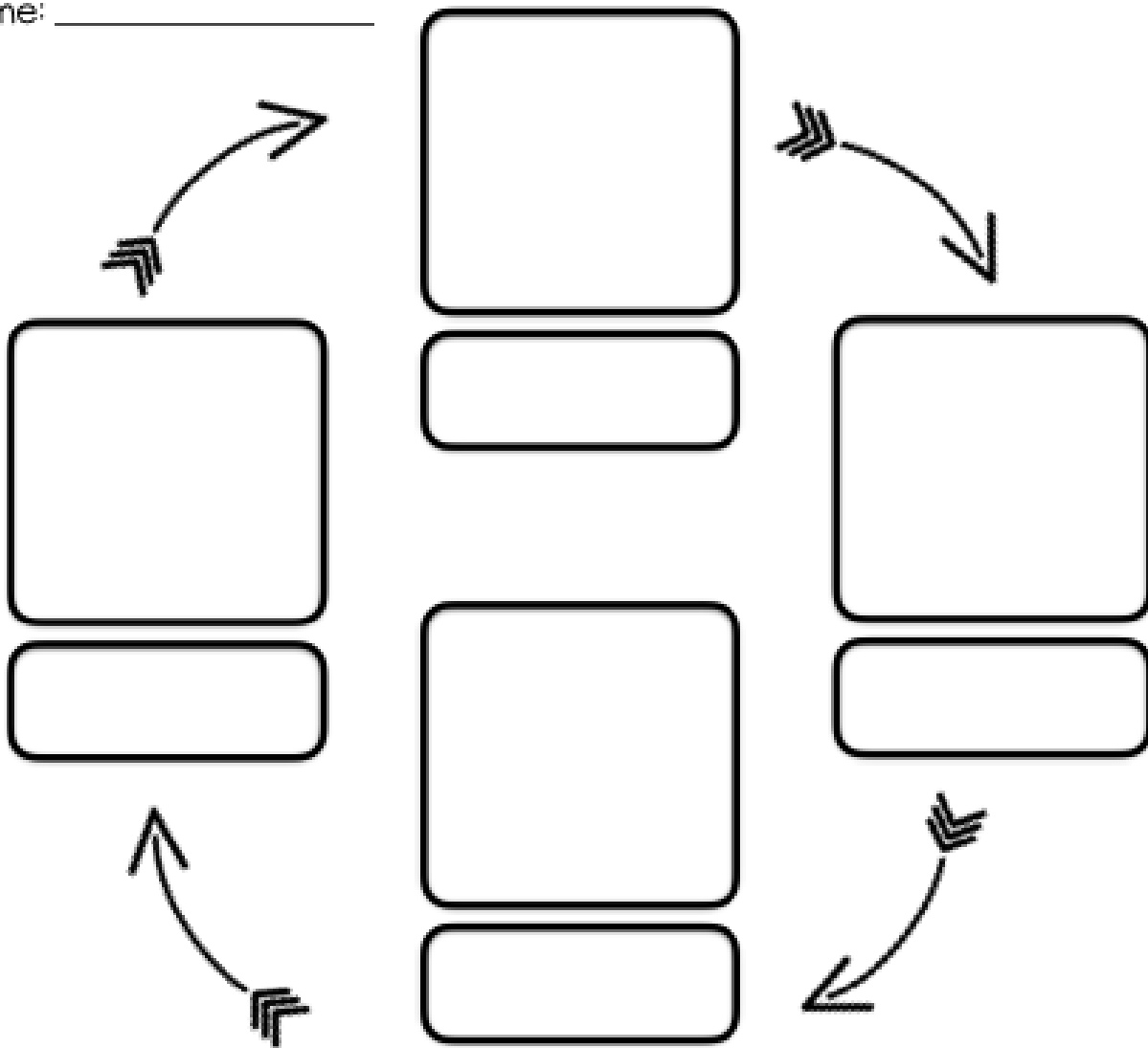


Western Toad



Frog Life Cycle

Name: _____

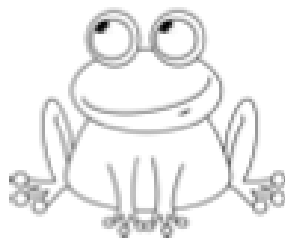
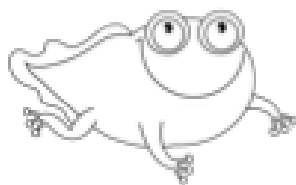


frog

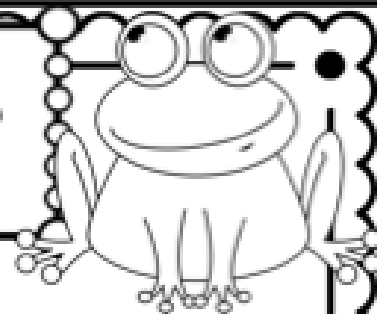
tadpole

egg

froglet



Frog Life Cycle



Name: _____

A large empty rectangular box with rounded corners, intended for drawing the first stage of the frog life cycle.

First,

A large empty rectangular box with rounded corners, intended for drawing the second stage of the frog life cycle.

Next,

A large empty rectangular box with rounded corners, intended for drawing the third stage of the frog life cycle.

Then,

A large empty rectangular box with rounded corners, intended for drawing the fourth stage of the frog life cycle.

Finally,

Name _____

POISON DART FROGS

Poison dart frogs are **amphibians** that live mostly in the forests of Central and South America. They come in many colors and sizes. Their bright skin color warns **predators** to stay away. Some frogs live near tropical streams and ponds. Others stay in the **canopy**, the top level of the rain forest. Their sticky **feet** help them climb. Poison dart frogs can be deadly. Their skin releases **poison** when they are in danger. Poison dart frogs **croak** loudly to communicate. This helps them find **mates**, or partners. Rain forest predators are everywhere. Poison dart frogs must keep **eggs** and **tadpoles**, young frogs, safe. Parents carry their young on their backs to keep them away from danger. The rain forest is a wet place. Poison dart frogs can go almost anywhere when they are thirsty. They drink water through their skin. They eat beetles and other insects. These make the frogs **poisonous**. Poison dart frogs have long sticky **tongues** they use to grab passing bugs.

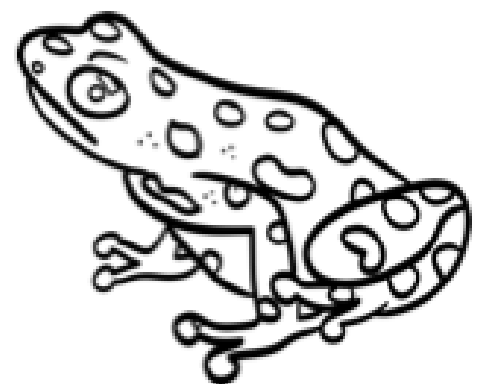


IDENTIFY: Use the word bank to identify each description.

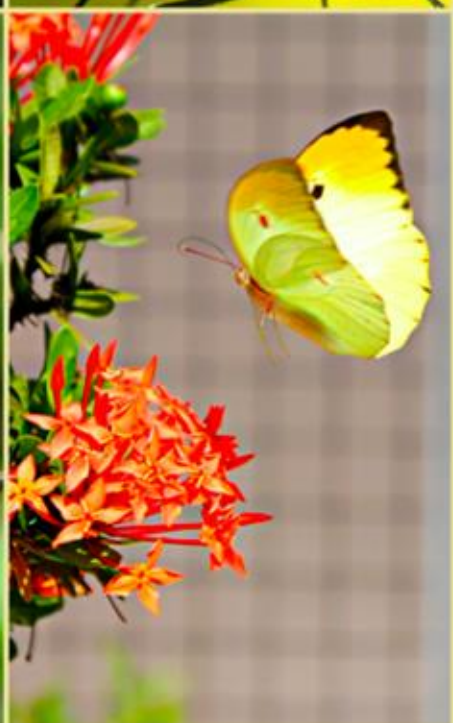
tadpoles	canopy	mate	predators
poison	tongue	croak	forests
	1. The uppermost level of the rain forest		
	2. Partner		
	3. Young frogs		
	4. Animals that hunt other animals		
	5. Released when in danger		
	6. Used to grab passing bugs		
	7. Noise made by poison dart frogs		
	8. Where poison dart frogs live		

MULTIPLE CHOICE: Choose the best answer.

9. What is the **main** reason poison dart frogs are bright in color?
- A. To warn predators to stay away
 - B. To attract mates
 - C. To look nice
10. What does a poison dart frog do when it is in **danger**?
- A. Makes a loud noise
 - B. Releases poison from its skin
 - C. Hides in the canopy of the trees
11. How do poison dart frogs drink **water**?
- A. They lick it with their sticky tongues.
 - B. They dip their sticky feet into water.
 - C. They drink it through their skin.
12. How do poison dart frog parents keep their young **safe**?
- A. They carry them on their backs.
 - B. They hide them in trees.
 - C. They bury them in burrows.
13. Where do poison dart frogs **live**?
- A. Australia
 - B. Africa
 - C. South America
14. What do poison dart frogs mainly **eat**?
- A. Insects
 - B. Plants
 - C. Berries
15. Why did the author **mainly** write this passage?
- A. To persuade
 - B. To entertain
 - C. To inform



Butterfly Resources



QUEEN BUTTERFLY

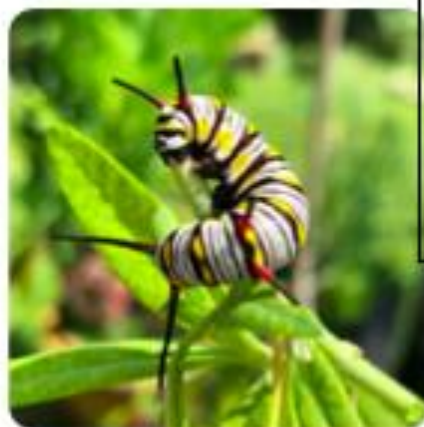
Similar to that of the monarch species, the queen uses milkweed varieties as its host plant to lay her eggs. A queen's eggs and chrysalides closely resemble that of the monarch. Having less noticeable wing veins, the queen also has a deeper, richer color. The most significant factor in the identification of a queen is in its caterpillar stage, where you will see three sets of tentacles, whereas a monarch has two sets. A queen chrysalis is more petite and appears green, white, or a light hue of pink.



Common Name: Queen
Scientific Name: *Danaus gilippus*



Egg



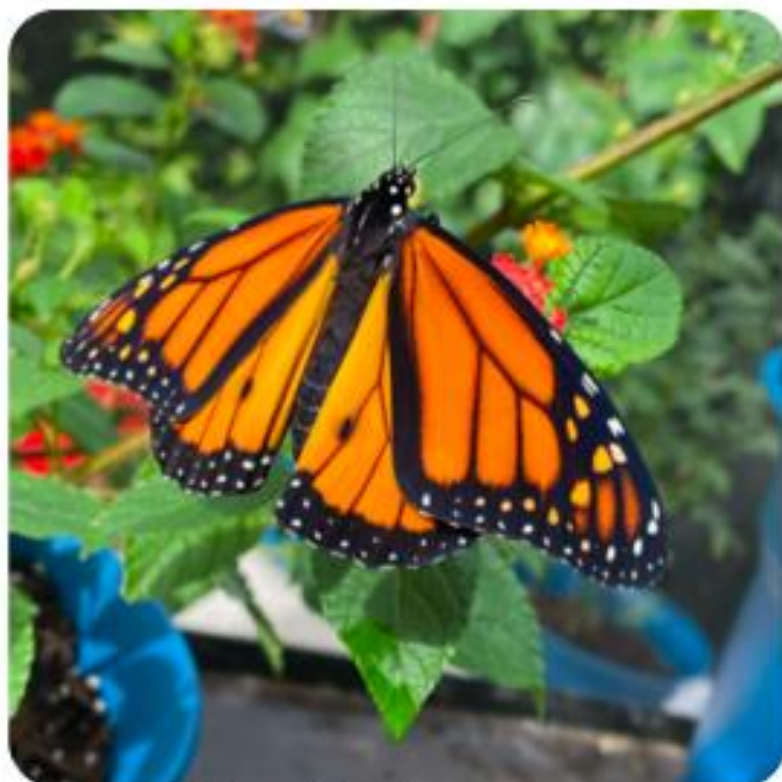
Caterpillar



Chrysalis

MONARCH BUTTERFLY

Unlike the Queen, a Monarch chrysalis will always be a shade of green with gold specks. The eggs are usually laid on the underside of the leaves on the milkweed plants.



Common Name: Monarch
Scientific Name: *Danaus plexippus*



Egg



Caterpillar



Chrysalis

LIFECYCLE

Featured below is the lifecycle of the Monarch, which also applies to the Queens whose caterpillars use the milkweed varieties as their host plant and source of nutrition.



The monarch lays a single egg on its host plant, milkweed



The hatchling emerges from its egg within 4 days



A caterpillar goes through five stages called instars, growing in size while leaving behind their old shell



The caterpillar hangs in a "J" form



Spinning silk to suspend itself, the caterpillar begins molting into its chrysalis



Using its cremaster to attach to the silk, the caterpillar morphs into a chrysalis until it completely envelopes itself



The day before the monarch completes its metamorphosis, the wings are visible through its chrysalis



About two weeks after the chrysalis is formed, the adult butterfly ecloses

NECTAR PLANTS

A nectar plant is defined as a plant in which organisms such as pollinators feed on for nutrients. Provide a good mix of plants with shorter and longer centers to allow the butterflies easy access to nectar. Butterflies have varying lengths for their proboscis; therefore, it's best to have a variety of nectar plants.



Common Name:
Blue porterweed
Scientific Name:
Stachytarpheta jamaicensis



Common Name:
Firebush
Scientific Name:
Hamelia patens



Common Name:
Golden dewdrop
Scientific Name:
Duranta erecta



Common Name:
Fire-cracker
Scientific Name:
Jatropha integerrima



Common Name:
Mexican flamevine
Scientific Name:
Pseudogynoxys chenopodioides



Common Name:
Pentas
Scientific Name:
Pentas lanceolata



Common Name:
Lantana
Scientific Name:
Pineland Lantana



Common Name:
Plumbago
Scientific Name:
Plumbago auriculata



Common Name:
Scarlet sage
Scientific Name:
Salvia coccinea

FEMALE VS MALE

While many confuse the Monarch and Queen butterflies, with a close observation you'll be able to identify the difference between the Queen and Monarch males and females in your garden and the wild.



Queen females have less visible wing veins and a more solid cinnamon chocolate appearance with white dots around the edges of the wings.



Queen males have specialized scales for secreting pheromones in the form of a black spot on each hind wing.



Monarch females have thicker wing veins making them appear darker.



Monarch males exhibit less intense wing veins and have specialized pheromone scales in the form of a black spot on each hind wing.

ANATOMY



Abdomen



Antennae



Cell



Compound Eye



Head



Forewing



Hindwing



Monarch and Queen butterflies eclose beginning from a central opening allowing their abdomen to drop down, their wings to unfold and dry as they grab onto their chrysalis. A butterfly's wings will appear crumpled until they've had ample time to hang dry, allowing their wings to fully expand as the hemolymph (a fluid equivalent to blood) fills their wings. The proboscis is curled in the center of the head under the compound eyes.



Monarch Caterpillar



Monarch
Butterfly



**Painted
Lady
Caterpillar**



Painted Lady Butterfly



Swallowtail caterpillar and butterfly



Pollinator Flowers

Chives



Echinacea



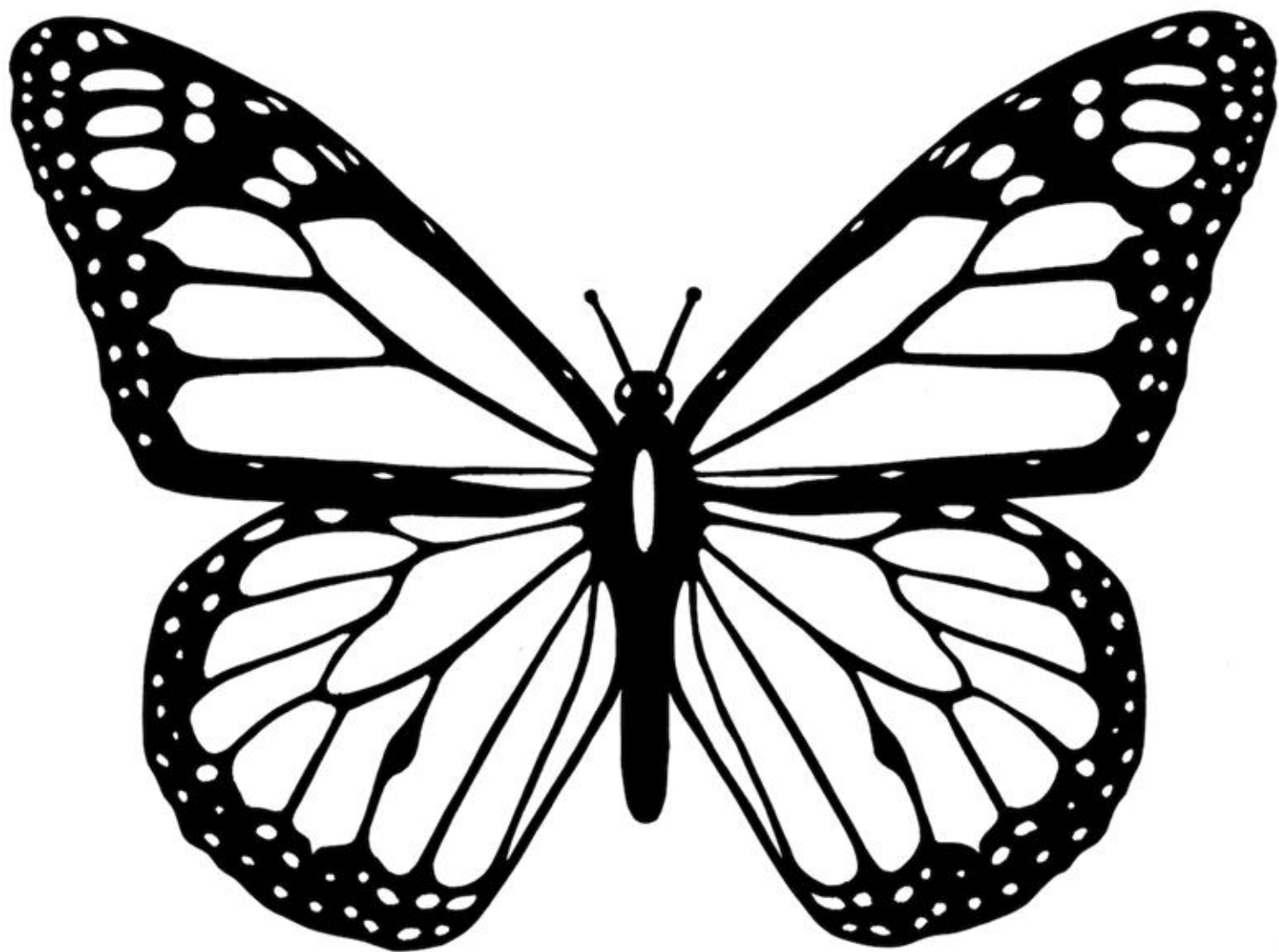
Milkweed

Monarch Butterflies favourite nectar source



Fireweed





Name _____

Butterfly Life Cycle Word Search

M	L	I	F	E	C	Y	C	L	E	A	B	C
I	E	D	E	F	E	G	H	I	M	I	U	C
L	J	T	K	L	A	G	N	W	E	Y	T	A
K	M	E	A	T	I	N	G	N	R	O	T	T
W	P	Q	R	M	E	S	T	U	G	V	E	E
E	M	I	B	A	O	T	P	T	I	E	R	R
E	R	F	V	L	Y	R	U	K	N	M	F	P
D	E	R	A	P	M	I	P	L	G	K	L	I
G	A	E	G	C	H	R	A	H	S	A	Y	L
L	J	-	S	H	A	P	E	L	O	M	O	L
N	M	O	N	A	R	C	H	A	R	S	C	A
E	A	L	M	I	G	R	A	T	E	I	I	R
L	I	F	S	C	H	R	Y	S	A	L	I	S



butterfly



milkweed



egg



larvae



eating



caterpillar



J-shape



chrysalis/pupa



emerging



metamorphosis



life cycle

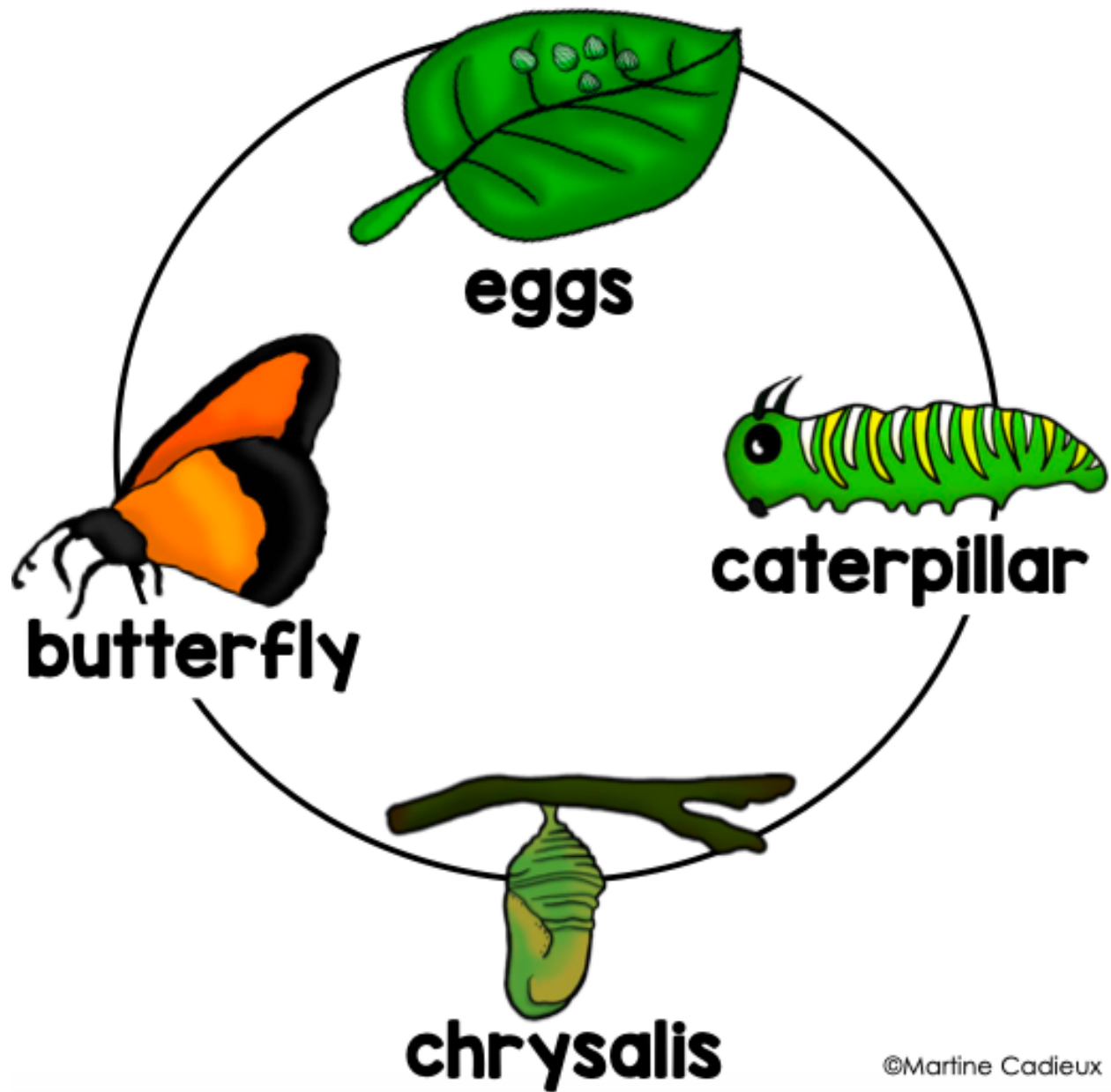


Monarch



migrate

Butterfly Life Cycle

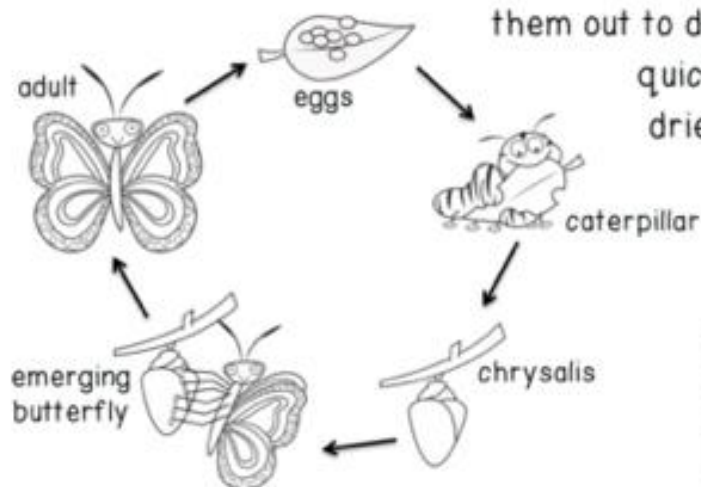


©Martine Cadieux

Name: _____ Date: _____

THE LIFE OF A BUTTERFLY

Butterflies start out as **eggs**. After about five days, a butterfly egg hatches and out comes a tiny **caterpillar**. The caterpillar is very hungry when it comes out of the egg. It eats and eats and grows very quickly. When the caterpillar is done growing, it sheds its skin and forms a **chrysalis**, which is also called a pupa. The chrysalis is brown or green so that it is camouflaged in nature. Inside the chrysalis, the caterpillar begins to change into a butterfly. This complete change is called **metamorphosis** (*met-uh-mor-fuh-sis*). The change happens quickly! Soon, the chrysalis opens and an **adult butterfly** emerges. When the butterfly first comes out, its wings are damp, so it spreads



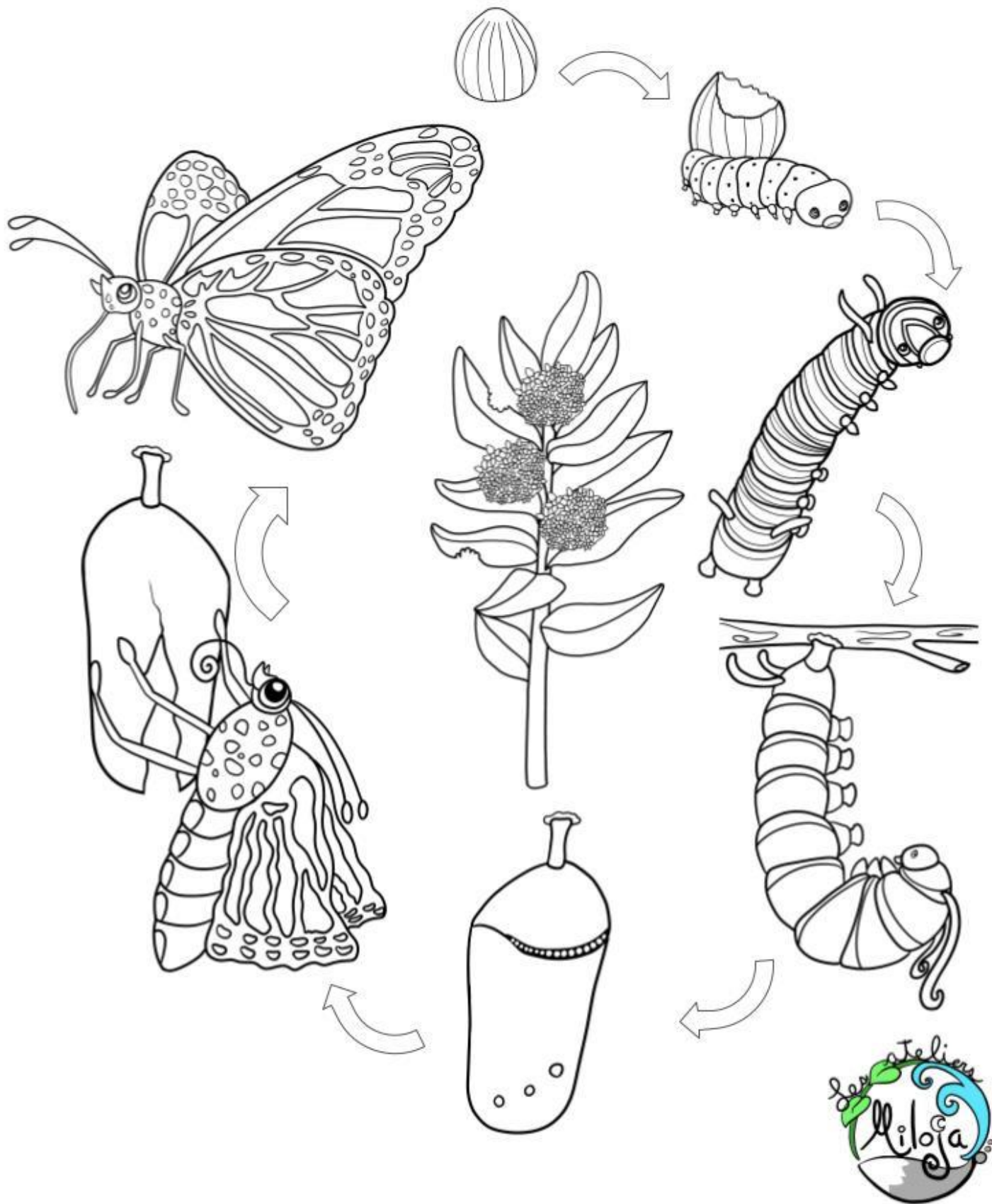
them out to dry. Butterflies learn to fly quickly after their wings have dried. Then, an adult butterfly lays eggs, and the life cycle starts all over again.

Like all cycles, the life cycle of a butterfly repeats itself over and over. Can you think of any other cycles?

.....
*Locate the text features and circle them with the correct colors.
Check each box as you find each text feature.*

- | | |
|--|---|
| ☐ RED: bold text | ☐ GREEN: diagram |
| ☐ ORANGE: pronunciation | ☐ BLUE: heading |
| ☐ YELLOW: labels | ☐ PURPLE: text box |

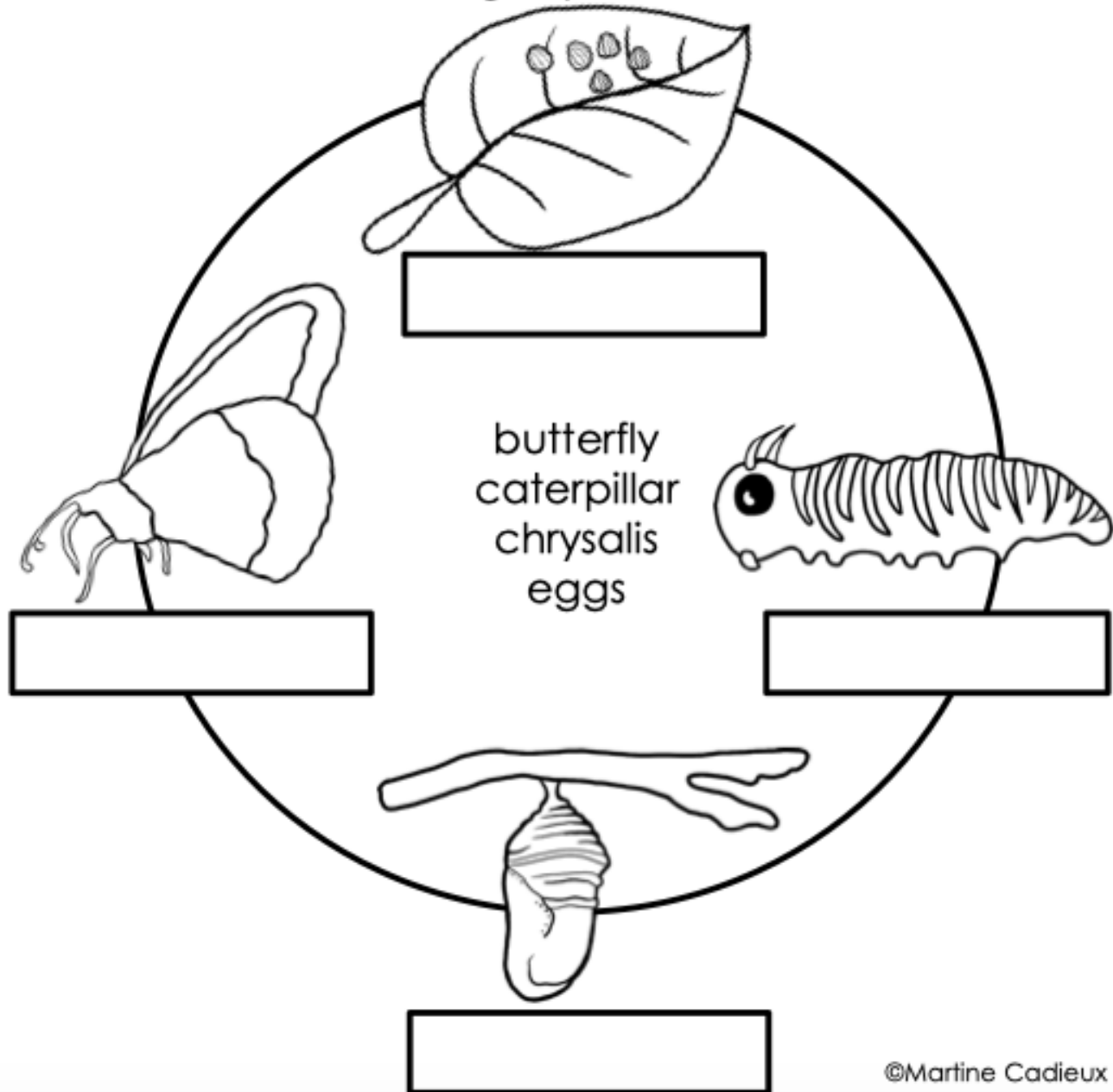
Le cycle de vie du papillon monarque



Name : _____

Butterfly Life Cycle

Write the words at the right spot.



BUTTERFLY SYMMETRY

Trace the pattern on the right side to create a symmetrical design, then color it in to finish both sides of the butterfly.



SYMMETRY: Two parts of a whole are that are identical.

Butterflies exhibit bilateral symmetry, as seen by their identical wing patterns on either side of its abdomen.

Name: _____

Citizen Scientists: Pollinator Monitoring

Observer Name: _____

Site: _____

Date: _____

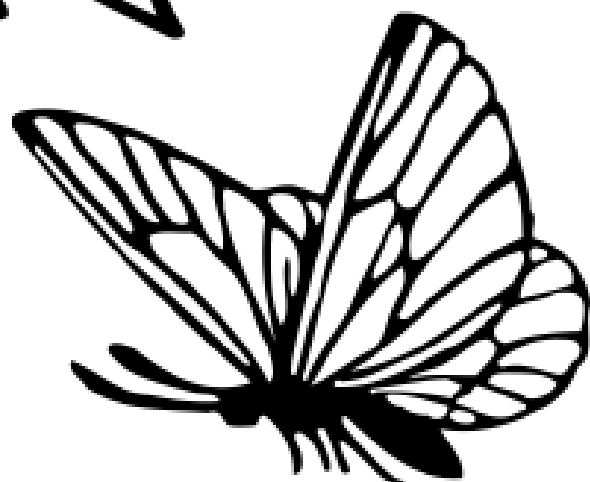
Weather: _____

Temperature: _____

Pollinator Group: _____

Observations		
Flower Color	Number of Visitors	Total Number

Name: _____





Moths Vs. Butterflies

BUTTERFLY VS MOTH

Be cautious with your caterpillars. If you come across a fuzzy caterpillar, do not touch it because it will sting you. While some butterfly caterpillars may appear spikey and dangerous, they do not sting. Moths are essential pollinators who take over the pollination in the evening hours. Download an insect-identifying app to confirm your findings before handling them.



- Many moth caterpillars are fuzzy and will sting you.
- They are active during the evening (Nocturnal).
- Rest with their wings open in a flat position.
- Their antennae tend to resemble a feather or leaf.
- Form a silk pupa, known as a cocoon.
- They are stockier with furry bodies.
- Have a duller and less vibrant coloring.
- Superposition eyes that reflect light at the angle taken in.
- A wing coupling device called a frenulum ensures the wings travel together during flight.



Ocola Skipper Moth

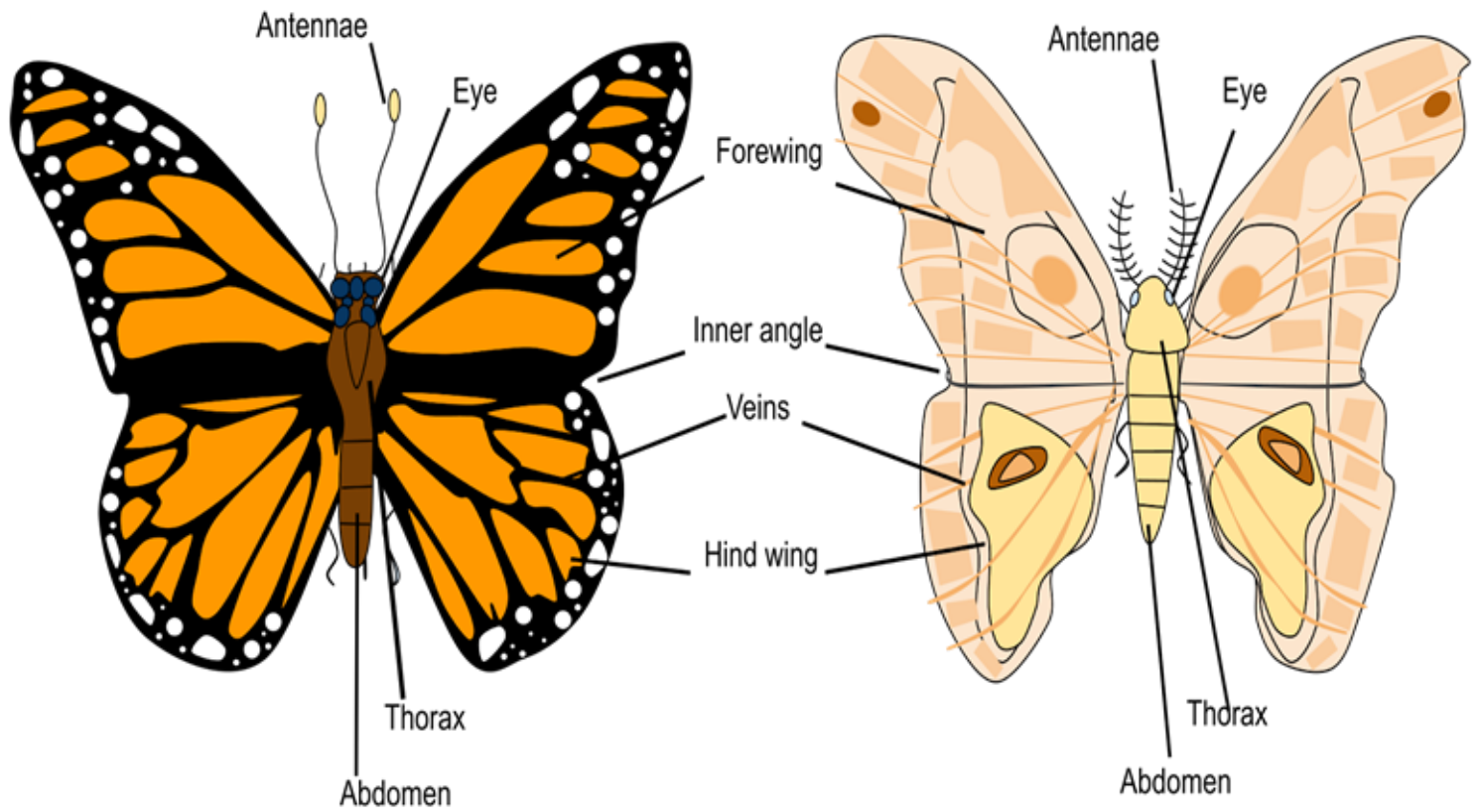


Tussock moth that wasps parasitized within the silk padding spun under the caterpillar.



Oleander Moth Caterpillar

Butterfly vs. Moth



Moths found in British Columbia



More Moths Found in BC



Name: _____

Butterfly and Moth Coloring Sheets



Monarch
Butterfly



Polyphemus
Moth

Name: _____

Butterfly and Moth Guide

Butterflies have these features:



Moths have these features:



Butterfly Example

How many I found:



Monarch
Butterfly

Moth Example

How many I found:

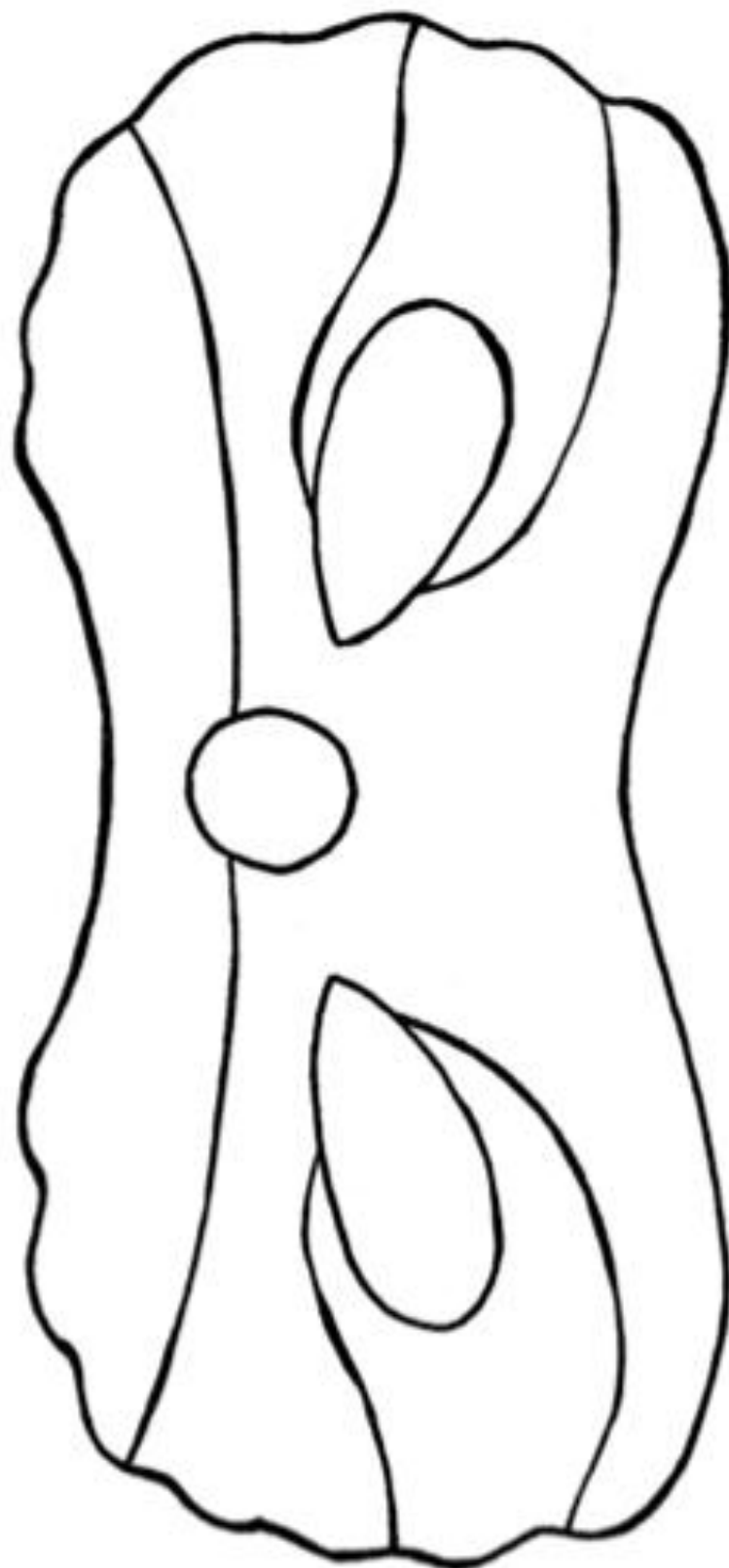


Polyphemus
Moth

Hummingbird Resources

Name: _____

Hummingbird Mask Template



Rufous Hummingbird: Indigenous to Vancouver Island



Anna Hummingbird: Invasive to BC



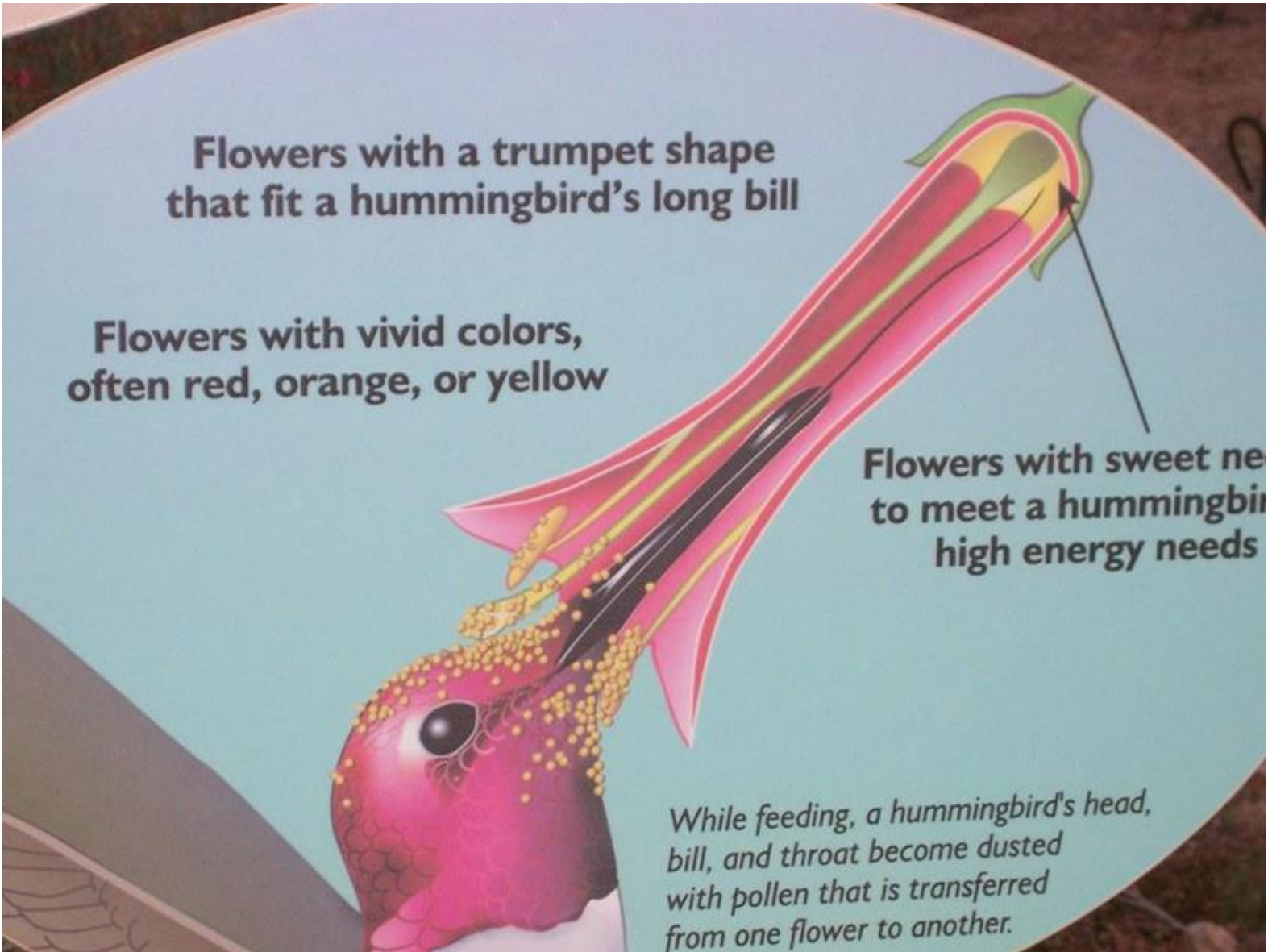
Ideal flower shape for Hummingbirds

**Flowers with a trumpet shape
that fit a hummingbird's long bill**

**Flowers with vivid colors,
often red, orange, or yellow**

**Flowers with sweet nectar
to meet a hummingbird's
high energy needs**

*While feeding, a hummingbird's head,
bill, and throat become dusted
with pollen that is transferred
from one flower to another.*





Lichen gathered to make hummingbird nest





**Hummingbirds
favourite flowers**

Crocosmia non-native but great pollinator
flower (bottom image)



Animal Tracks

Mouse v Squirrel game

An active game to keep warm & have fun



You will need:
'Nuts'
A squirrel (usually
the grown up)
Mice (usually the
children)
A container
Open space

Prep:

Gather 'nuts' (this can be anything from soft balls, pinecones, or any other items you deem appropriate). Place your container (a bucket or large tub works best) in the centre of your space.

Play:

The 'squirrel' then scatters the nuts around the space for the mice to scurry around and gather to place, one at a time, in the container.

As the 'mice' place the 'nuts' in the container it is the job of the 'squirrel' to toss them back out.

The job of the mice is to get all the nuts into the container before the squirrel can toss them back out!

Animal Track Matching

... to the animal



Cut them out and see how many you can match!

Animal Track Matching

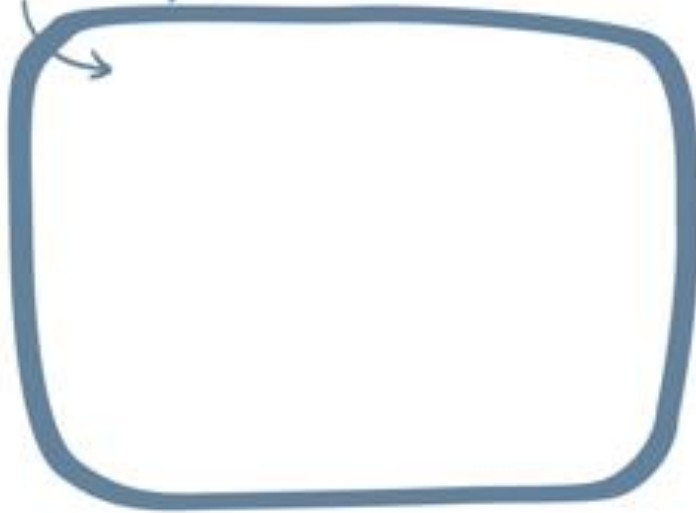
Match the tracks...



Track Study

On snow coated or muddy ground, animals leave footprints, known as tracks.

Draw your tracks



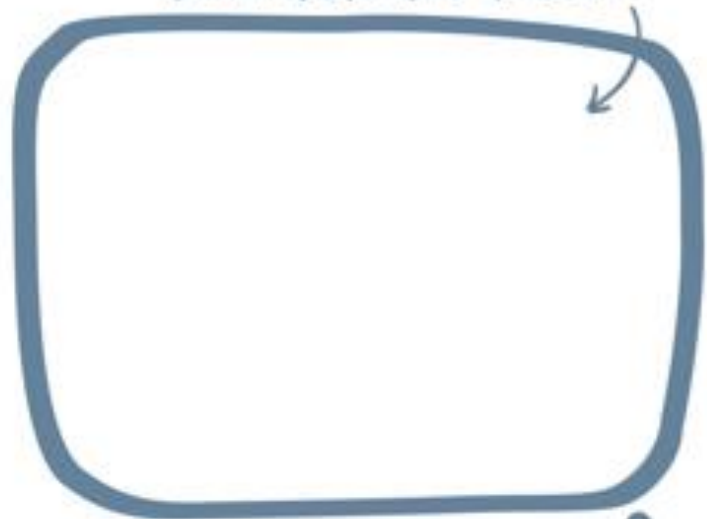
What type of environment did you find the track in?

How big is each print?
Measure your print.

Can you identify which animal the print belongs to?

Do you think the animal was alone?

Draw the animal you think made the tracks



If you are patient and quiet, you may even spot the creature that made the tracks.

Also look for other signs like poo, feathers and nests.



Bird Activities



'Owl Eyes' Game



An owl's eyes are fixed in their sockets, so in order to see, they have to move their whole head.

To get an idea what this is like, make binoculars with toilet roll inserts or by encircling your eyes with your hands. Look around you. Practice is needed to see the world this way.

Compare your own field of vision to that of an owl. In pairs mark out a large circle on the ground. One person stands in the centre, the other on the edge of the circle behind. The person behind moves slowly round the other in a circle. When the centre person can see the moving partner, without moving his or her head, mark this spot on the circle. Repeat the activity but centre person should make binoculars round their eyes. Investigate the difference.





Bird Study



Head outside and sit a while. Watch the birds around you, look at their feathers, their beaks and listen to their songs.

Draw your favourite feathered visitor.

Why did you choose this bird to draw?

What was it doing as you watched?

Did you see it eating anything? If so, what?

Can you sing just like your bird?

Things you can do to help the winter birds

Make fat balls to hang out for them.

Make a bird bath with a large shallow bowl of water.



Hang pine cones spread with peanut butter from trees.



BIRD JOURNAL

I found a:



Duck



Songbird



Shorebird

It is:



Small



Medium



Large

In its habitat I see:



Water



Grass



Sand



Trees

My Observations



This journal belongs to:

Grade:



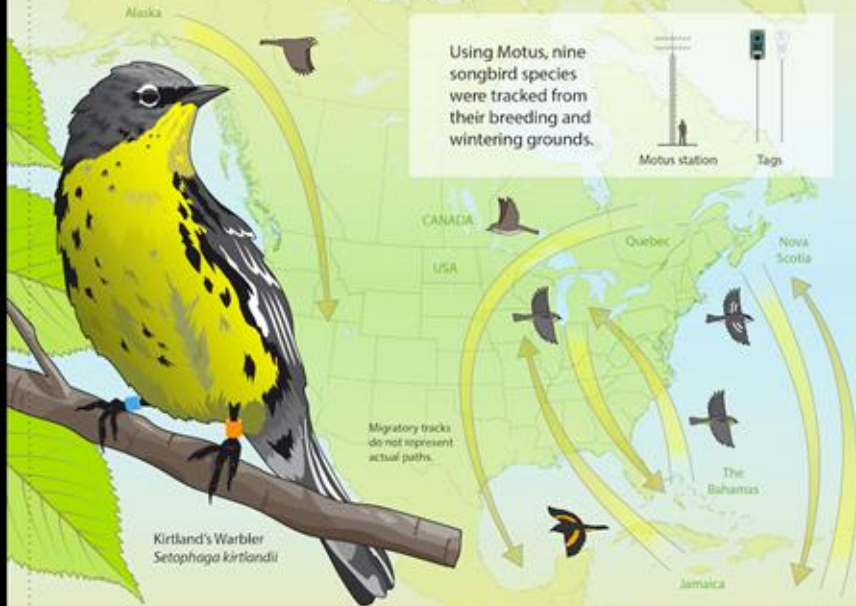
Smithsonian
National Zoological Park
Conservation Biology Institute

When Do Birds Migrate?

Tracking data reveal when and why songbirds begin their massive journeys

Every year, billions of birds fly thousands of miles to reach their breeding and wintering grounds. In two large collaborative studies, new information is revealed about when and why migratory flights are initiated.

Using Motus, nine songbird species were tracked from their breeding and wintering grounds.

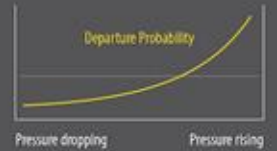


Kirtland's Warbler
Setophaga kirtlandii

KEY FINDINGS

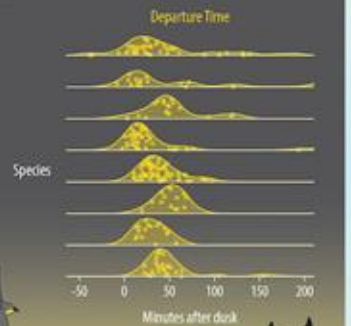
How birds decide to take to the sky

Birds depart when atmospheric pressure rises which means good weather in the days ahead



When birds take to the sky

90% of birds started their migratory flights within a 69-minute window after dusk to maximize flight duration



Cooper, N.W., B. C. Dossman, L. E. Berrigan, J. M. Brown, D. A. Cormier, C. Bégin-Marchand, A. D. Rodewald, P. D. Taylor, J. A. Tremblay and P. P. Marra. 2023. Atmospheric pressure predicts probability of departure for migratory songbirds. *Movement Ecology*. <https://doi.org/10.1186/s40462-022-00356-z>

Cooper, N.W., B. C. Dossman, L. E. Berrigan, J. M. Brown, A. R. Brunner, H. E. Chimura, D. A. Cormier, C. Bégin-Marchand, A. D. Rodewald, P. D. Taylor, C. M. Tonra, J. A. Tremblay, and P. P. Marra. 2023. Songbirds initiate migratory flights synchronously relative to civil dusk. *Movement Ecology*. <https://doi.org/10.1186/s40462-023-00382-5>

Smithsonian Conservation Biology Institute
Migratory Bird Center

BIRDS
CANADA OISEAUX
CANADA

Motus

Common Birds of British Columbia that do not migrate



Robin



Nuthatch



Chickadee



Sparrow



Pileated Woodpecker



Downy
Woodpecker



Red Finch



Flicker

Red Winged Blackbird





Blue Heron



Bald Eagle



Red tailed hawk



Peregrine
Falcon



Raven



Crow



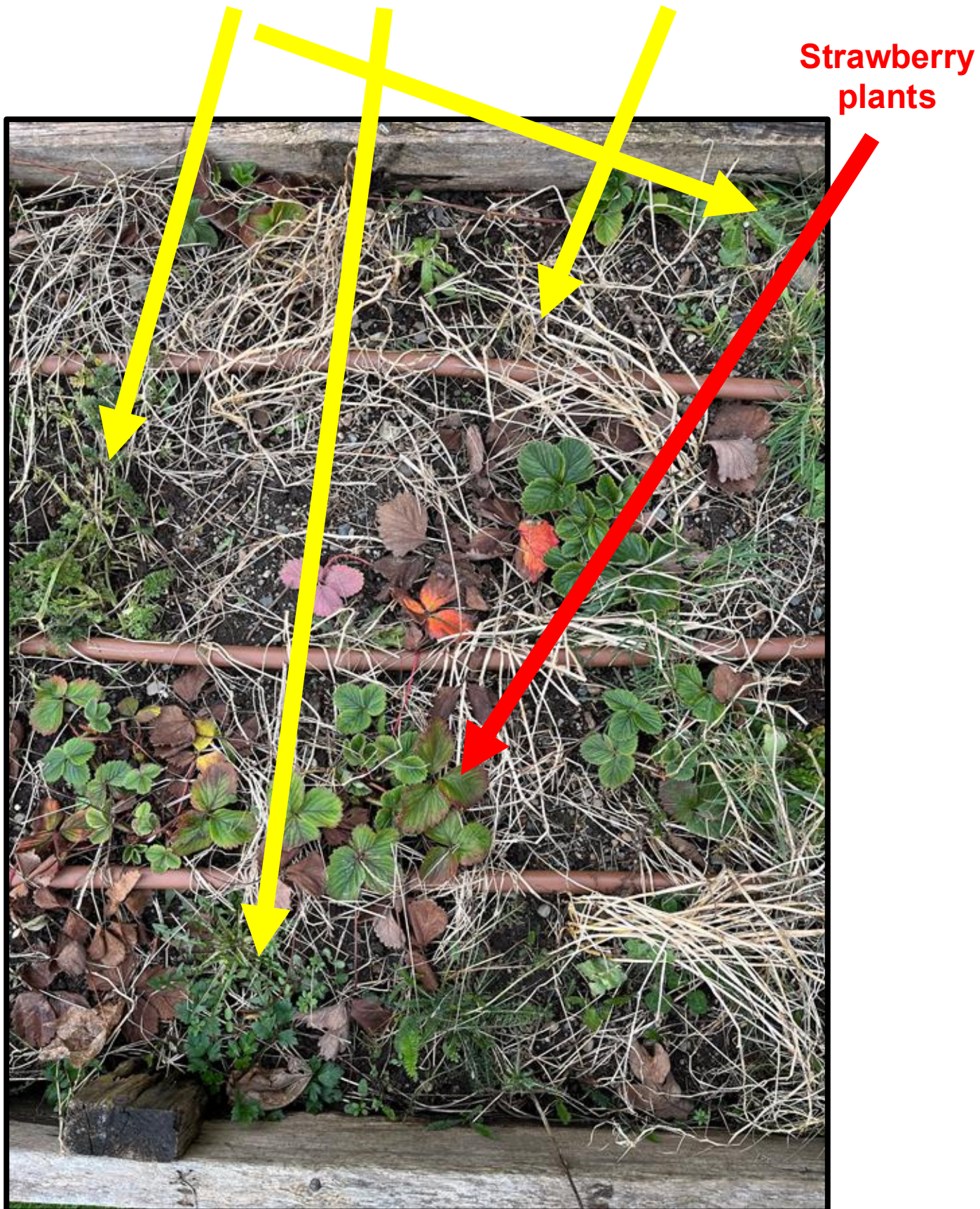
How to Identify Weeds

How can we learn to identify weeds we want to remove and plants we want to keep safe to grow?



Parsley

What is a weed? How can we know? ASK!



Job Cards



Raking
Leaves



Raking
Leaves



Raking
Leaves



Raking
Leaves



Raking
Leaves



Raking
Leaves



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Pulling
Weeds



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Nature
Journaling



Nature
Journaling



Nature
Journaling



Nature
Journaling



Nature
Journaling



Nature
Journaling



Nature
Journaling



Nature
Journaling



Watering
Plants



Watering
Plants



Watering
Plants



Watering
Plants



Watering
Plants



Watering
Plants



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Adult
Directed
Activity



Choice
Learning
Activity



Choice
Learning
Activity



Choice
Learning
Activity



Choice
Learning
Activity



Choice
Learning
Activity



Choice
Learning
Activity



Gardening Job Descriptions



Weeding Garden Beds

- Finding weeds that don't belong in the garden beds
- Putting them in compost bin #3



Watering Plants

- Using hose to fill watering cans and water the plants
- Any plants in the greenhouse that might need watering



Raking

- Raking leaves all around the garden
- Putting them into big piles
- Moving the piles to Compost Bin #3



Choice Learning

- Reading a book
 - Journaling
- Joining another job (raking, watering)



Adult Directed Task

- Speak to adult for a specific daily task



Nature Journals

- Sketch
- Draw the garden
 - Label
 - Measure
 - Colour
- Journal thoughts/feelings



Take home slip for Garden Harvest Party

Garden Harvest!

We are harvesting lettuce on Tuesday!

We will be having a salad lunch

Tuesday May 30th.

Please bring in a **small** portion of a salad topping. Please choose anything that you have at home to feed **4-5 people only**. Please have it already chopped/shredded/grated. With 44 students bringing something in, we will have lots!

Here are some ideas:

- Peppers
- Tomato
- Cucumber
- Carrot
- Quinoa
- Shredded/grated Cheese
- Feta cheese
- Radish
- Strawberry
- Blueberries
- Dressing
- Seeds (no peanuts)
- Dried fruit
- Croutons
- Bacon bits
- Other crispy bits

Garden Harvest!

We are harvesting lettuce on Tuesday!

We will be having a salad lunch

Tuesday May 30th.

Please bring in a **small** portion of a salad topping. Please choose anything that you have at home to feed **4-5 people only**. Please have it already chopped/shredded/grated. With 44 students bringing something in, we will have lots!

Here are some ideas:

- Peppers
- Tomato
- Cucumber
- Carrot
- Quinoa
- Shredded/grated Cheese
- Feta cheese
- Radish
- Strawberry
- Blueberries
- Dressing
- Seeds (no peanuts)
- Dried fruit
- Croutons
- Bacon bits
- Other crispy bits

Ice Breaker Games

Ice Breaker Games

Greetings	
Daily Greetings Stand/sit in a Circle	"Every morning, we are going to greet each other in a friendly and respectful way." ● Students need to look at each other. ● friendly tone, body language,
Ball Toss	After their greeting, child rolls/bounce/throwing ball to someone else. Game ends when ball is returned to the original person. Extension: do this again without talking and following the same pattern
Knock Knock	First greeter turns to her left and pretend to knock on the door. Teaches students last names. Knock Knock, Who's there? Maya, Maya who? Maya Gonzales, Good Morning Mya Gonzales!
Popsicle	Student grabs popsicle and greets the name on the popsicle. Greeting ends with last child greeting the first child.
Math Match Card	Math equations on one card and the answer on a different card. Each child is given one card. Mix and mingle to find your better half. Matched cards give each other a friendly greeting and sit down. Each group shares their equation.
Adjective	Greet with an adjective before their first name ex/ Hello, I'm energetic Eva!
Spider Web	Ball of yarn, toss to someone across the circle. The person who catches it holds on to some before throwing it to the next person. To undo the web students reverse the order.
Snowball	Everyone writes their name onto a scrap piece of paper and then scrunches it up and throws it into the center of the circle. Student who starts picks up a ball of paper, reads the name and then walks

Ice Breaker Games

Beginning of the year Clapping Names	Children clap out the number of syllables in each child's first name while everyone chants the name together. Go around in a circle until everyone has gone.
A Warm Wind Blows	Chairs around the circle, one less chair than students (use knee pads in the garden). Student without a chair stands in the center. They say "A warm wind blows for anyone who _ _ _ _ _" Categories should be brainstormed onto an anchor chart. Interests, hobbies, family rather than clothes or appearance. Move chairs if it applies to you
Cooper Says	The same as Simon Says but no one is out if they make a mistake. Student only follow the instruction if it begins with Cooper says. Try getting fast at it.
Hot and Cold	One child goes into the hallway. The teacher hides the class cougar. Class gives hot and cold signs to help the child in the hallway find the class cougar.
Nonverbal Birthday lineup	Students line up according to their month and day of birth without talking. Respectful expressions and body language. Other nonverbal lineup ideas??

