The Green Pages: EE K-12 Activities - Invertebrates

These activities were developed by Bruce Barbarasch, Maggie Byrkit and the staff of the Tualatin Hills Nature Center in Beaverton, Oregon. Illustrations by Abigail Marble.

GRADE K-2

Science

Bug Homes

Go on a collecting trip for small insects and spiders. Discuss with students what bugs need to survive. Do they need the same things that other animals need? How can we provide food, water, shelter and air for our "pet" bugs? Show students pictures of insects/spiders in natural habitats. Can we create a home for our bugs in the classroom that is as healthy as their outdoor homes? Why or why not? Have students build homes for the bugs using indoor and outdoor materials. How long should we keep our bugs inside before we release them back into the outdoors?

—Maggie Byrkit

Social Studies

Pollination

Bees are very important animals because they help to produce seeds and fruit that we eat. By transferring pollen from plant to plant, they help fruits and nuts to grow. Students probably realize that bees make honey, but they're not always aware that bees are really important to farmers. They're so important that they bring hives of honey bees out to their fields to pollinate their crops. Explain this to students by sharing some foods such as honey, apples and berries with your students. Ask students what might happen if we didn't have bees?

Mathematics

Building Bugs

Display pictures of insects, spiders and other bugs. How many legs do insects have? (Six) How many do spiders have? (Eight) Give teams of 2-3 students paper "bodies" and toothpicks in multiples of 6 or 8. Using these materials, how many insects or spiders can you build without leftover "legs"? Can you build some of each?

—Maggie Byrkit

Language Arts

Caterpillar to Butterfly

Read *The Very Hungry Caterpillar* by Eric Carle. This will introduce students to the life cycle of a butterfly. Read the story to the students, then have them make cards showing the stages of a butterfly life cycle. Review the four stages: egg, caterpillar, cocoon, and butterfly. Provide each student with glue, four 3"x 5" index cards, one button, a cotton ball, and a small piece of brown construction paper cut in an oval. First card- Draw and color a green leaf. Glue the button on the leaf to represent an egg. Second card- Draw and color some grass. Stretch the cotton ball and glue it on the grass to represent a caterpillar. Third card- Draw and color a brown branch with two green leaves on it. Glue the precut oval shape piece of brown construction paper on the branch to make it look like it is hanging from the branch. This represents a cocoon. Fourth card- Use crayons or markers to draw a butterfly.

Modified from: www.theteacherscorner.net/thematicunits/insects2.htm

Fine Arts

Moth Puppet

Make a moth finger puppet. Copy a moth drawing from an insect book onto card stock. Cut the silhouette out for students to use as a template. Give each student a swatch of felt and a marker. Have them trace the template onto the felt and cut out the outline. Centered about a half inch below the head and above the tail, make parallel marks about a half inch long. Cut along the slits to make holes for a finger. Insert finger through both holes and flutter away.

GRADE 3-5

Science

Life Stage/Metamorphosis Game

Do butterflies begin life as butterflies? (No, first they are caterpillars.) Where do caterpillars come from? (Eggs.) How do caterpillars change into butterflies? (Building pupae, changing inside.) This change is called metamorphosis. So the 4 stages to a moth's life are egg, larvae

(caterpillar), pupae (metamorphosis stage), and adult.

To play the game students start their moth "life" as eggs. Students represent eggs by forming an O with their arms above their bodies. To advance to the other stages of life, students wander around and find a partner in the same stage and play rock-paper-scissors with that person. The winning partner advances on to the next life stage, and the loser stays in the same stage. Larvae can be represented by a whole-body wiggle motion, pupae by arms folded across the body, and adult butterflies by arms outstretched and flapping. Students who become butterflies continue to play until they win another game of rock-paper-scissors and then start over as eggs. Set a time limit of 5 minutes and have students try to complete as many moth "lives" as they can.

—Maggie Byrkit

Social Studies

Careers with Invertebrates

Invertebrates are a huge group of animals that are very much a part of our lives, whether we like it or not. Because of this, there are a lot of jobs that deal directly or indirectly with invertebrates. Can students think of some? How do these jobs relate to invertebrates? A few examples include bee keeper, agricultural extension agent, farmer, exterminator, lobster fisherman, forester...

Mathematics

Fact or Fiction?

Come fall, people across North America often begin to see large numbers of woolly bears- the black and orange caterpillar of the Isabella moth. Legend has it that the amount of black on the caterpillar indicates the severity of the upcoming winter. Scientists believe that this is really a sign telling how close the caterpillar is to being fully grown and therefore how close it is to seeking a winter resting place. Have students go out and measure the lengths of the animals and their colors. Are they all the same? If you're ambitious you could do this annually and have students compare their data from year to year against winter weather records. Is there a correlation?

Info from The National Audubon Society Field Guide to North American Insects & Spiders

Language Arts

Good or Bad?

Have students brainstorm a list of words they associate with invertebrates. Write the responses where students can see them. Afterwards, sort them into categories such as positive, negative and neutral. Discuss: Where did most of the words end up? Why? What are some of the benefits of insects? (Ex: honey, pollination, food for many animals, break down dead plant and animal matter, predatory insects control pests) What are some of the problems they cause?

Fine Arts

Climbing Spiders

Use colored construction paper, 1-2mm diameter string, drinking straws, paper clips, stapler and tape.

1. Cut out small, medium and large circles or ovals of construction paper for head, thorax and abdomen. Abdomen should not be larger than 6" in diameter.
2. Cut out rectangular strips of paper for legs and thin strips for antennae.
3. Tape or staple body parts together, overlapping the head/thorax pieces and the thorax/abdomen pieces slightly.
4. Tape Ω of a drinking straw (about a 4" section) vertically on the thorax of each spider.
5. Cut a 36-48 inch length of string for each spider.
6. Fold the string in half and thread the folded end through the straw section, with the folded end coming out towards the head of the spider.
7. Attach a paper clip to the folded end of the string. Wrap tape on the string below the paper clip so that the string will not slip. Paper clips tied onto the loose ends of the string might be helpful so that spiders don't slip off.
8. Hang the spiders off a table, shelf or door frame. Students can make their spiders climb by pulling the strings apart. Having trouble climbing high? Have two students work together to pull the strings further apart.

—Maggie Byrkit

GRADE 6-8

Science

Pitfall Traps

Many people are surprised to discover just how many different types of ground dwelling beetles and other invertebrates that can be found on the forest floor or in a garden bed. Many of these hunt by wandering around, cris-crossing an area until they find prey. By building a simple pitfall trap, you can utilize the beetles' apparently aimless wandering to catch them and find out for yourself the amazing mini-beasts that are living, quite literally, in your backyard.

Get two stackable, 12 oz., plastic cups (Plastic cups have slippery sides that the beetles can't climb up.) These cups will form the pit into which the critters will fall. Put one cup inside the other, then dig a hole in the ground and bury them so that the lip of the top cup is level with the ground surface. Fill the dirt in around the cup so that there are no gaps around the outside of the lip and the ground is smooth. Using a few stones and flat piece of wood, make a lid that sits about a half inch off the ground and covers the cups. This will keep rain and larger animals like a shrew from falling in while allowing smaller invertebrates to be trapped. You must check your traps at least

every 24 hours (preferably more often) to prevent the captured animals from starving. When you go to check your traps take spare cups so that you can take the top cup out of traps with beetles and replace it with a spare one. When you have inspected the captured critters, you can release them.

Social Studies

Reporter!

Pretend that you are a news reporter. Interview three people about their attitude towards invertebrates. Are they useful? Why or why not? Helpful or harmful? Explore their answers with more questions.

Mathematics

Lots of Bugs!

The honey bee queen (Apis mellifera), can produce up to 200,000 eggs each year (Bodenheimer & Nerya 1937), and has a life span of 3-4 years. How many eggs could this bee produce in a lifetime? Other insects such as the African driver ant *Dorylus wilverthi* can lay broods with up to 3-4 million eggs every 25 days. How many eggs could this ant produce in a year? If these insects can reproduce in such large numbers, why isn't the world overrun with them?

facts from:http://gnv.ifas.ufl.edu/~tjw/recbk.htm The University of Florida's Book of Insect Records

Language Arts

It's Up to You

Imagine that the ACE Chemical Company has just developed an insecticide that will kill any bugs in an area where it is sprayed. They claim this is the product of the millennium because it will not harm plants, animals or people and it is very inexpensive to create. Cities across the continent are considering buying and using it. You are an expert ecologist. They want your approval before they begin to spray. What would you tell them?

Fine Arts

Build a Bug

Invertebrates have some amazing color adaptations that help them to survive by camouflaging themselves or by using bright colors to announce how toxic they are. Have students build a life sized organism, real or imagined that shows one of these adaptations. Place their creations in an outdoor area and see how many the students can find.

GRADE 9-12

Science

Cricket Behavior

Crickets are fascinating creatures that are easily obtained at pet stores. Get a field guide. What's are the physical differences between males and females. Once you've mastered the difference, set up a terrarium and conduct a study of the mating behavior of the crickets. Are certain animals dominant over others? When do they chirp? Do both sexes chirp? Design an inquiry based experiment. Have students collect data pertaining to their hypothesis. For more detailed information, check out: www.master.ph.utexas.edu/CTC/JMcFarland/mcfarland/insects/labs/CrikTalk

Social Studies

Frankenstein Foods?

There has been a lot of controversy in the news over the last year about genetically modified (GM) foods. People on one side of the issue argued that it is easier to grow GM foods since they are more resistant to pests while others said we don't know enough about their effects on humans and other animals. Several reports noted that the pollen from certain strains of GM corn were had the potential to kill butterflies. Do some research and find out the facts of the story and the present scientific opinion about genetically modified foods. Should we continue to grow these plants? Why or why not?

Mathematics

Pesticides

Investigate the amount of pesticides used each year in the United States. Figure out the year we started using them and research the amount used per year. Find out the human population and calculate the number of pounds of pesticides used per person. When did we start using pesticides? At what rate do they decay? How much might be accumulated in the soil of a farm field? An apartment house?

Language Arts

Bee Poetry

Sylvia Plath was a writer who lived a tumultuous life. She married writer Ted Hughes. Read *The Bee God*, from Hughes' poetry book Birthday Letters (1998) and compare these writings to Plath's poems about bees such as *The Arrival of the Bee Box, Stings*, or *The Bee Meeting*.

Fine Arts

Chocolate Chirpie Chip Cookies

Are bugs good to eat? People in Africa and South America relish insects, but people in North America aren't always so fond of them. Try this recipe and see if your attitude doesn't change.

Ingredients:
2 1/4 cup flour
1 tsp. baking soda
1 tsp. salt
1 cup butter, softened
3/4 cup sugar
3/4 cup brown sugar
1 tsp. vanilla
2 eggs
1 12-ounce chocolate chips
1 cup chopped nuts
Ω cup dry-roasted crickets

Directions:
Preheat oven to 375. In small bowl, combine flour, baking soda and salt; set aside.
In large bowl, combine butter, sugar, brown sugar and vanilla; beat until creamy.
Beat in eggs. Gradually add flour mixture and insects, mix well. Stir in chocolate chips. Drop by rounded measuring teaspoonfuls onto ungreased cookie sheet. Bake for 8-10 minutes.

Iowa State University's Tasty Insect Recipes http://www.ent.iastate.edu/misc/insectsasfood.html