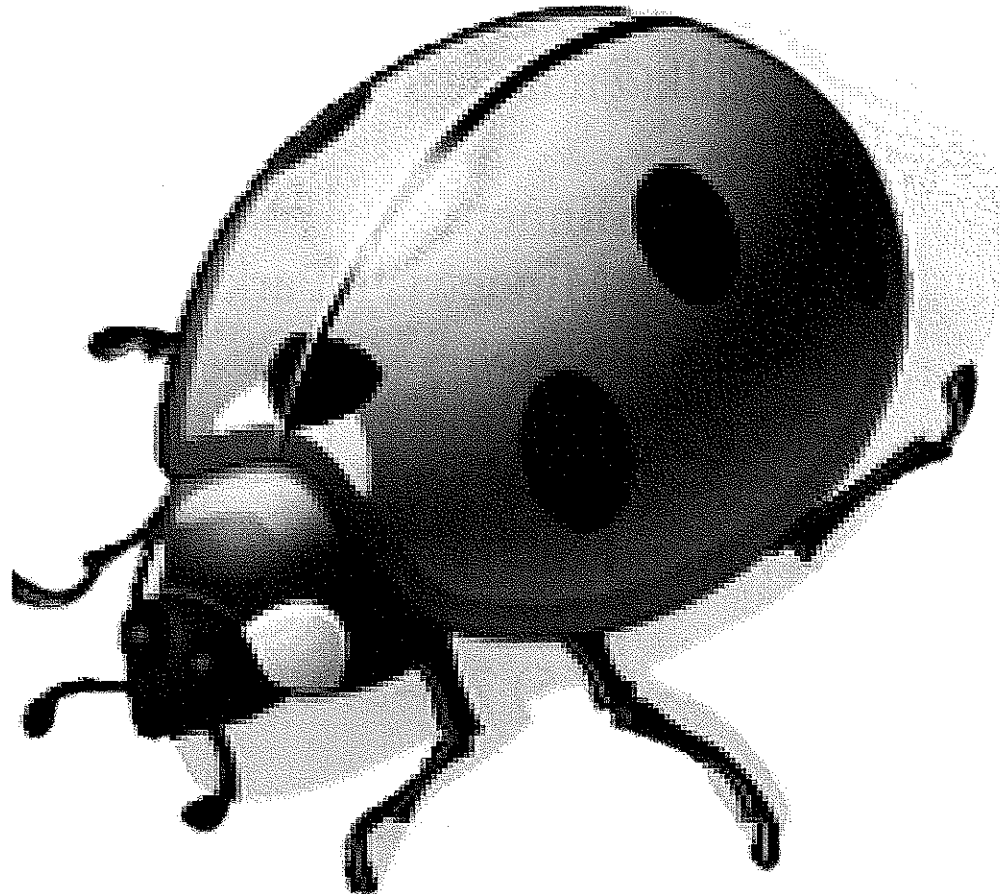


# Creepy Crawlies



Teacher's Packet  
State Standards Included!

 **Minnetrستا**

NATURE • HISTORY • GARDENS • ART

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## **About Minnetrista**

Minnetrista is located along the banks of the White River on a campus of more than 40 acres. The Ball family purchased most of the land along the north bank of the White River between Wheeling and Granville pikes in 1893. The name chosen by the family for the property was taken from a Sioux word, “mna” (pronounced mini) which means “water,” and combined with the English word, “tryst,” to form “Minnetrista,” or, “a gathering place by the water.” Eventually the Ball brothers children decided to turn the site of the Minnetrista home into a center to preserve the culture of the area. Ground was broken March 14, 1987 and Minnetrista Cultural Center opened December 10, 1988. George and Frances Ball’s home, Oakhurst, was opened to the public in 1995 to provide additional educational opportunities. Minnetrista’s campus now includes eight major buildings, a historic home, Nature Area, numerous gardens and sculptures and a portion of White River Greenway.

### **Mission Statement**

Minnetrista creates awareness, understanding and appreciation of the natural heritage and cultural heritage of East Central Indiana.

Minnetrista is a non-profit, charitable organization governed by a board of community leaders from seven counties across East Central Indiana.

### **Our Educational Values**

We believe in learning through having fun.

We adapt programs based on the audience needs.

We use teacher responses and feedback to improve our programs.

We encourage active participation.

We strive to deliver accurate, researched information in our programs.

We strive to inspire imagination.

We encourage appreciation for learning.

## What to Expect on the Creepy Crawlies Tour

If you're scared of spiders, itchy about insects, or cringe at things that crawl, then this is the program for you! We'll teach you all about the amazing and important world of nature's most prominent, yet misunderstood animal populations.

We will rotate your students through several stations. Each station is detailed in the following description. Students will walk outside to get to each station. Please make sure your students are dressed for the weather.

- |   |                                 |                   |
|---|---------------------------------|-------------------|
| <b>MCC Lobby</b>  | <b>Introduction</b>             | <b>5 minutes</b>  |
| Students will learn what an entomologist is and start to identify the differences between those crawlies that are insects and those that are not. Students will also learn the tools entomologists use to study crawlies. |                                 |                   |
| <b>L.L. Slideshow</b>   | <b>What's that on My Leg?</b>   | <b>15 minutes</b> |
| Students will learn the different parts of an insect. Students will determine what crawlies are insects and which are not with our model crawly collection.   |                                 |                   |
| <b>Ed Center</b>  | <b>Insect Lifestyles</b>        | <b>15 minutes</b> |
| Students will learn the life cycle of crawlies. Students will play the metamorphosis relay.   |                                 |                   |
| <b>Discovery Circle</b>   | <b>Stop and Smell the Roses</b> | <b>15 minutes</b> |
| Students will learn why crawlies are important. Students will learn what pollination is and play the Pollination Game to see how pollination works.   |                                 |                   |
| <b>L.L. Classroom</b>   | <b>Crawly Craft</b>             | <b>15 minutes</b> |
| Students will participate in a craft activity.  |                                 |                   |
| K-2: Mosquitoes   | 3-5: Beetles                    |                   |
| <b>Oakhurst Gardens</b>   | <b>Bug Hunt</b>                 | <b>15 minutes</b> |
| Students will use magnifying glasses to look for evidence of bugs and other creepy crawlies.  |                                 |                   |

**\*Please dress appropriately as portions of this tour will be outside.**

**\*Please arrive on time. Those who arrive late may receive a shortened program.**

## **Creepy Crawlies Tour Standards**

### Kindergarten

Language Arts	K.2.2, K.4.8, K.7.1
Science	K.1.1, K.1.2, K.2.1, K.4.1, K.4.2
Mathematics	K.1.1, K.1.3, K.1.6, K.1.9, K.2.1, K.3.1

### 1<sup>st</sup> Grade

Language Arts	1.4.4, 1.4.6, 1.2.4, 1.7.1, 1.7.4, 1.7.5
Science	1.1.2, 1.1.3, 1.1.4, 1.2.5, 1.3.4, 1.4.2, 1.4.3, 1.4.4, 1.6.1
Mathematics	1.1.1, 1.1.2, 1.2.1, 1.4.3, 1.4.5
Social Studies	1.3.6

### 2<sup>nd</sup> Grade

Language Arts	2.2.8
Science	2.1.2, 2.3.4, 2.4.1, 2.4.4, 2.5.6, 2.6.1, 2.6.2, 2.6.3

## Background Information

The following are a list of definitions used when talking about various creepy crawlies.

- 1) **Abdomen**-The elongate hind part of the body, behind the thorax
- 2) **Antenna** - Sense organ on the head of an insect. In Monarch larvae, these are often confused with the tentacles or filaments. Larval antennae are very small while adult ones are much longer.
- 3) **Aposematic Coloration** - Aposematic coloration is conspicuous, bright coloration that protects an organism, whether or not the organism contains poisons or other noxious chemicals. This term is often used in the context of mimicry to describe the bright colors of both poisonous species and their palatable mimics.
- 4) **Camouflage**- Camouflage is concealment by coloration, pattern, or shape that makes something hard to pick out of the background or makes it appear to be something else. In the animal world, camouflage often involves looking like a plant (a leaf, stem, twig, etc.), an inanimate object (a stone, bird droppings, dirt), or a larger animal (e.g., eyespots on wings).
- 5) **Cardiac Glycosides** - (KAR-dee-ak GLI-coh-sides)- Cardiac glycosides (also called cardenolides) are heart poisons that seriously affect vertebrates. They are related to digitalis, a chemical from the foxglove plant that is used in medicine to treat heart disease but can also be poisonous in large doses. Milkweed plants make these chemicals, probably to protect them from being eaten. Certain insects, including monarch butterflies, have evolved mechanisms to consume these chemicals and sequester them in their bodies without harming themselves.
- 6) **Caterpillar**- The second stage, after the egg, in metamorphosis. Also known as larva.
- 7) **Chrysalis** - (KRISSE-uh-lis)-Another name for a butterfly pupa.
- 8) **Cocoon**- A silk web that encloses the pupae of many moths.
- 9) **Diapause** - (DI-uh-pawz)- A period of dormancy between periods of activity.
- 10) **Eclosion** - (i klozh'n)- An entomological term; the emergence of an adult insect from its pupal case -or- the hatching of a larva from its egg.
- 11) **Egg**-The first stage of development during the lifecycle of many insects. Each egg is surrounded by a hard outer shell, called the chorion, to protect the developing larva. The shell is lined with a layer of wax, which helps keep the egg from drying out. The raised areas on an egg shell are called ridges. They are formed inside the female before she lays the egg.
- 12) **Emerge**-When the adult butterfly hatches from the chrysalis. See **eclosion**.
- 13) **Exoskeleton**- A hard skeleton located on the outside of an invertebrate's body (in contrast to the internal skeleton of vertebrates) that protects it and serves as a point for muscle attachment. Arthropods and mollusks have exoskeletons. Arthropod exoskeletons are made of a substance called chitin, similar to fingernails, while mollusk exoskeletons are made of the mineral calcium carbonate.

- 14) Frass-** The waste product of an insect.
- 15) Host-**A human, animal, plant, or other organism in or on which another organism, especially a parasite, lives. The milkweed plant is the host plant of the monarch caterpillar. This is the only plant a monarch caterpillar will eat.
- Instar-** A period between larval molts. There are five of these periods in the growth of a Monarch larva.
- 16) Larva -** (LAR-vuh), plural, larvae (LAR-vee)- The second stage, after the egg, in metamorphosis. Also known as caterpillar. Monarchs molt five times in their larval state, which lasts about 9-14 days.
- Larvae have three distinct body parts. They have a head, and a body with a thorax and an abdomen. The head has a pair of very short antennae, mouthparts (upper lip, mandibles, and lower lip), and six pairs of very simple eyes, called ocelli. Even with all of these eyes, the caterpillar's vision is poor. The antennae help to guide the weak-eyed caterpillar and the maxillary palps, which are sensory organs, help direct food into the larva's jaws.
- Each thoracic segment has a pair of jointed, or true legs, while some of the abdominal segments have false legs, or prolegs. There are usually five pairs of prolegs. The prolegs have tiny hooks on them that hold the larva onto its silk mat or leaf. The fleshy tentacles at the front and rear ends of Monarch larvae are not antennae, but they do function as sense organs.
- 17) Lepidoptera -** (lep-uh-DOP-ter-uh)- The group or order of insects that is made up of butterflies and moths. This word should be capitalized, but the adjective lepidopteran should not.
- 18) Lepidopterist-** Lepidopterists are scientists who study butterflies. Some famous lepidopterists include Vladimir Nabakov and Sir Walter Rothschild. Well-known monarch scientists are Fred Urquhart and Lincoln Brower.
- 19) Mandibles-** Strong "jaws" on the larval head.
- 20) Maxillary Palp-** Small sensory organs on the larval head, below the mandibles, that may help direct food into the larva's jaws.
- 21) Metamorphosis -** (met-uh-MOR-fuh-sis)- The series of developmental stages through which insects go to become adults. Through metamorphosis a butterfly is transformed from an egg, to a larva, to a pupa, to a butterfly.
- 22) Migration-**Typically refers to the movement of animals from one place to another. Migration usually takes place during seasonal and temperature changes. Animals move to more hospitable places where food can also be found.
- 23) Milkweed-**Monarch larvae appear to feed exclusively on milkweeds (Asclepidaceae). There are approximately 108 species of Asclepias and several genera of viney milkweeds in North America and Monarch larvae have been observed feeding on many but not all of these species. Milkweed is a perennial plant, which means an individual plant lives for more than one year, growing each spring from rootstock and seeds rather than seeds alone. In the Midwest, milkweeds were historically common and widespread on prairies, but habitat destruction has reduced their range and numbers.
- 24) Mimicry-** Mimicry is the close resemblance of one organism (the mimic) to another (the model). In many cases, predators learn to avoid certain prey items

after having a bad experience with them (such as throwing up, being stung, or harmed in another way). Mimics can take advantage of this learning; even if they are not harmful, a predator will avoid them if they look enough like a harmful model. Mimicry is common in butterflies in moths, which may mimic distasteful butterflies and moths, or even unrelated species such as wasps and spiders.

- 25) **Molting**- The shedding of skin. A monarch larva molts as it grows and becomes too large for its former skin.
- 26) **Nectar**-Nectar is the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination. Monarch butterflies drink this nectar.
- 27) **Nectaring**-Nectaring is the act of drinking and consuming nectar.
- 28) **Ocellus** - (o-SEL-us)- Simple eyes of some insects. Monarch larvae have 12 ocelli.
- 29) **Overwintering Colonies**- The two populations of monarch butterflies (west of the Rocky Mountains and east of them) overwinter in California and Mexico respectively. In California, monarchs overwinter in sheltered bays and inland areas along the coast, roosting in eucalyptus trees, Monterey pines, and Monterey cypresses. The eastern population, which constituted 95% of the North American monarch population, migrates to central Mexico. They roost in trees in the mountain ranges. The sites they choose must have trees and underbrush for resting on; cool temperatures but protection from snow and wind; water from clouds and fog; and nearby streams for additional water sources. These roosts were discovered by the scientific community in 1975 (although local villagers had known about them before that) after several years of following tagged butterflies.
- 30) **Pollination**-Many species of butterflies eat plant nectar. When these butterflies land on a series of flowers in search of food, they brush their bodies against both male and female floral organs, inadvertently transferring pollen from one flower to another. This transfers of pollen is known as pollination. **Proboscis** - (pro-BAHS-kiss)- The adult Monarch's feeding tube, for sucking nectar, which is coiled under the head when not in use.
- 31) **Prolegs**- The "false" legs on the abdominal segments of the Monarch larva. Only the three pairs on the thorax will become legs in the adult Monarch.
- 32) **Pupa** - (PU-puh)- The third stage in metamorphosis, after the larval stage. In Monarchs this stage lasts 8-13 days. When it pupates, a Monarch larva splits its exoskeleton and wiggles out of its larval skin. When this skin moves far enough down the body, the cremaster appears. The cremaster is a spiny appendage at the end of the abdomen. The Monarch hooks its cremaster into a silk pad spun by the larva just before pupation; it will hang from this until it emerges as an adult. The freshly exposed pupa is very soft and delicate until it hardens. You can see many different body parts on the pupa, including the wings, abdomen, legs and eyes.
- 33) **Pupate** -To change from a larva (caterpillar) to a pupa (chrysalis).

- 34) Roost**-A place where an animal like a bird or a butterfly rests or sleeps such as a perch or a tree branch. Monarchs roost together in oyamel fir trees in their overwintering sites in Mexico in massive clusters of butterflies.
- 35) Scales** -Overlapping pieces of chitin (the same material of which exoskeletons are made) that insulate butterflies' bodies and wings, improve their aerodynamics, and give them color and markings. Many people think the scales look like fine dust on butterfly wings.
- 36) Spinneret**- The organ on the bottom of the larva head from which silk is spun. This is the only silk-producing organ in the larvae.
- 37) Spiracles** - (SPEER-uh-kulls)- Openings on the thorax and abdomen of insects through which gases are exchanged with the outside air. These lead to long air tubes, or tracheae, that run throughout the body.
- 38) Tagging** -The monarch butterfly is affixed with a sticker. The sticker has a number or code that corresponds to written documentation kept on a data sheet. Monarchs are tagged in the fall. The tagging program provides the basis for assessing the impact of human activities on the Monarch population; allows us to monitor the patterns of the migration and characterize the year to year changes in the population; generates data that can be used as the basis for conservation efforts; engages an increasing number of citizen scientists in an endeavor to monitor and conserve the Monarch population; and connects an increasing number of people with one of the world's magnificent migrations and significant conservation issues.
- 39) Tarsus** - (TAHR-suhs)- The second-to-last segment of insect legs (analogous to human toes). Butterflies stand and walk on their tarsi.
- 40) Tentacles**- The fleshy black extensions at the front and rear of the Monarch larvae, which function as sense organs. Also called filaments.
- 41) Thorax**- The middle section of an insect's body. The wings (if present) and legs are attached to this segment.
- 42) Tracheae** - (TRAY-kee-uh)- Airtubes that run through insects' bodies, delivering oxygen to cells, tissues, and organs.
- 43) True Legs**- Jointed appendages located on the thoracic segment of a larva. Contrast with prolegs.
- 44) Viceroy**-A butterfly that mimics the Monarch butterfly. Upperside is orange and black and resembles a Monarch except the Viceroy has a black line across the hindwing and a single row of white dots in the black marginal band. Viceroys are also smaller than Monarchs. See **mimicry**.
- 45) Warning Coloration**- Warning coloration (sometimes called aposematic coloration) is conspicuous, bright coloration that protects an organism. This bright coloration advertises poisons or other harmful defenses to potential predators.

## Pre-Visit Teaching Activities

### Creepy Crawly Walk

**Supplies:**

Stop watch

Magnifying glasses

Nets

Bug catchers

Graphing Activity sheet (attached)

**Method:**

Take your class on a nature walk. Use magnifying glasses, nets, and bug catchers to get a closer look at the crawlies you find on your walk. Try to identify various insects and other crawlies on your walk. (Insect Field Guides are a great source for identification.)

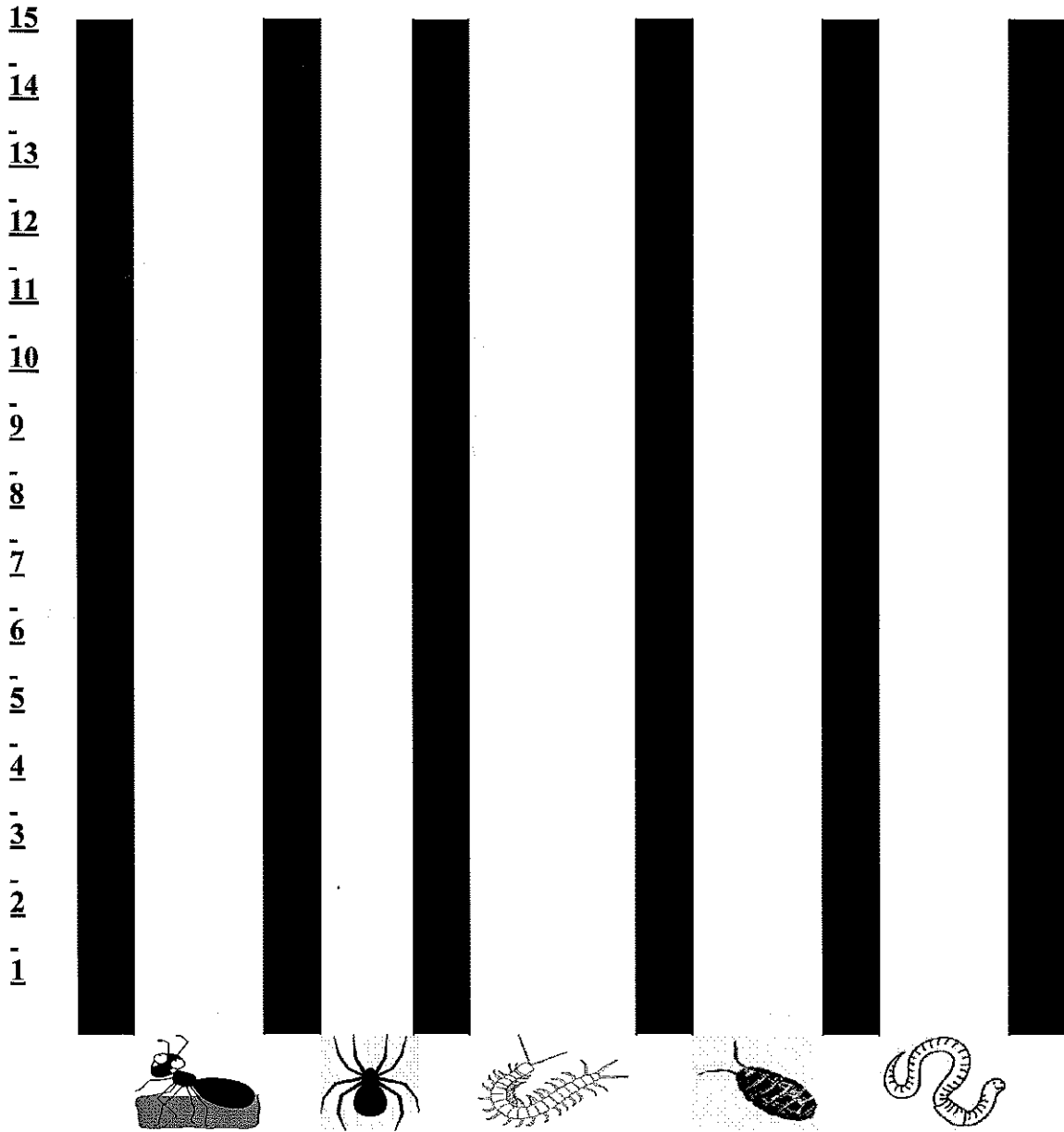
Collect data on the type and number of bugs you find on your walk, using the graphing activity included. Use a stopwatch to give students two minutes to find as many bugs as they can during the time limit. Keep a tally of how many and which bugs you find. Then graph your findings. Explain to children how important it is for scientists to do this kind of research. It helps to determine what kind of creatures we have living in an area and how many we have.

**Standards:**

*Science-* K.1.1, K.2.1, K.4.1, K.4.2, 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.1, 1.2.2, 1.2.5, 1.2.6, 1.3.4, 1.5.2, 2.1.2, 2.1.6, 2.3.4, 2.4.1, 2.4.2, 2.4.3, 2.5.6, 3.1.2, 3.1.3, 3.4.1, 3.5.3, 4.4.2, 4.5.4, 5.4.7

*Math-* K.1.1, K.1.6, 2.1.1, 2.1.11, 2.1.12, 5.6.1

A good scientist keeps data about nature. Make a **bar graph** of how many bugs you can find.



## Crawly Anatomy

### Supplies:

“Cootie” Game

Paper

Crayons

### Method:

Use the “Cootie” Game insects to teach children about the anatomy of insects. Explain the body parts: one head, thorax, and abdomen, two antenna and eyes, six separate legs. After explaining the different body segments, use paper and crayons to have students draw and label the different body parts. Then have the children put together the “cootie” and figure out what kind of insect they created.

For older children, explain the difference between an insect and an arachnid. Arachnids would have one cephalothorax and abdomen, no antenna, eight eyes and eight legs.

Explain to the children how the two are different.

### Standards:

*Science-* K.1.1, K.2.2, K.6.1, 1.1.1, 1.5.3, 1.6.1, 2.2.4, 2.2.5, 2.4.1, 2.6.1, 2.6.2, 3.2.6, 3.4.1, 3.4.2, 3.6.3, 5.4.7

## Post-Visit Teaching Activities

### Plant a Butterfly Garden

#### Supplies:

Outdoor place to plant garden

Shallow dish

Flowers

Gardening tools

#### Method:

Discuss with the children that all living things need food, water, shelter, and space in order to survive. This includes all of the insects we have around our school.

Find a location outside to build a habitat suitable for a butterfly. You will likely need support from the principal and grounds supervisor to complete this project. Discuss with the class the types of things you would like to include in your butterfly garden. Keep these suggestions in mind, while making your decisions.

Butterflies need plenty of sunlight; because they are cold blooded they need the sun to warm their body for daily activities. Plant your garden in an open area and place a rock or sandy area for the butterflies to bask.

Water plays a very important part in all animals' lives. Butterflies do something call "mud-puddling" where they will land on moist soil or sand and absorb the water and minerals they need without directly being in the water. Provide a shallow dish in garden for the butterflies to land.

Food is another thing that is very important to all animals'. Butterflies depend on nectar from flowers as a food source. Here is a list of flowers butterflies are attracted to.

- Yarrow, Milkweed, Hollyhocks, Black-eyed Susan, Butterfly weed, Dahlia, Sunflower, Daylily, Primrose, Petunia, etc.

You can also purchase a butterfly feeder as an extra source of food.

Butterflies also need shelter to protect themselves from any predators, wind, or rain. Choosing a location with shrubs or trees around the area will

provide the shelter they need. Letting your garden overgrow will also give them lots of safe places to sit in safety.

(If you do not have a place to plant a butterfly garden you can always plant miniature ones in milk jugs for the children to take home.)

**Standards:**

*Science-* K.1.1, K.4.2, 1.1.3, 1.3.2, 1.3.3, 1.3.4, 1.4.2, 1.4.3, 1.4.4, 2.3.4, 2.4.1, 2.4.2, 2.4.3, 3.1.5, 4.4.2, 4.4.3, 4.4.4, 5.4.4, 5.4.5

## Classroom Ant Farm

### **Supplies:**

Ant Farm

### **Method:**

Purchase an ant farm online or from a local garden shop. The ants are usually mail order ants, but they send a bunch so you will have a good variety for your farm when they arrive. Work with your class to put together the ant farm, discussing how all animals need food, water, and shelter to survive.

Once your ants have arrived carefully place them in the farm. It is important to continue to provide them with the necessities they need to survive.

Assign students daily or weekly jobs of feeding and watering the ant farm. Watch and observe how the ants move. Where is the queen in the colony? How is she different from male ants? Who does the digging for the colony? Discuss how the ants are interacting in a community, where different ants have different roles, just like people in a community.

### **Standards:**

*Science-* K.1.1, K.3.2, 1.1.2, 1.4.4, 2.4.1, 2.4.3, 3.4.1, 4.4.2, 4.4.3, 4.4.4, 5.4.4, 5.4.5

*Social Studies-* K.4.3

## Vermi Composting

### **Supplies:**

Plastic tote with lid  
Newspaper  
Soil  
Worms  
Food scraps

### **Method:**

Use your plastic tote as a habitat for the worms. Cut holes in the lid and use shredded newspaper and a couple of handfuls of soil to provide grit for the worms' digestion. Be sure to moisten the bedding material before placing it in the bin. You can purchase worms from any store that sells live bait, red wigglers work best. Place worms inside the habitat and observe.

As your worms get comfortable you can start to place food scraps like vegetables, fruit, egg shells, tea bags, and coffee grounds. Avoid things like meat, dairy products, oily foods, and grains. These can attract flies. Be sure to cover your scraps with some of the bedding each time you add some to the tote.

Explain that by the worms eating our food waste we are recycling the organic waste into compost, which allows us to return badly needed organic matter to the soil. In this way, we participate in nature's cycle, and cut down on garbage going into landfills.

### **Standards:**

*Science*- K.1.1, K.4.2, 1.1.1, 1.1.2, 1.1.3, 1.4.3, 1.4.4, 2.3.4, 2.3.5, 2.4.1, 2.4.3, 2.4.5, 2.5.3, 3.1.1, 3.1.8, 4.4.3, 4.4.4, 4.4.6, 4.4.9, 5.1.6

## **Bibliography & Teacher Resources**

Sandra Dee's How to Butterfly Garden

<http://hometown.aol.com/sndrad67/butterfly/index.html>

This site offers information on how to plant a butterfly garden.

Teachingheart.net

<http://www.teachingheart.net/teachinsects.html>

This site is a good resource for easy and fun insect crafts.

Composting with Red Wiggler Worms

<http://www.cityfarmer.org/wormcomp61.html>

This site offers information on how to compost with worms. It goes through the process step by step.