



## Growing the Future by Teaching Children in the Gardens

granny@grannysgardenschool.org

20 Miamiview Lane, Loveland, OH 45140  
[www.GrannysGardenSchool.org](http://www.GrannysGardenSchool.org)

513-324-2873

### Early Spring Invertebrates Grade Four

#### Lesson Summary

##### When to use this lesson

Use this lesson in early spring to begin observations about seasonal changes in nature.

##### Objective

Students will tally invertebrates as insect or non-insect and record air and soil temperatures to understand how temperature affects animal activity.

##### Standards

S4E4. Students will analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes.

- Identify weather instruments and explain how each is used in gathering weather data and making forecasts (thermometer, rain gauge, barometer, wind vane, anemometer).
- Using a weather map, identify the fronts, temperature, and precipitation and use the information to interpret the weather conditions.
- Use observations and records of weather conditions to predict weather patterns throughout the year.
- Differentiate between weather and climate

##### Materials

- Compost thermometer to measure soil temperature
- Air thermometer
- Worksheet for each student
- Clipboard for each student
- Pencil for each student
- One collection box for each team of students
- Garden organisms folder, optional
- Ground organisms folder, optional

##### Estimated Duration

30 minutes

#### Invertebrate Discussion

- **What are invertebrates?** Animals like insects, worms, and pillbugs are called invertebrates – animals that do not have a backbone. Invertebrates need energy from the sun or their surroundings to warm their body temperature. Animals that need heat from outside their body to be warm are called cold-blooded. Cold-blooded animals are not active if they are too cold. Mammals (like people) and birds are warm-blooded because their body temperature is regulated inside their body.

- **What do invertebrates do in the winter?** Some adult invertebrates seek shelter in tree or rock cracks or in leaves and go into a rest period called diapause. Diapause is similar to hibernation, except that animals in diapause do not grow. The animal loses water from their bodies so they don't burst when the water freezes. Some invertebrates spend the winter in the egg or pupa (cocoon or chrysalis) stage where the animal is protected. So, depending on the invertebrate, seasonal changes can be harmful to the animal if the life cycle stage is not adapted to survive.
- **Do all invertebrates need the same amount of energy to become active in spring?** Explain that students will look for garden animals to answer this question.

### Tallying Invertebrates

- Explain the worksheet. Students will make a tally mark for each insect they find and a tally mark for each non-insect. Write the names in the section provided. Review the characteristics of an insect – 6 legs, 3 body parts, wings if it is an adult.
- You can spread students out by assigning groups of students to certain areas of your garden space. Each adult helper receives 1 collection box and is assigned to a group of students.
- Record soil and air temperature information as one group. Choose a student to read the air temperature including the unit. How are degrees expressed? Fahrenheit or the metric Celsius. Where do you find the unit of measurement (Fahrenheit or Celsius)? Help students understand the scale of the lines – e.g., each line may represent 2 degrees. Insert the compost thermometer 4-6 inches into the soil. After a few minutes, choose a student to read the soil temperature.
- Wrap up by answering the question “do all invertebrates need the same amount of energy to become active”?
  - What common garden animals were not seen (that perhaps they recall from last summer/fall)?
  - Did you see a lot of one or two particular animals and only a few of others?
  - Were more insects or non-insects found?
- Release collected specimens.

### If You Want to Know More

- Invertebrates are cold-blooded animals. Some vertebrates are cold-blooded, such as fish, amphibians (frogs, toads, salamanders), and reptiles (snakes, lizards, turtles, crocodiles, alligators); others are warm-blooded.
- Diapause is an insect adaptation in which the insect is dormant (at rest) to survive difficult periods in their environment. Diapause is different from hibernation because the insect does not continue to grow and because it happens before the adverse conditions occur. In our area, the approach of winter triggers diapause. The days get shorter, temperature starts to go down, and food sources may begin to be depleted. Favorable conditions wake them up to resume their life cycle.
  - Insect species have their own ideal life cycle stage to enter diapause. This insures that the food needed by the insect will be available during its eating stage.
  - Insects that go through the four stages of complete metamorphosis (egg, larva, pupa, adult) are usually in the egg or pupa stage during winter. However, some species overwinter in the larva and adult stages. When overwintering as an adult, the insects seek shelter in places like tree and rock cracks and crevices, leaf litter, and may emerge on warm days. Overwintering adults lose water from their bodies, which leaves a concentrated sugary substance so they don't burst from water freezing and expanding in their bodies. Some examples: cabbage white pupa, woolly bear larva, Cercropia moth pupa, honeybee adult in hive, mourning cloak butterfly adult, fly adult, ladybug

- adult in clusters
- Insects that go through the three stages of incomplete metamorphosis (egg, nymph, adult) usually overwinter in the egg stage. Some examples: grasshopper, cricket, praying mantis
  - Insects that spend some or all of their life cycle stages in water usually overwinter in the nymph or larva stage. Some examples: dragonfly nymph

### Sources

- The Deep Sleep, Oracle ThinkQuest Education Foundation, <http://library.thinkquest.org/TQ0312800/index.htm>, 2-12-10.
- Hands-On Nature by Jenepher Lingelback. Woodstock VT: Vermont Institute of Natural Science, 1986.



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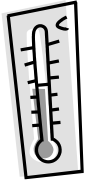
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## Early Spring Invertebrates – Grade One

Name: \_\_\_\_\_



What is the temperature of the air today? \_\_\_\_\_

What is the temperature of the soil today? \_\_\_\_\_

Tally the insects

Write the name



Tally the non-insects

Write the name



In science, we learn that seasonal changes affect the survival and activities of organisms. Today we recorded observations about the kinds of invertebrates that are active in early spring. We discussed some we expected to see, but did not. Ask your child what we found and why other common garden invertebrates from summer and fall are missing. Email [granny@grannysgardenschool.org](mailto:granny@grannysgardenschool.org) to join us for our next gardening experience!