

The Butterfly Project (Descriptive)

Where is Waterville?

We can find butterflies everywhere. But not all butterflies live everywhere in Washington. Waterville is in the Columbia Basin and the butterflies that live there are the ones the first graders will study (Geography EALR's 1.1).

Native and non-native species

Some are more common than others, and some are introduced two different ways. The first way, is when a chrysalis (pupae) is already attached to a plant that is shipped to a nursery from another part of the world. The second way, is from butterfly kits sold to teachers and parents. When the butterfly "hatches", doors and windows are opened to let the butterfly fly away.

Formulate a Question and Develop Identification Skills

The first graders want to know what butterflies in Waterville are native. First, they have to learn what a butterfly looks like. It will be good to know about caterpillars because they turn into butterflies. Learning about butterflies means counting the number of legs and spots on wing to help with identification. (Math EALR's 1.1). The size of the spots/eyes on the wings of some butterflies, is related to the amount of rainfall: During a drought, the eyes will be larger. For those butterflies, measuring the size of the eyes can tell you about the climate. Counting the number of days it takes for a chrysalis to hatch into a butterfly and the number of days a butterfly lives is important because you can estimate or model how many generations of butterflies you will see during the spring/summer. (Math EALR's 3.2). Some butterflies, such as the Monarch that come to Waterville, are migratory. They fly north from their wintering locations, laying eggs, dying and the next generation continues their migration. It may take three generations for the Monarchs to reach their summer range. When it is time to migrate south for the winter, the last surviving Monarchs will not lay eggs, but will fly south, living longer than any of the Monarchs that flew north. Many people track the progress of the Monarch's traveling north through the Internet. Time tables can be created to estimate the Monarch's arrival (Geography EALR's 1.1.2). (Math EALR's 3.2).

Butterflies can be seen when the temperature is greater than 70°. Students must learn to read thermometers so they know when to go outside to look for butterflies. Caterpillars don't seem to be bothered by the temperature as much as the butterflies. But if it is raining, both will hide under leaves. (Math EALR's 1.2, 3.1)

Project Design (Identify Setting with a System and Identify Variables of Interest)

The lifespan of a butterfly is short. Most of their life is taken up as an egg, caterpillar, and chrysalis. That can be as long as a month or months, but the butterfly only lives a few days to a couple of weeks. Individual's lifespans are not identical. There is a range of the number of days a species of butterfly survives. Lifespan and hatching data collected on butterflies raised in the classroom can be collected and reported in a table. (Math EALR's 1.1, 4.2).

Most butterflies only look for nectar from flowers. Some don't eat at all, and only males can be found near water. Males can be found puddling, or eating mud to get minerals that they need. A list of favorite flowers (and pictures) should be obtained from the Internet or other references. Watch the butterflies' behaviors (flying, courting, puddling, resting) in the classroom. Use the dead butterflies to look closeup at their features (e.g., length of proboscis, color of "knobs" on antennae, spot patterns, symmetry of wings and patterns). Students will draw the same butterflies to reinforce their ability to identify them outdoors.

Students need to make a map of Waterville that shows where all the flower gardens are. (Geography EALR's 1.1, 2.2). The teacher can help students find their homes and flower beds on a map.

Collect Data Outdoors

A walking field trip to the best flower beds when the temperature is high enough to begin looking for butterflies. Students should ask the homeowners/parents or gardeners if they see any caterpillars to report them, so the students can take digital photos. Caterpillars don't look for nectar, they eat leaves and a lot of them. Many caterpillars will build their chrysalis in the same bush/tree where they were eating.

Sightings of butterflies should be recorded by date, location, and what plants the butterfly was using. The same is true for caterpillars. Butterfly nets may be needed to catch the butterfly for identification. Many times it is better to be patient and wait until the butterfly rests to record its identifying features on a field journal or by taking a picture.

Students should collect data from home on a Saturday afternoon (or after school) when the weather is expected to be warm, once a week for at least 3 weeks. Students will bring their data to class and post their sightings on a table that contains columns for all of the data the students collect. If all students go out at the same time for the same length of time, the chances they see the same butterfly are low. (Math EALR's xxxx).

A trip to a farm field with a dry creek, large scrub patches and shrub steppe plants or to Douglas Creek will give students the opportunity to look for different species. (This becomes a comparative study)

All students should be encouraged to report any butterfly sighting they see during the project as long as they record the required data.

Analyze Data

Bar graphs can show the number of butterfly species, the most common species based on the number of sightings, where the favorite locations were, and the favorite foods. (Math EALR's 1.2, 1.4). This information can be highlighted on a map or series of maps. (Geography EALR's 1.1.3).

Discussion (Use Evidence to Support and Explanation)

Based on the data, what did you conclude? Why did you see one species more than others? Do you think you need to conduct this project longer to find other species? Did the weather play a part in the number of species you saw? Or do you need an entomologist to help in species identification? (Math EALR's 3.2).

Future Directions for a Long-term project

Collecting data over a period of years will build a good butterfly collection and plant preference lists that will help community members know what to plant for a butterfly garden.

Second grade students studying birds will learn about insectivores – birds that eat insects, including butterflies and caterpillars. The favorite places for butterflies, should be favorite places for insectivores. Data from both classes would show that.

This would become a correlative study by studying the relationship between the habitat, predators and prey species. Middle and high school students could use these data to understand these math principles. Maps depicting locations and territories not only use geography, but polygons of territories can be developed.