

STAGES SURVEY

Objective

- To compare between life stages of different organisms (plants and animals) in a snapshot observation of a time and place
- To relate various organisms' life cycle strategies to seasonal changes

Materials

- A habitat with a wide variety of plants and animals is best for finding a variety of life cycle stages
- Drawing paper and colored pencils or something to draw with
- Drawings are best kept in a journal or booklet for future use

Background

A major component of early science education is a focus on natural cycles. These usually include energy cycles, food cycles, life cycles, and the seasons. We tend to teach and learn these phenomena without regard for the ways we encounter them naturally - especially life cycles.

It is rare to observe the entire monarch butterfly life cycle in nature. You see one or another stage of the life cycle – egg, caterpillar, chrysalis or adult. There are exceptions to this. During certain times of the year in Hawaii you can see all stages of the monarch life cycle without moving from one spot. But in the northeastern United States, it doesn't happen often. It is possible to see all the stages of some organisms' cycles. Bird nests may have eggs and hatchlings with the parents on top or nearby. Some plants have flowers, seeds and leaves on them all at the same time.

In general, an organism's life cycle has three distinct stages (*see Stages Chart*): pre-birth, growth and reproductive (and as a Massachusetts 3rd grader pointed out, death!) These may be separated by relatively dormant stages or, in the case of some insects, a pupa stage in which changes occur under the cover of apparent dormancy.

Typically, a 'snapshot-view' of a habitat reveals only one stage in the life cycles of the organisms living there. In this activity you investigate a habitat and identify different stages. This should be done at least once per season, and perhaps at different times of day, in the same habitat, for comparison.

Procedure

Find a place close to you that has a large variety of plant life. Most people think the 'woods' is the best place for a nature walk, but for variety, open areas, and especially edges are best. The edge of forest and field, of pond and meadow, or even parking lot edges, often support the widest variety of environmental conditions (light/shade, moist/dry, etc.) and create the most niches for natural life. By definition, a *niche* (pronounced 'nitch') is a portion of a habitat that is occupied by

As in all outdoor activities with groups of children, it is important always to consider safety first. Outdoor activities work best with groups of two or three. Often some random mechanism for dividing the group is desirable, perhaps counting-off by the number of groups you have (if you have 20 children, by twos they would make 10 groups – have them count-off to 10, remembering their number, and then match them up). You may also choose to collect and tear ten leaves in half and then matching leaves to split up. This way you can separate friends who may be too distracted to complete the activity – friends usually stand next to each other.

only one species. (This definition does have shortcomings, but it is useful here.)

Lead a discussion with the group reviewing the various stages of familiar and local plants and animals. Relate, as in the Stages Chart, each life stage of different organisms to similar stages in others. Point out that we think of flowers blooming in spring and summer, and leaves falling from trees in autumn, but things are not as simple as that. April showers don't bring all flowers in May.

Instruct the group to locate, draw and describe as many unique examples of each stage of plant and animal life as they can. For example, a 'helicopter' seed from a maple tree is the same stage as an acorn. But, perhaps, a dandelion seed represents the same stage but is from a different 'type' of plant – a tree versus a flower. Some of these distinctions are subjective and it is ok to allow individual differences in this (don't let this become a substitute for shirking!) As everyone is locating and recording their finds, it is your job to circulate among the groups and keep them on task and constructive.

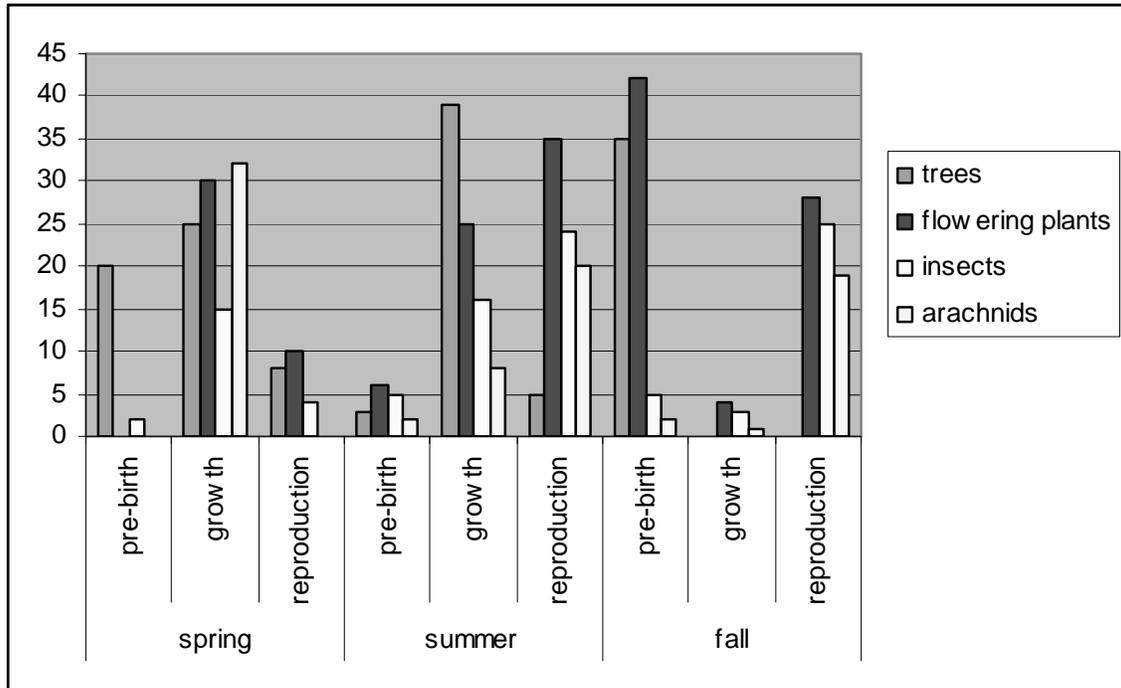
Extensions

This activity should be repeated at least seasonally. The separate drawings can be used to make a life cycle mural in the hallway or classroom. Students can choose to include their favorite (or assigned) organism(s) entire cycle, or seasonal snapshot.

Seed pods or clusters can be used to generate data for graphs. You can compare with the class the numbers of seeds in a milkweed seed pod to the numbers of seeds from a different pod. With a large enough collection of data, a graphical comparison between different stages by season can be useful (see *Graph 1*).

STAGES CHART

STAGE	PRE-BIRTH	GROWTH	REPRODUCTIVE	OTHER
DESIDUOUS TREE	Seed	Leaf	Flower	Seed can remain dormant
"EVERGREEN" TREE				
FLOWERING PLANT				
MOSS				
IVY	Seed	Leaf	Flower or Stem or Root	Underground stem/root can remain dormant
INSECT				
ARACHNID				
FROG				
AQUATIC ANIMAL				
MAMMAL				
BIRD	Egg	Hatchling/Fledgling	Adult	Hibernation



Graph 1. This graph has a lot of information on it, but by following the shaded bars between seasons, you can see 'trends' for each type of organism. Clearly this is a crude method of sampling (and numbers were just made up for this example), but this sort of activity can generate a good deal of discussion and many opportunities to teach about data collection, presentation and analysis. What conclusions can you draw from these data? If this graph shows nothing important, can the data be rearranged to be more helpful? Should the data collection have been different?