1. ***Introduction***

*Who we are?*

1. ***What are insects?***
* *are sometimes called “bugs”*
* *Have their skeleton on the outside*
* *have six legs*
* *have a head, thorax, and abdomen*
* *Go through a “LIFE CYCLE”*

*(show pictures or of different insects or project live insects)*

1. ***Pest and Our Homes***

Our homes are great habitats for many animals. When they bother us, we call them pests. But why do they want to live with us? If possible, show the children the pest introduction movie found on the Pestworld Website at this time. Stress that pests are not being bad animals, but animals in too great of numbers in the wrong place.

**Safe from predators!** Our home environments also tend to eliminate the pest’s predators (predator/prey relationships).

**Excellent unnatural habitats!** Discuss how our basic needs, i.e., air, water, food, and shelter, as the main reasons that animals invade our homes and yards. Living things can survive only in environments in which their needs can be met. Ask the children why they think that many pests are found in kitchens or bathrooms. People’s actions can make life too good for certain animals, i.e., wonderful food supply, endless water source, warm year-round.

**Student pest stories.** Ask the kids to talk about specific pest stories that they might recall from their own lives.

**Discussion:** Pest damage. Discuss some possible damage that specific pests might cause, i.e., mosquito – painful bite on skin, rabbit – destroy garden vegetables, termite – eat wood that supports our home.

**Discussion:** Protection from pests. Discuss some possible ways, some common sense measures, for self-protection from those same specific pests that were just discussed. Make a list. For example, we can apply insect repellant to our skin and clothing to prevent mosquito bites, we can put up a rabbit proof fence around our vegetable garden, and we can contact termite specialists, or pest control professionals, to inspect our homes for possible termite infestation (pest management)..

1. ***Pest Life Cycles***

All species experience a life cycle. It is the certainty of birth, growth, reproduction, and death that all living things share. Humans and other mammals have relatively simple life cycles — beginning life as babies, growing larger until becoming adults, and dying. Insects, however, experience unique life cycles involving the process of **metamorphosis**, which means "change." Most insects experience either **complete metamorphosis** or **incomplete metamorphosis**. In complete metamorphosis there are four stages — egg, larva, pupa, and adult. An adult female lays eggs, which hatch into larvae. The larvae do not look like adult insects — they usually have a worm-like

shape (caterpillars, maggots, and grubs are all insect larvae). The larvae **molt**, or shed their skin several times as they grow larger. Finally, they **pupate**, or make cocoons around themselves, and stay inside while their bodies change into an adult form. The adult breaks out of the cocoon and is ready to reproduce and begin a new life cycle. In incomplete metamorphosis there are only three stages — egg, nymph, and adult. An adult female lays eggs, which hatch into nymphs. Nymphs look much like adult insects but usually don't have wings. The nymphs molt 4-8 times, stopping when they reach adult size and finally grow wings.

**Activity — The Metamorphosis of Pests**

Discuss the concept of life cycles with students, using humans and pets as examples. Have students share what they know about different types of life cycles. Introduce the term metamorphosis if necessary and outline the two types — complete and incomplete. Use the two visual aids, Incomplete Metamorphosis of a Dragonfly and Complete Metamorphosis of a Lady Bug.

1. Which type of metamorphosis do most insects experience? (Approximately 88% of known insects undergo complete metamorphosis and 12% undergo incomplete.)

2. Are there any insects that show no metamorphosis? (Yes — they are called ametabolous insects. The immatures look exactly like the adults except for the presence of reproductive organs. The silverfish is an example.)

3. What is the term used to describe the different stages of larval or nymph development as they molt? (instar)

As an extension, discuss molting in greater detail. As an immature insect grows, it forms a new, flexible skeleton beneath its existing exoskeleton. When it's ready to molt, it takes in extra air to expand itself and split open the old skin. Then it crawls out and the new skin begins to harden. To demonstrate this, blow up a balloon, leaving room for more air. Clamp the open end in vice grips or using a strong clothespin, chip clip, or binder clip, so that later you can blow more air into the balloon. Then cover the balloon with a thin layer of paper mache and let it dry. Once dry, remove the clips or vice grips, being careful not to release any air, and blow more air into the balloon until the "exoskeleton" splits open.