INCREDIBLE INSECTS
Grades 1 - 3

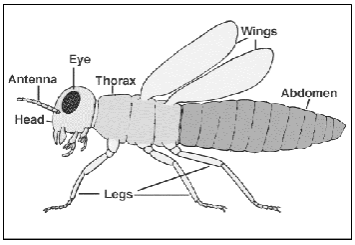
NJCCCS: 5.1, 5.3, 5.4

Field Trip Overview:

Learn about the largest group of animals in the world. Classification, life cycles, and characteristics will be investigated. Students will go outside to collect and study live insects and dicuss their role in local habitats. After learning about insects, students will "Build-a-Bug", using arts and crafts supplies to create their own insect to take home with them.

Background Information:

Insects are part a group that constitutes approximately 90% of the animal kingdom: arthropods. The two main characteristics of an arthropod are exoskeletons, the hard outer covering, and jointed legs. Within the phylum arthropod are insects (6 legs, example: fly), arachnid (8 legs, example: spider), crustacean (10-20 legs, example: shrimp) chilopod (one pair per segment, example: centipede, and diplopod (two pairs per segment, example: millipede).



The outside of an insect's body is its skeleton. It is made a hard flexible material called chitin. This is known as an exoskeleton. The exoskeleton is divided into three parts: the head, thorax, and abdomen. Most insects have a pair of antennae on the head. Antennae vary in length, shape and number of jointed segments. Wings and legs grow from the thorax. All insects have six legs.

Insects lives are divided into a series of stages: egg, one or more immature stages, and adult. There are two types of metamorphosis: simple metamorphosis and complete metamorphosis. In simple metamorphosis a nymph hatches from an egg. It grows to adulthood through a series of increases in size. Dragonflies are an example of an insect that undergo simple metamorphosis. In complete metamorphosis, a wormlike form called a larva hatches from an egg. When the larva is fully grown it transforms into a pupa, usually spinning a cocoon around itself. After a period of either weeks or months, the adult emerges from the cocoon. Butterflies are an example of an insect that undergo complete metamorphosis.

Vocabulary:

Abdomen: the hindmost of the three many body regions

Antenna (pl. antennae): feelers located on head above mouth parts, used to sense surroundings

Chrysalis: the pupa of a butterfly

Cocoon: a case of silk in which the pupa is formed

Compound eye: an eye composed of many individual parts, which allows insects to see multiple images at once

Exoskeleton: a skeleton, or supporting structure on outside of body

Head: the front most body region where the eyes, antennae, and mandible can be found

Larva (pl. larvae): the immature stage between egg and pupa of an insect with complete metamorphosis

Mandible: jaw

Nymph: young of an insect with simple metamorphosis

Pupa (pl. pupae): the stage between larva and adults in insects with complete metamorphosis

Thorax: the body region behind head which bears legs and wings

References / Resources:

- Borror, Donald Joyce, and Richard E. White. *A Field Guide to the Insects of America North of Mexico*. Boston: Houghton Mifflin, 1970.
- Earthlife Web: Insects
- Insects.org: Entophiles

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Pre-Trip Activities

1. Complete Metamorphosis

Read Eric Carle's *The Very Hungry Caterpillar* to introduce the concept of metamorphosis. Discuss what the caterpillar does throughout the story and the changes he undergoes. Reinforce the concept of metamorphosis by having the class sing a song and act out a finger play *(*See attached instructions). Raise butterflies in a live butterfly garden. Students will experience complete metamorphosis first hand and discover what a butterfly egg, larva, pupa and adult look like. See resources for information on purchasing a butterfly kit.

Assessment Opportunity: Are the students able to name the different stages of complete metamorphosis if given illustrations as cues?

References / Resources:

Carle, Eric. *The Very Hungry Catepillar*. Burwood, Vic.: Royal Victorian Institute for the Blind Educational Centre., n.d. Print.

Order Live Butterfly Kits

Looking Closely at Life Cycles

2. Insect Webquest

In this webquest, students will learn about different insects through a series of guided web activities. Students will collect information through internet sites on the butterfly, the bee, the praying mantis, and the mosquito. At the end students will create an insect guide book to share with the rest of the class.

References / Resources:

Insect Webquest

BECOMING A BUTTERFLY

*(*Sung to the tune of *Brother John* or *Frere Jacques)*

1. I'm a flower, I'm a flower
   With my roots, underground,
   Rich soil and rain,
   Clean air and sunshine,
   Help me grow, help me grow.

2. I'm an egg, I'm an egg,
   On a leaf, on a leaf,
   Every day I'm changing,
   Into a caterpillar,
   Soon I'll hatch, soon I'll hatch.

3. Here I am, caterpillar,
   Crawling here, crawling there,
   Eating, eating, eating, more, and
   more, and more,
   Then I rest, then I rest.

4. I'm a chrysalis, I'm a chrysalis
   Safe and sound, warm and dry,
   Changing from the inside,
   Into a butterfly,
   Soon I'll fly, soon I'll fly.

5. I'm a butterfly, I'm a butterfly
   Flying around, flower to flower
   Using my tongue,
   to drink my food,
   Yum, yum, yum, yum, yum, yum.

Instructions for finger play (while seated):
Introduce to students by reciting the song, or singing aloud. Demonstrate the gestures, and then invite kids to join in!

Verse 1: Raise arms overhead and sway.
Verse 2: Curl fingers into a fist, and slowly release.
Verse 3: Walk fingers on the desk in front of you (or on the palm of your other hand.)
Verse 4: With one hand, point your index finger (pretend it's a twig). With the other hand, place your index fingertip (chrysalis) underneath, touching the "twig." Wiggle the "chrysalis" finger.
Verse 5: Hook thumbs together, and flap other fingers in unison. Fly hands around your head.
Verse 6: Raise arms overhead and sway.

Adapted from an earthsbirthday.org activity

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Post-Trip Activities

1. Insect Movement

Construct a concept map using *movement* as the theme (see sample attached). Focus students' attention on animal movement with guiding questions like "Can you name some animals that move in different ways?" Using live specimens, Riker mounts, or pictures, provide students with examples of insects that move in a variety of ways. Have students make observations and identify the way each insect moves. Organize an Insect Olympics. See attached instructions.

Assessment Opportunity: Were the students able to work cooperatively to replicate insect movement? Working in small groups and using only photographs and pictures, have students classify common insects according to methods/mechanisms used for locomotion they observe.

References / Resources:

The Bug Club

What's That Bug?

University of Kentucky: College of Agriculture

2. Mystery Bug Webquest

Students will identify a mystery bug through this webquest. After being given information about the insect, students will need to determine the identity of the bug. Once they have identified the bug they will prepare a presentation about their bug as well as a paper mache model of the bug.

Assessment Opportunity: Students can be graded on their presentation and correct identification of the mystery bug.

References / Resources:

Mystery Bug Webquest

3. Insect Olympics

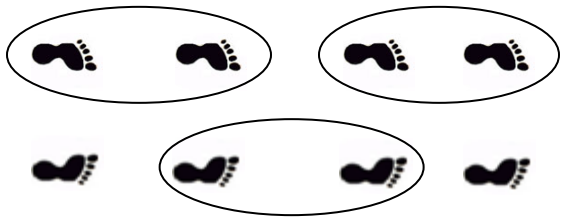
A. Caterpillar Crawl

Materials:

- measuring tape or yard stick
- stopwatch
- paper and pencil
- live caterpillars
- 18" bands of fabric (felt is best)
- gym mats or thick carpet

1. Observe a caterpillar and measure the time it takes to crawl over a distance of about 1 foot
2. Extrapolate caterpillar time to move a longer distance (distance X) to find its rate of speed for this distance. For example, if the caterpillar moves 1 foot in 30 seconds, 20 feet would take approximately 10 minutes.
3. Measure a distance of 20 feet that the student teams must travel in the amount of time established as the caterpillar's rate of speed.
4. Divide the class into teams of 6 to 8 and have each forms a single file line.
5. Explain that the front half of each group represents the walking legs and the back group represents the prolegs.
6. Connect the last person in each front group to the first person in each back group by an inflexible rope tied from one to the other.
7. Prior to each group traveling the 20 foot course, explain the proper "crawling" procedure; first the front group moves together a pre-determined number of steps (3 or 4) then stops and waits for the back group to catch up. This represents the "inchworming" movement exhibited by caterpillars.
8. Measure each team's time on the course.
9. Compare the teams' time to the caterpillar's time.

Note: As an alternative (with trustworthy students), this event can be done by tying the students legs together in the following pattern:



B. Fly larvae (maggot) races

Materials:

- measuring tape or yard stick
- stopwatch
- paper and pencil
- burlap/potato sacks
- house fly maggots
- desk or floor lamp
- masking tape
- gym mats or thick carpet

1. Place a maggot on a table surface and shine a light on them from 8-12" away. This will cause them to move away.
2. Measure the distance they crawl in 10 seconds.
3. Calculate the distance crawled as a multiple of the maggot's body length. In other words, if the maggot crawls 1" in 10 seconds and its body length is ¼" the distance traveled would be considered 4 body lengths.
4. Measure each of the students' heights in inches. Calculate how far each student will have to crawl in 10 seconds by multiplying their height by the number of body lengths the maggot crawled.
5. Place gym mats together and mark off start and finish lines.
6. Line up students and help them step into sacks. Have students lay belly down on mats and hold onto bags up around their rears (elbow in the air).
7. Have the students try to crawl on their stomachs in the sacks for 10 seconds. Remind them that they are not to use their elbows to crawl, only their chins and bodies.
8. Measure the distances the students crawled and compare them to the maggots.

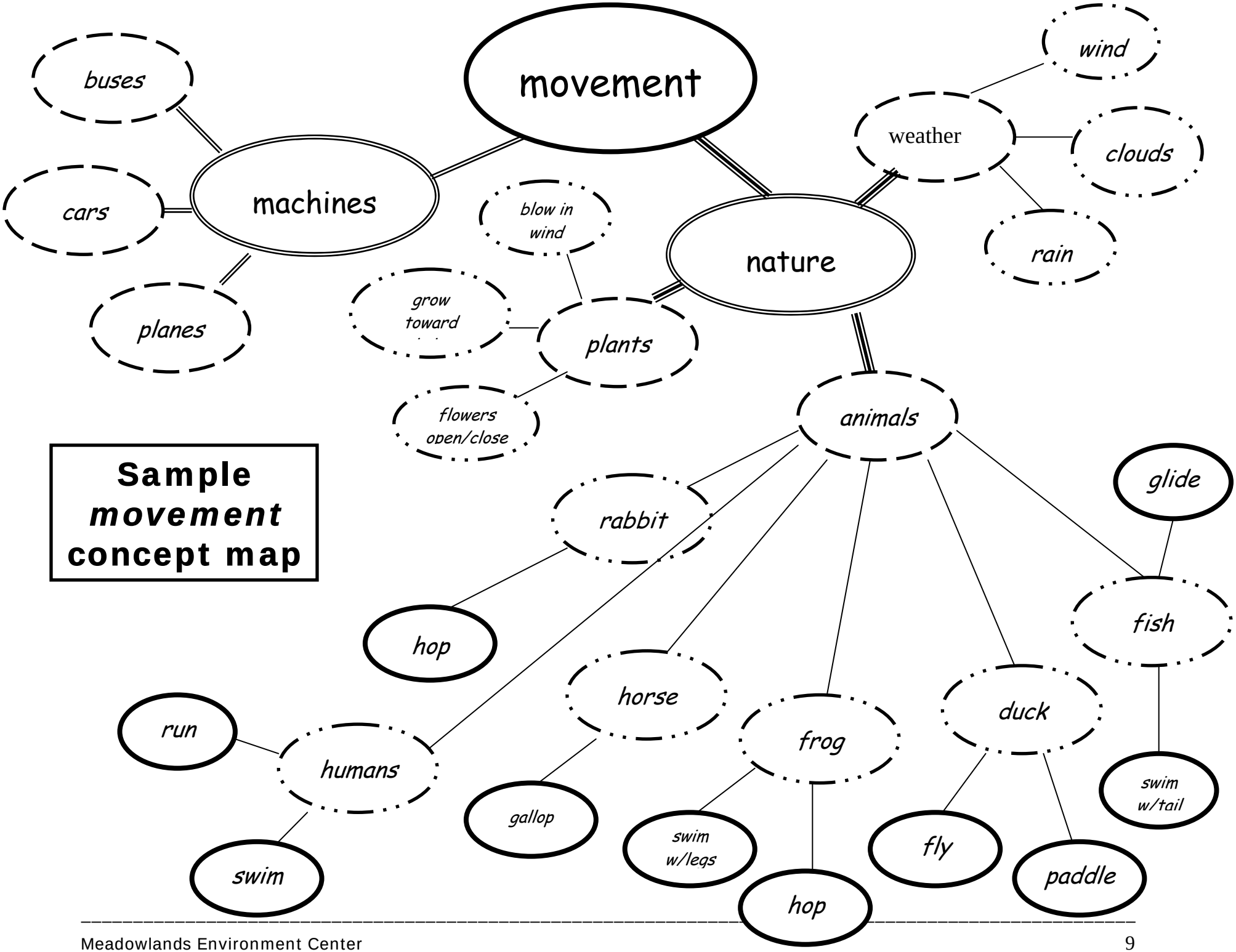
C. Cricket Hop

Materials:

- measuring tape or yard stick
- stopwatch
- live crickets
- paper and pencil

1. Pick up a live cricket and measure its body length.
2. Have each group of 3-5 students release their cricket at the starting point and let it jump. If the cricket is reluctant to jump, guide them in motivating it gently without injuring it.
3. Record the distance hopped by the cricket.
4. Line up the students and measure and record their heights.

5. Have the students hop from a common starting point marked with masking tape then measure and record their hop distance and record their group's longest hop distance.
6. Calculate the hop distance to body length ratio for each group (divide hop distance by body length, i.e., height) and do the same for each of the group's crickets. Compare the ratios calculated for each group.


movement
machines
buses
cars
planes
nature
weather
wind
clouds
rain
blow in wind
grow toward
plants
flowers open/close
animals
Sample movement concept map
rabbit
hop
glide
fish
horse
gallop
duck
swim w/tail
frog
swim w/legs
hop
fly
paddle
humans
run
swim