

Presto-Change-o

Subject: Science

Objectives: Students will be able to identify insects that go through incomplete and complete metamorphosis.

Materials:

- access to research materials
- card stock copies of cube and tetrahedron for each student
- coloring and writing utensils
- glue stick or tape
- scissors

Procedure:

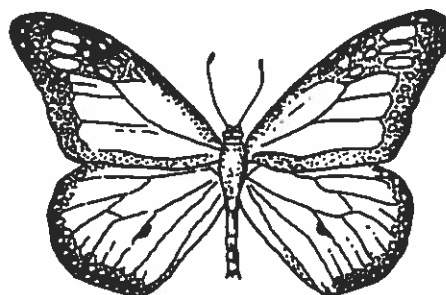
1. Review complete and incomplete metamorphosis with your students. Ask them to brainstorm lists of insects that go through each type of metamorphosis.
2. Tell students they will be researching one type of insect for both complete and incomplete metamorphosis. Have the students gather the following information: name of insect (common and scientific), complete or incomplete metamorphosis, illustration of each stage, and habit for each stage of metamorphosis.
3. Hand out the card stock templates. The cube should be used to identify an insect that goes through a complete metamorphosis. The tetrahedron should be used for an insect that goes through an incomplete metamorphosis. Have the students write and draw the information below on the templates. Then cut out templates, fold along dotted lines and glue or tape to complete.

The boxes on the cube should contain the following:

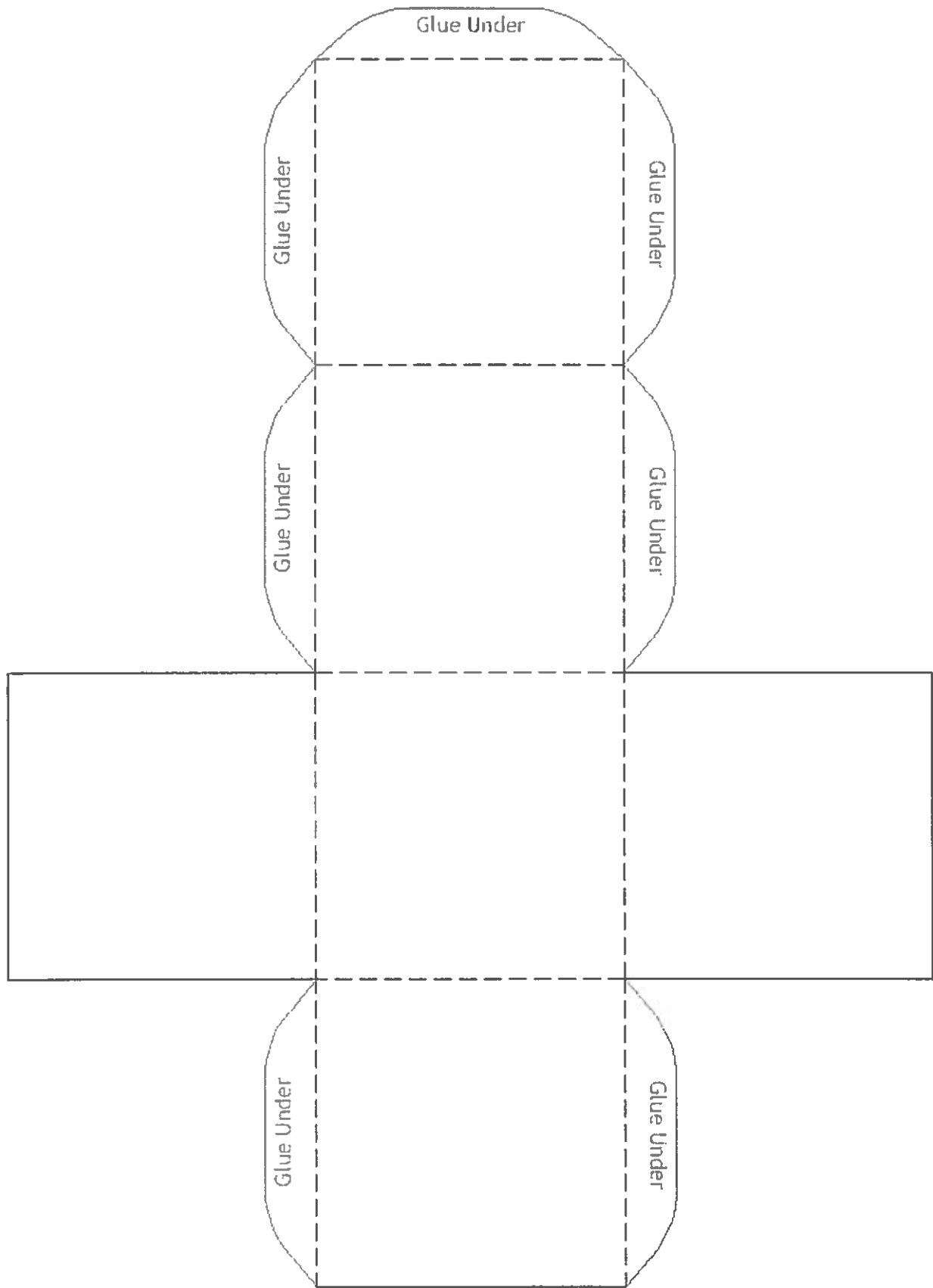
1. Name of insect
2. Stage one
3. Stage two
4. Stage three
5. Adult
6. Habit for one of the stages

The boxes on the tetrahedron should contain the following:

1. Name of insect
2. Stage one
3. Stage two
4. Stage three



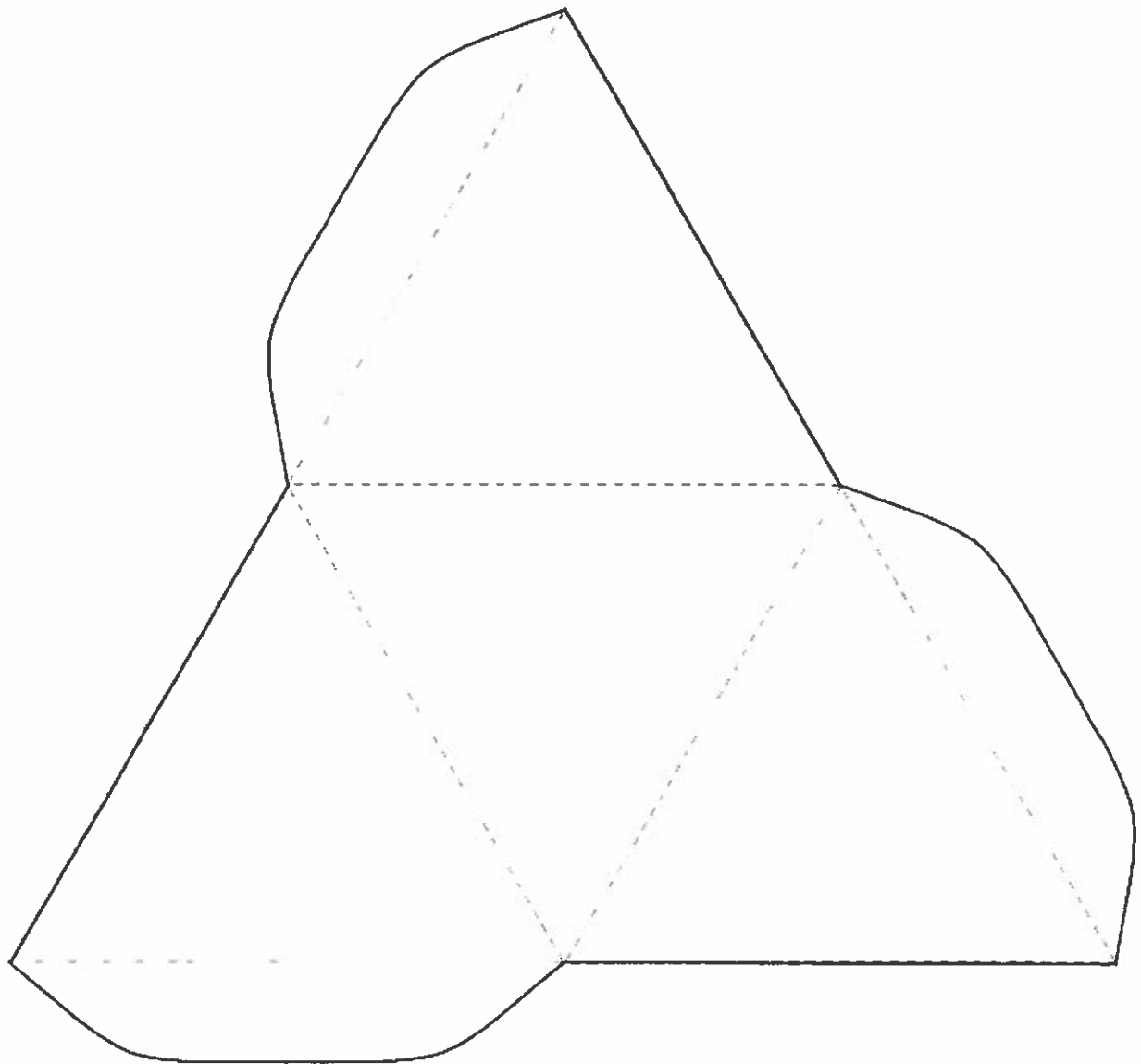
Cube Model Template



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<http://www.mathsisfun.com/geometry/cube-model.html>

Tetrahedron Model Template



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Bug-o

Buggo by Univ. of Kentucky Entomology website

Subject: Science

Objectives: Students play bingo to become familiar with insects.

Materials:

- copies of Bug-O Master sheet (cut up)
- blank Bug-O sheets
- markers (beans, poker chips, small pieces of paper)
- glue stick for each student




























Procedure:

1. Before class, determine the number of copies you'll need of the Bug-O Master sheet. (Each student will need 19 insects. You'll need an entire set.) Cut out the boxes on each sheet. Stack each insect in separate piles. Take one insect from each pile and place them in a can or hat. Copy blank Bug-O sheets for students and one for yourself.
2. To begin, review the insects with your students. Tell them they will be playing a game of Bingo, using insects instead of numbers. Each student will need 19 insect boxes, a glue stick and a blank Bug-O sheet. Distribute the 19 insect boxes to the students. (You may want the students to come up and choose 19. You may want to hand them out. Or you might want to have previously placed them in piles of 19 mixed insects to hand out.) Once the students have their 19 boxes, tell them to glue an insect in each square. There will be one square left over. Students should write Free Space in this square.
3. Play Bug-O. Start with the letter B and choose an insect card from the can or hat. Example: B Water Strider. Keep a tally sheet of the cards you draw for each letter. Then go to U. Choose another insect from the can or hat. Continue reading all the letters (and the hyphen) and begin again once you get to the end. Students should mark the insects they have on their cards as you call them out.
4. When someone gets a Bug-O (5 in a row), they should call out, Bug-O. You can then have students clear cards to play again, or go for a black out.
5. Celebrate the winners by giving all students gummy bugs or another treat. 😊

Bug-O Master

Modified from Bug-O activity University of Kentucky Entomology

Make copies, cut up and distribute for students to glue onto their Bug-O sheets.

 Stick Bug	 Ant	 Beetle	 Aphid	 Monarch Butterfly
 Cockroach	 Crane fly	 Cricket	 Dragonfly	 House Fly
 Giant Water Bug	 Head Louse	 Ladybug	 Leaf Insect	 Swallowtail Butterfly
 Queen Bee	 Walking Stick	 Bald-faced Hornet	 Flea	 Honey Bee
 Horn-tail Wasp	 Katydid	 Locust	 Moth	 Weevil

B U G - O

Identifying Insects

Subject: Science

Objectives: Students use a dichotomous key to identify insects into different orders.

Materials:

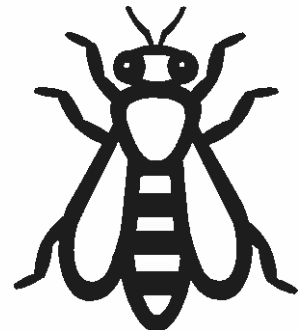
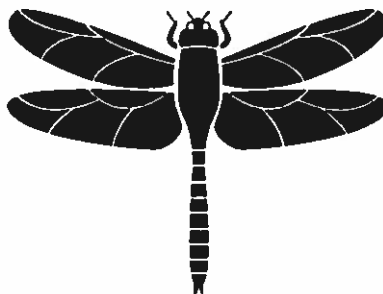
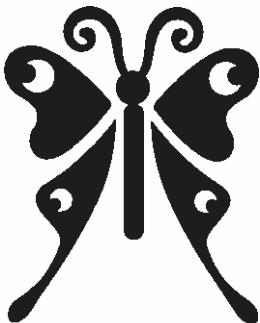
- copies of Wildlife Worksheet *Identifying Insects*
- copies of the *Key to Insect Orders*
- live insects to identify (optional)

Procedure:

1. Review animal classification with your students.
2. Pass out the *Key to Insect Orders* sheet. Explain to the students that a dichotomous key is a tool used to identify specimens. A dichotomy is a split into two parts, so a dichotomous key is one in which each step is split into two choices. Each step asks whether the specimen has a particular characteristic or not. Students start with number one, look at the insect and decide which of the two choices fits the insect best. The answer will direct them to another question on the key. They answer each question until the order of the insect is revealed.
3. Pass out Wildlife Worksheet *Identifying Insects*. Have the student identify the insects on the worksheet or have students use the dichotomous key to identify live insect specimens. If the students are not sure which answer is correct, have them follow each choice to see if the answer becomes obvious.

Answer key:

- | | |
|-----------------------------|--------------------------|
| 1. Hymenoptera (ant) | 2. Homoptera (aphids) |
| 3. Hymenoptera (wasp) | 4. Odonata (dragonflies) |
| 5. Lepidoptera (moth) | 6. Orthoptera (cricket) |
| 7. Phasmida (walking stick) | 8. Diptera (mosquito) |
| 9. Coleoptera (beetle) | |



Wildlife Worksheet

Identifying Insects

Use the Key to Insect Orders to find the order for each insect.



1. _____



2. _____



3. _____



4. _____



5. _____



6. _____



7. _____



8. _____



9. _____

Key to Insect Orders



The following key will help you place insects in the correct order. Start with number one and decide which answer fits the insect best. The answer you choose will either reveal the order or direct you to another part of the key. Some orders have members that are both winged and wingless, so they are listed twice. Not all orders are listed.

1. Does the insect have wings?

- a. Yes ----- go to #2
- b. No ----- go to #18

2. How many pairs of wings does the insect have?

- a. One ----- Diptera (flies)
- b. Two ----- go to #3

3. Are the two pairs of wings very different, the first pair being thick and hard or leathery?

- a. Yes ----- go to #4
- b. No ----- go to #7

4. Is the first pair of wings rigid, and do they meet in a straight line down the middle of the back?

- a. Yes ----- go to #5
- b. No ----- go to #6

5. Is there a pair of large cerci (pinchers) at the tip of the abdomen?

- a. Yes -- Dermaptera (earwigs)
- b. No -- Coleoptera (beetles and weevils)

6. Does the insect have:

- a. chewing mouthparts, front wings leathery and heavily veined, hind wings folded like a fan? Orthoptera (grasshoppers, crickets)
- b. sucking mouthparts and front wings leathery at the base, membranous and overlapping at the tip? Hemiptera (bugs)

7. Are the mouthparts a coiled tube, and the wings covered with scales?

- a. Yes ---Lepidoptera (butterflies and moths)
- b. No ----- go to #8

8. Are the wings tent-like, sloping downward the outward from the middle of the back?

- a. Yes ---- Homoptera (cicada and aphids)
- b. No----- go to #9

9. Is the insect slender and moth-like, with long, slender antennae and wings that are widest past the middle?

- a. Yes ---Trichoptera (caddisflies)
- b. No ----- go to #10

10. Do the wings have few or no cross veins?

- a. Yes ----- go to #11
- b. No ----- go to #12

11. Does the insect have chewing mouthparts and hind wings smaller than the front wings?

- a. Yes --- Hymenoptera (bees and wasps)
- b. No --- Thysanoptera (thrips)

12. Are there two or three long, slender tail-like hairs on the tip of the abdomen?

- a. Yes --- Ephemeroptera (mayflies)
- b. No ----- go to #13

13. Does the insect's head have a long beak with chewing mouthparts at the tip?

- a. Yes --- Mecoptera (scorpionflies)
- b. No ----- go to #14

14. Does the insect have small antennae, long narrow wings and a long slender abdomen?

- a. Yes --- Odonata (dragonflies)
- b. No ----- go to #15

15. Does the insect have two short "hairs" on the tip of its abdomen and front wings narrower than the back wings?

- a. Yes --- Plecoptera (stoneflies)
- b. No ----- go to #16

16. Do the feet each have five segments?

- a. Yes ----- go to #17
- b. No --- Isoptera (termites)

17. Is the insect's body flattened and the head hidden from above?

- a. Yes ---Blattaria (cockroaches)

b. No --- Neuroptera (lacewings and antlions)

18. Is the insect's body long and stick-like?

- a. Yes --- Phasmida (walking sticks)
- b. No ----- go to #19

19. Is the insect ant-like, with a narrow waist?

- a. Yes ---Hymenoptera (ants)
- b. No ----- go to #20

20. Is the insect ant-like, with a wide waist?

- a. Yes --- Isoptera (termites)
- b. No ----- go to #21

21. Is the insect small and flattened, with chewing mouthparts and a head about as wide as its body?

- a. Yes ----- go to #22
- b. No ----- go to #23

22. Are the antennae long, with many segments?

- a. Yes --- Psocoptera (barklice and booklice)
- b. No --- Mallophaga (chewing lice)

23. Is the insect's body soft and rounded, with two tubes sticking out the abdomen and a small head?

- a. Yes --- Homoptera (aphids)
- b. No ----- go to #24

24. Is the insect small, with a flattened body, a hook-like claw on each leg and sucking mouthparts?

- a. Yes --- Anoplura (lice)
- b. No ----- go to #25

25. Is the insect very small and narrow with sucking mouthparts?

- a. Yes --- Siphonaptera (fleas)
- b. No ----- go to #26

26. Is the insect:

- a. delicate with chewing mouthparts and thread-like tails and antennae? Thysanura (silverfish)
- b. very small with a spring-like lever folded under its abdomen which it uses for leaping? Collembola (springtails)

Most Wanted Bug Poster

Subject: Science

Objective: Students will be able to practice research skills as they learn about characteristics, diets, habitats and habits of a variety of bugs.

Materials

- access to internet or library for research purposes
- coloring tools
- Wildlife Worksheet Wanted Poster

Procedure:

1. Have a quick discussion about wanted posters and their purpose. Tell the students they will be researching a particular “bug” and creating a wanted poster for that “bug.” Will it be a “good guy or a bad guy?”
2. Assign students a bug by choosing one from a hat or by using popsicle sticks to draw names for a bug on the following list (or have students choose their own.)

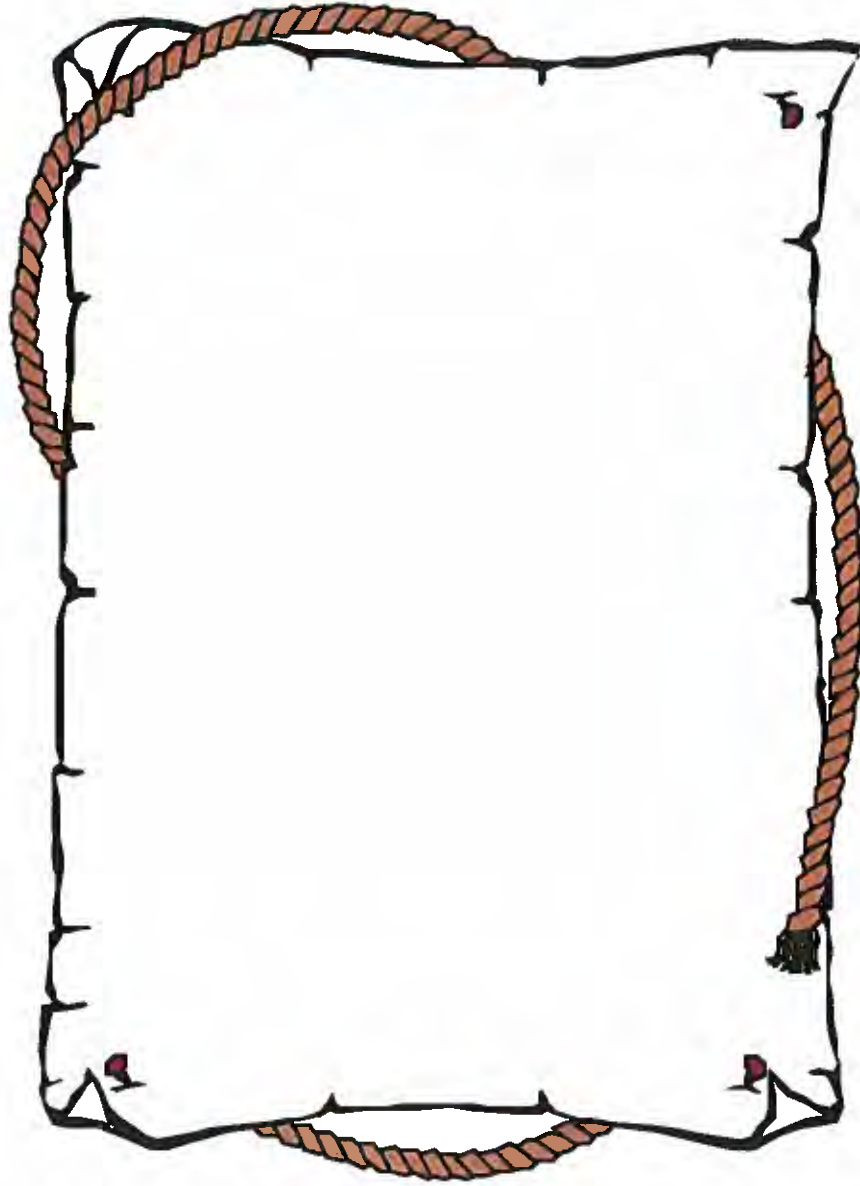
stink bug	cockroach	flea	termite
water strider	fruit fly	moth	mosquito
praying mantis	ladybug	dragonfly	assassin bug
minute pirate bug	lacewing	moth	walking stick
honey bee	potato beetle	grasshopper	wasp
ant	dust mite	aphid	house fly
head louse	black widow	pill bug	Mormon cricket
3. Hand out the Wildlife Worksheet Wanted Poster and explain the directions. Students should fill out the information at the bottom of the worksheet and draw a picture of their bug on the poster.
4. Assess students on the accuracy of information presented on the wanted posters. Display the posters in the hall!

*Modified from Linda Starr's Education World lesson plan. www.educationworld.com and Pesky Insects from Animals, The Education Center.



Wildlife Worksheet

Wanted Poster



Name: _____

AKA (Also Known As): _____

Scientific Name: _____

Identifying features: _____

Diet: _____

Habitat: _____

Wanted For: _____

Last Known Location: _____