VIRGINIA ANIMALS & THEIR HABITATS

Topic 2
How Do Scientists Classify Animals?

TABLE OF CONTENTS

TOPIC 2 – How Do Scientists Classify Animals?

Topic 2: Overall Information

Overview

In this group of lessons students will explore the different characteristics scientists use to classify animals.

Topic 2 Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 a, b, c, d, h, i, j, k, l, m 2.5 a, b	2.2 a, b, c, e 2.3 a, b, c 2.6 2.7 d, e 2.8 2.9 2.10 2.12 a, c, d 2.14	2.5 2.6 2.7 2.8 2.9 2.17 2.19	2.5 2.6

Teacher Background Knowledge

- Six different classifications of animals will be studied. They are mammal, reptile, amphibian, bird, fish, and insect. (These are not terms that second-grade students are expected to memorize.)
- Mammals are warm-blooded, have hair or fur, give birth to live young (except the platypus and echidna), and nurse their young.
- Reptiles are cold-blooded, have scales, and lay eggs or give birth to live young.
- Amphibians are cold-blooded, have skin, lay eggs, and go through metamorphosis.
- Birds are warm-blooded, have feathers, wings, beaks, and lay eggs.
- Fish live in the water and have gills instead of lungs.
- Insects have six legs and 3 body parts.
- Virginia is home to 85 species of mammals, 61 species of reptiles, 74 species of amphibians, 374 species of birds, 210 species of freshwater fish, and over 10,000 species of insects and other invertebrates. (Statistics from the Virginia Department of Game and Inland Fisheries, http://www.dgif.virginia.gov/wildlife/)
- The Appalachian Mountains, the James River, and the Atlantic Ocean are geographic features of Virginia. The location of each of these features will be identified on a Virginia map.
- A cinquain is a poem of five lines. There are variations to the specific format. The following cinquain format will be used with Topic 2 to help the students picture content material as a strategy for comprehension.
    - The first line is one word: the subject
    - The second line is two words: adjectives describing the subject

    - The third line is three words: -ing verbs describing actions of the subject
    - The fourth line is two words: adjectives or adverbs describing the subject
    - The final line is one word: a synonym for the subject
- Bar and picture graphs are tools that will be constructed using data collected during Topic 2. The data will then be interpreted by students.

Student Learning Expectations

- Use and understand the key science terms: mammal, reptile, amphibian, bird, fish, and insect. (These are not terms that second-grade students are expected to memorize.)
- Utilize observation skills to collect data and draw conclusions.
- Sort and classify animals by their characteristics into groups.
- Construct bar and picture graphs using a key and scale.
- Write a cinquain about an animal.
- Label a Virginia map that includes a title, a compass rose, a map key, and the features a) Appalachian Mountains, b) James River, and c) the Atlantic Ocean.
- Utilize a table of contents, glossary, and index when reading nonfiction selections.

Procedure

NOTE: The procedures in the topic sessions may be divided into several different lesson periods. Each session may take more than one lesson period to complete.

Topic 2: Session 2.1 – Animal Sorting

Session Supplies:

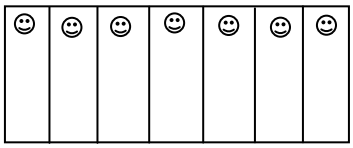
- *Animal Reading Response* sheet (pg. 18) – this page will be used again with Topic 2, Session 2.3
- Teacher-made seven-column chart prepared on chart or bulletin board paper (this chart will be used throughout the unit)
- *Animal Labels – With Pictures* (pg. 20-23) for each of the animal groups (i.e., mammal, reptile, amphibian, bird, fish, and insect)
- *Animal Labels – No Pictures* (pg. 24-27) for each of the animal groups (i.e., mammal, reptile, amphibian, bird, fish, and insect)
- A teacher-selected book that is a fiction book but also contains factual information about wetlands
- Minimum of two sticky notes per student
- *Virginia Animals Brainstorming Graphic Organizer* sheet (pg. 19) (This page will be used again in Topic 2, Session 2.7)

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 a, b, c, d, h, i, j, k, m	2.2 a, c, e 2.3 a, b, c 2.8 2.9 2.12 a		

An excellent resource for more information about wetlands can be found on the New Hampshire Fish and Game Department (NHFGD) Web site at http://www.wildnh.com/Kids/kids.htm, *Wetlands* Vol. 8, Issue 1. *Wild Times for Kids* is published twice a year by the NHFGD. The magazine can be downloaded.

Session 2.1 – Animal Sorting

Teacher Questions & Notes	Procedures
Sample Seven-Column Chart 	*Prior to the lesson, make a seven-column chart (using chart or bulletin board paper). You will also need a picture of each animal group (these will be added to the chart during the lesson). The "Animal Labels – with Pictures" and the "Animal Labels – No Pictures" sheets can be found at the end of this Session. You may decide which labels you wish to use based on your students.*
-Would you find factual information about Virginia animals in a fiction or nonfiction book? -Can you find factual information in a fiction book?	1. Explain to students that we have already discussed fiction and nonfiction books. Today we are going to explore information about animals that live in Virginia.
Prior to reading ask: -What is a wetland?	2. Show the students the teacher-selected book that is a fiction book but also contains factual information about wetlands. 3. Tell them that this is a fiction book that contains factual

Session 2.1 – Animal Sorting

Teacher Questions & Notes	Procedures
	information about a wetland. 4. Have students respond to the top two statements on the *Animal Reading Response* sheet that will be put into their journal or have students set up a page in their journal that looks like the *Reading Response* sheet.
After reading ask: -What did we find out about wetlands in this book? -Is the information about wetlands in the book fiction or nonfiction? -What is another name for a wetland? -What are some of the animals that the book described as living in a wetland? -Why is it important to save the marshy, soggy places in the wetlands?	5. Read aloud the first few pages of the teacher-selected book on wetlands.
-What other types of animals do you think might live in a wetland?	6. List student responses on the board.
	7. Finish reading the book. *8.* Have the students respond to the two remaining statements on the *Animal Reading Response* sheet (pg. 18). *(This sheet will be used again for Topic 2, Session 2.4.)* *9.* Discuss the changes in the student responses on the *Animal Reading Response* sheet before the book was read and after it was read.
-What other animals live in the wetlands?	10. After reading, add any additional animals to the list on the board.
	11. Have each student brainstorm a list of animals that live in Virginia using the *Virginia Animals Brainstorming Graphic Organizer* sheet (pg. 19). (This page will be used again in Topic 2, Session 2.7. In lieu of using the sheet, students can write their list in their journal.)
	12. Have students turn and talk with a partner to compare their lists.
	13. Have each student choose two animals and write them on separate sticky notes.

Session 2.1 – Animal Sorting

Teacher Questions & Notes	Procedures
	14. Put a picture of a mammal on the pre-made seven-column chart. 15. Ask the students, "Who thinks their animals are like this animal?" Have students place their sticky notes on the chart below the mammal picture. 16. Repeat for each of the remaining animal groups (i.e., fish, bird, reptile, amphibian, and insect) 17. If there are any animals that don't fit into the above categories after sorting, give students a chance to figure out where the animal may go.
-Let's look at the animals under each picture. What do these animals have in common? -What common name could we give to this group of animals? (repeat for each group)	18. Discuss common characteristics of each group. 19. Record characteristics on the chart. 20. Guide students to correct any sorting errors. For any animal that does not fit within the six groups, create an "other" column. (e.g., If a student chooses a spider or an earthworm, it would go into the "other" category.) 21. Label each animal group with its correct name. 22. Save the seven-column animal chart that you have made for use with Topic 2, Session 2.4.

Additional pictures of Virginia species may be found in the ***Virginia Wildlife*** magazine or calendar. Every Virginia public school library receives the ***Virginia Wildlife*** magazine each month.

Your school library and school librarian are great resources for identifying the books that will be used with your students.

For additional information about wetland wildlife and the importance of wetlands, read the background information in the Project WILD Aquatic activities *"Marsh Munchers"* (pg. 34) and " *Wetland Metaphors*" (pg. 39).

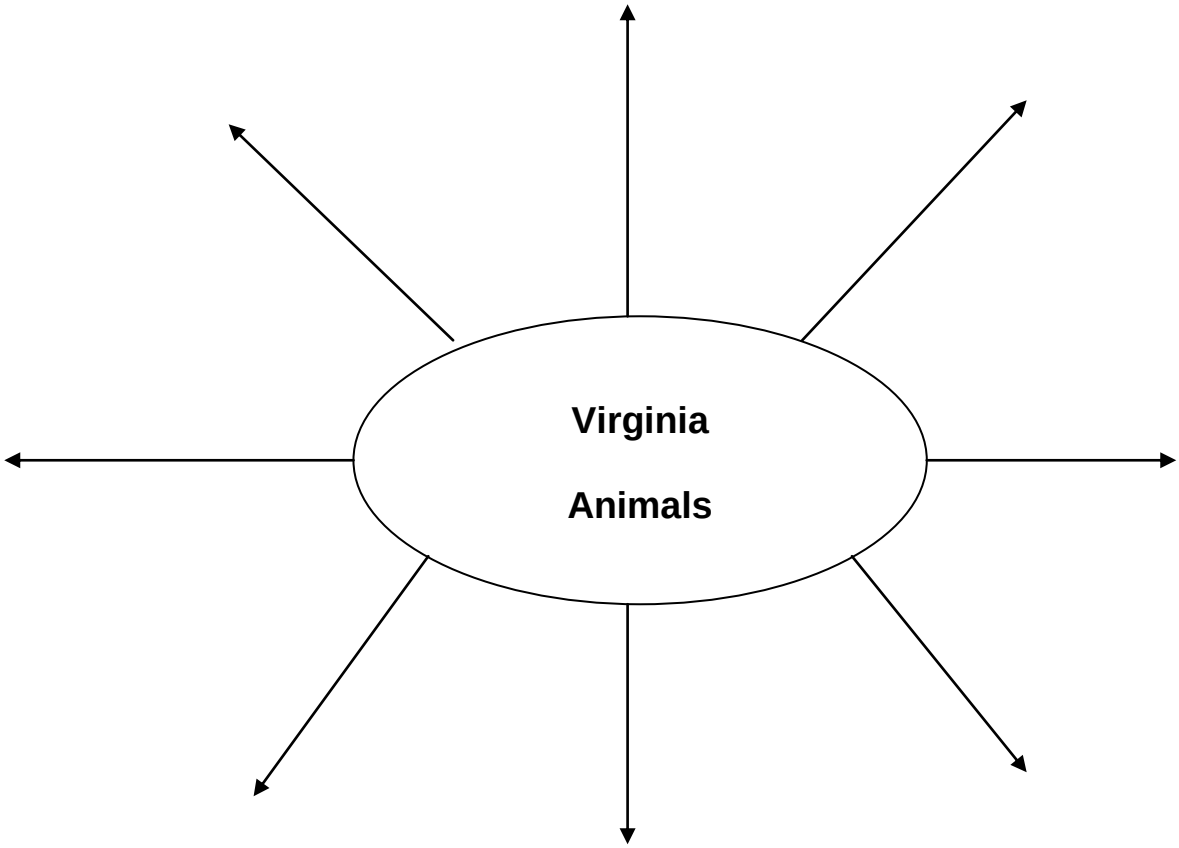
Animal Reading Response – Student Sheet **Name:** _____

I know . . .	I expect to learn . . .
I learned . . .	**What new questions I have . . .**

Name: _____

Virginia Animals Brainstorming Graphic Organizer – Student Sheet

Use the graphic organizer below to list Virginia animals. You may add as many arrows as you need.



Mammals

Gray Squirrel
(Jeff Trollinger, VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/information/?s=050057

Reptiles

Eastern Box Turtle
(John White, VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/information/?s=030068

Birds

Osprey
(VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/birds/raptors/

Amphibians

American Toad
(John White, VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/information/?s=020059

Fish

Largemouth Bass
(VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/fish/details.asp?fish=010188

Insects

Prince Baskettail
(David Arbour, USDA Forest Service)
https://wwwnotes.fs.fed.us/wo/wfrp/find_a_photo.nsf/findphoto.nsf/photo/8582A1FAB0BBA641852570CE005F5E74?OpenDocument

Other Animals

Argiope Spider
(David Arbour, USDA Forest Service)
https://wwwnotes.fs.fed.us/wo/wfrp/find_a_photo.nsf/findphoto.nsf/photo/BD08DF386BAB223A852570CA006D2819?OpenDocument

Mammals

Reptiles

Birds

Amphibians

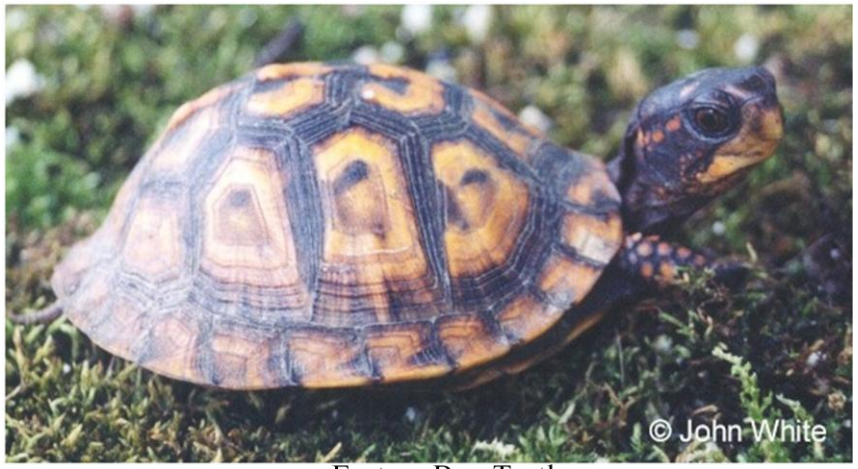
Fish

Insects

Other Animals...

Animal Labels – Just Pictures

Gray Squirrel
(Jeff Trollinger, VA Dept. of Game & Inland Fisheries)
http://www.dgif.virginia.gov/wildlife/information/?s=050057



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https://wwwnotes.fs.fed.us/wo/wfrp/find_a_photo.nsf/findphoto.nsf/photo/BD08DF386BAB223A852570CA006D2819?OpenDocument

Topic 2: Session 2.2 – Insects!

Session Supplies:

- Seven-column class animal chart from Topic 2, Session 2.1
- Insect Safari lesson plan (pg. 34) *[Used with permission from Ohio Department of Natural Resources, Ohio Division of Wildlife, 2045 Morse Rd., Bldg G, Columbus, OH 43229]* www.wildohio.com
- *Insect Safari* sheet (pg. 37) *[Used with permission from the Virginia Department of Game and Inland Fisheries, Headquarters, 4010 West Broad Street, P.O. Box 11104, Richmond, VA 23230]* www.dgif.virginia.gov (Students will use this sheet again in Session 3.)
- Small containers (e.g., empty pill bottles, plastic baby food jars) or bug boxes
- Small paint brushes
- Sweep net (directions for making a simple sweep net can be found on pg. 33)
- Magnifying glasses
- Optional: Insects of Great Sand Dunes Insect Workbook, (pg. 39-46) National Park Service, Great Sand Dunes National Park and Preserve, *"Out of the Blue"* Elementary Teacher Lesson Plans *[Used with permission from Great Sand Dunes National Park and Preserve , 11500 Hwy 150 Mosca, CO 81146]* http://www.nps.gov/archive/grsa/resources/curriculum/docs/insect_booklet_3_6.pdf
- Directions for putting together the Insects of Great Sand Dunes Insect Workbook can be found on pg. 38

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 a, b, c, d, h, i, j, k, m 2.5 a, b	(If students make and use the book Insects of Great Sand Dunes) 2.6 2.7 d, e 2.9 c, d, e, f 2.10 b	2.5 2.6 2.7 2.8 2.9 2.17 2.19	

An excellent resource about insects can be found on the New Hampshire Fish and Game Department (NHFGD) Web site at http://www.wildnh.com/Kids/kids.htm, *Amazing Insects* Vol. 5, Issue 1. *Wild Times for Kids* is published twice a year by the NHFGD. The magazine can be downloaded.

Session 2.2 – Insects!

Teacher Questions & Notes	Procedures
Prior to discussion ask: -What were the six classifications of animals that we discussed previously? -What were some of the characteristics of each group?	1. Review the seven-column animal chart from Topic 2, Session 2.1.
-What does this graph tell us? -Which group has the most examples? The least examples? -How many more _____ than _____? -How many amphibians and reptiles	2. Create a bar graph using the sticky notes from the animal chart. 3. Add a title, labels, and a key to the class bar graph.

Session 2.2 – Insects!

Teacher Questions & Notes	Procedures
do we have all together?	
	4. Refer to the insect category on the seven-column animal chart and review characteristics of insects. Tell students that the class will be looking for examples of the insect family. a. Complete the Insect Safari lesson plan (pg. 34). *NOTE: If you do not have access to long handled, fine mesh nets for sweeping insects that is mentioned on pg. 35, you can make sweep nets following the directions found on pg. 33.* b. After students collect their insects with a partner, each student will choose one insect to observe and record information about it on the *Insect Safari* sheet. Make sure that the students record information about the color of their insects. This information will be used for Topic 2, Session 2.3.
-What do you notice about our groups? -What color is your insect? -Does your insect have wings? -Does anyone else have an insect that is similar?	5. As a class, guide students to group their insects according to similar characteristics. 6. After students are finished, the insects should be released unharmed.
	7. Use the data gathered to pose informal problem-solving scenarios such as: a. If one insect has two antennae, then how many antennae do three of that type of insect have? How do you know? b. How many legs does each insect have? (six) If one insect has six legs, how many legs would four of the same species of insect have? (24) Show how you know.
	8. Refer to the questions in the Insect Safari lesson plan for closure. Have students place the *Insect Safari* sheet in their journals when they return to the classroom. Students will use the *Insect Safari* sheet again in Topic 2, Session 2.3.
	9. OPTIONAL: Have students make the Insects of the Great Sand

Session 2.2 – Insects!

Teacher Questions & Notes	Procedures
	Dunes Insect Workbook (pg. 39-46). Directions for assembly of the book are located on pg. 38. Completion of the booklet may take several work sessions. You may also read the selections from the book and have students complete selected sections of the book.

The Project WILD activity "*Color Crazy" (p.2) will* provide additional background on how animals such as insects use color.

Directions to Make a Sweep Net

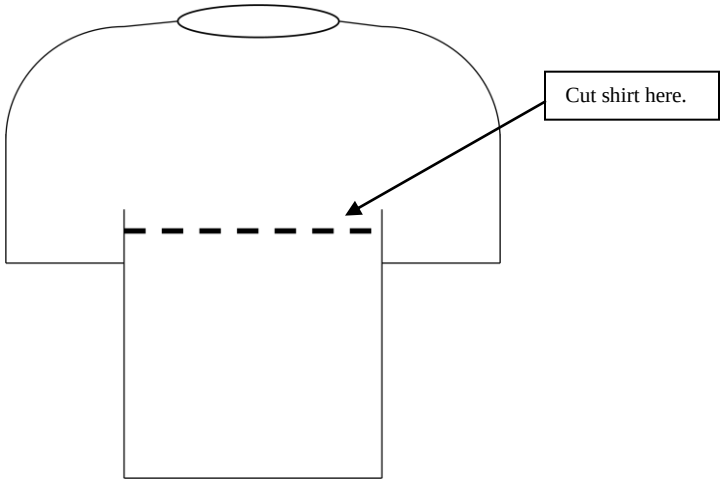
A sweep net can be used to collect insects. A sweep net can be made from an old, large, white, tee shirt and a coat hanger. You can make a few sweep nets for class use or you can have adult volunteers make them.

SUPPLIES NEEDED:
(for each sweep net)

1 old, large, white, tee shirt (shirt should not have any holes)
1 wire hanger
1 pair of pliers to bend the hanger
1 large sewing needle
Heavy duty thread for sewing
Duct tape

Directions:

1. Cut the tee shirt across just below the shirt armpits (see picture)



2. Make a small cut in the hem on the bottom of the shirt.
3. Unbend the hanger.
4. Thread the hanger through the hem.
5. When the hanger is threaded through the entire hem of the shirt, retwist the ends of the wire hanger. This will become the handle of your sweep net.
6. Cover the end of the wire hanger that is now the handle with duct tape to cover any sharp edges.
7. With the needle and thread, sew the other end of the shirt (the cut end) shut.
8. You now have a sweep net to use for specimen collections.

Insect Safari Lesson Plans

Insect Safari

Learning objectives: Students will be able to: 1) describe the relationship between insect structure and function and 2) recognize that wildlife includes both small and large animals in a variety of forms.

Method: Students will explore the school site for insects.

Background:
Wildlife is diverse. Wild animals occur in a variety of forms that help them exist in a wide variety of habitats. Many people only think of familiar birds and mammals as wildlife. Wildlife, however, includes fish, reptiles, and amphibians. Wildlife also includes insects, spiders, worms and invertebrates.

In a number of species and by actual count, insects far exceed all other groups of animals. Ants, grasshoppers, dragonflies, sow bugs and other crawling and flying "bugs' come in a tremendous variety of forms, and exist in almost every imaginable habitat, including every school site in the world.

From school building windows and cracks in the sidewalk, to grassy fields and the open air, insects are everywhere.

Wildlife diversity refers to the number of different kinds of wild animals living in an area. One way to assess the general environmental quality of an area is to evaluate its ability to support a variety of wildlife. The more diverse the habitat, the more likely different kinds of wildlife can live there. By examining the diversity of insects collected at different locations on the school site, some relationships between insect diversity, habitat diversity and how each depends on and interacts with the other can be inferred.

By collecting and examining insects from a variety of places on and around the school site, students begin to appreciate the concept of diversity and the variety of form and related functions among the insects.

Materials:
Students might begin by examining micro-habitats with the classroom or school building. Even in the cleanest building you can usually find evidence of living or dead insects. Look around baseboards, in corners, around light fixtures, and behind books and other items on shelves for moths, ants, flies and other insects.

Any living insects can be gently swept into a temporary container using a small paint brush.

Keep a record of where each insect was found.

Collecting insects out-of-doors can be as simple as a hands and knees inspection of any piece of lawn, a bush, or the bark of a tree. A plastic container can be used to scoop up and discovery for closer examination.

Catching flying insects with a butterfly net is more difficult then it appears. A sweep net is a much more efficient method of collecting a large number and wide variety of insects. Flies, moths, ladybugs, leaf hoppers, and gnats are some of the insects that can be easily collected using this equipment.

A long-handled, fine mesh net is swept back and forth just brushing the top of grass or weeds. The idea is to sweep any insects buzzing around and among the grass and weeds into the net. After 15 or 20 swipes, swing the net around swiftly above your head to concentrate the animals. Then grasp the top of the net to form a bag and to keep them from escaping.

Collected insects can be transferred for closer inspection into smaller plastic bags.

Larger insects like crickets and grasshoppers can be collected by hand and transferred to plastic bags or jars. A sheet of plastic pulled to the ground by two students usually traps grasshoppers safely.

While sweeping is a great way to catch many flying and hopping insects, small beetles, sow bugs and other low to the ground insects that are not usually captured in sweep nets can be added to your collection using pitfall traps.

Pill bottles, small juice cans or similar containers can be placed in holes in the ground the same size as the container. Small holes are punched or drilled into the bottom of the trap to let water drain.

Place a little bait such as candy crumbs, meat, or peanut butter at the bottom on the trap. Traps should be left for at least eight hours or overnight. Insects captured in the pitfall traps are then transferred to the containers for comparisons with insects captured earlier.

Once your collecting safari is complete, suggest to the students that they should describe and compare their collection as if these insects have been discovered for the first time.

The following questions can be used to help guide their inquiry:

- What are the most prominent features (body parts) of each insect? What do they appear to be used for?
- Does the insect have wings? How many? How are they attached to the body?
- Can you locate a mouth? What foods does the mouth seem suitable for?
- Where are the eyes located? How many? Are they like the eyes of mammals? How are they different?

- Does the insect have antennae? What do you think the antennae are used for?
- How many legs does the insect have? Does it hop, walk, run or climb?
- Describe the color of each insect. Do you think the color helps the insect survive?
- Where did you collect the insect? What form and function observations have you made that you can link to the place the insect was found?

Finally, talk about the diversity among the animals you've examined. How does the wide variety of forms help these animals survive and be successful?

NOTE: When you are through studying the insects, they should be released. Care should be taken to ensure survival. Temperature and moisture should be monitored.

Be prepared, however, for the few insects that will likely not survive. Deal with this dilemma on a case-by-case basis. Encourage the students to be careful with living organisms but not feel guilty if a few insects die.

Extension:
Larger flying insects like grasshoppers can be easily captured with a plastic sheet. A team of four each takes a corner of a 30-inch by 60-inch piece of clear plastic. The team walks through the grass and quickly pulls the sheet down trapping all the insects below. Larger insects will appear against the plastic as they try to escape.

Project WILD Connection:
The following Project WILD activities provide additional background information and enhance or supplement this activity
Ants on a Twig -- K-12 Guide, page 88
Grasshopper Gravity -- K-12 Guide, page 4

Activity reprinted with permission from *Twenty / Twenty; Projects and Activities for WILD School Sites,* Ohio Division of Wildlife.
For information about Virginia's WILD School Sites program visit
www.dgif.virginia.gov/education

Insect Safari – Student Sheet

Insects !

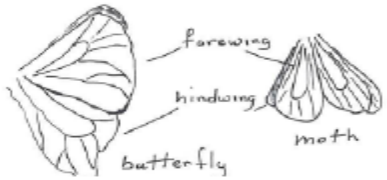
Name: _____

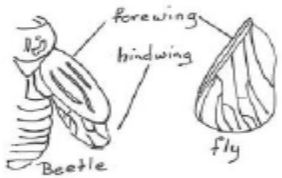
Mouth Parts

Draw your insect here

Leg Kinds

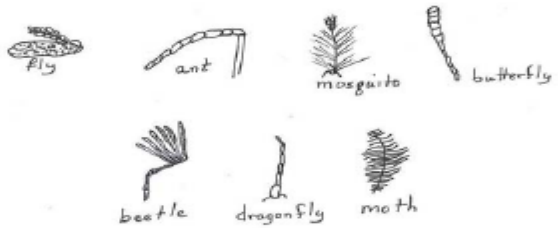
Wing Types





WORD BOX

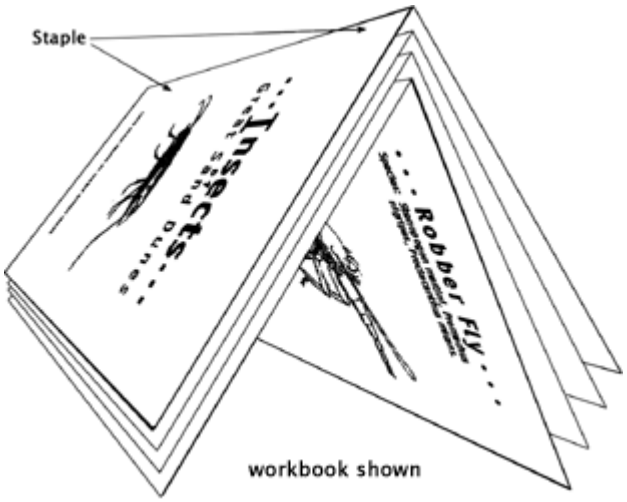
Antennae



Virginia Department of Game and Inland Fisheries 2008

Directions to Put Together the Insect Workbook

Step 1: For each student, prepare one copy of the Insect Workbook. This printable file is designed to be printed back-to-back, folded, and stapled in proper order; Page 2 is printed on the back of page 1, page 4 is printed on the back of page 3; etc. Use the diagram below to assist with production of Great Sand Dunes' insect booklets. You may wish to print each sheet out and then use a photocopier to collate the booklets.



Step 2: Provide each student one workbook. Older students will have the chance to invent their own insect. Provide students drawing and coloring materials.

Step 3: Once completed, post workbooks on a bulletin board so that students can see the variety of invented insects (booklet, page 14). Afterward, students who are interested may present their invented insect to the class. Be sure they describe how their insects' specialized parts are used in the way they live/eat.

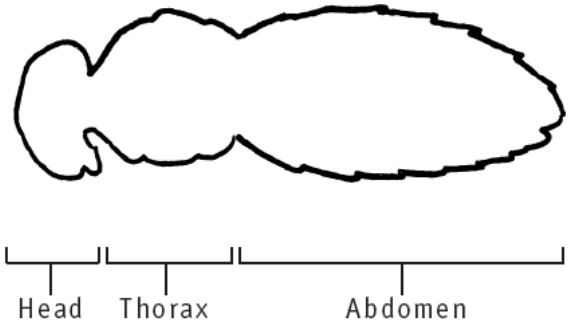
...Insects...
of
Great Sand Dunes

Great Sand Dunes...Insects...

• • • Insect Basics • • •

Over one thousand different kinds of insects live at Great Sand Dunes. Some live in the sand, some climb in the trees, some swim in the water, and some wander on the mountaintops in search of food.

Insects are closely related to shrimp, crabs, lobsters, spiders, and mites. All of these have segmented bodies. Scientists call these animals arthropods (arthro = jointed, pods = feet).



Insects have three main parts: head, thorax, and abdomen. The head contains the mouth, sensory organs, eyes, and brain. The thorax operates an insect's six legs and wings. The abdomen provides digestive, excretory, reproductive, and breathing abilities.

Convert this body into your favorite insect.

• • • _____ • • •

Insect Name

_____

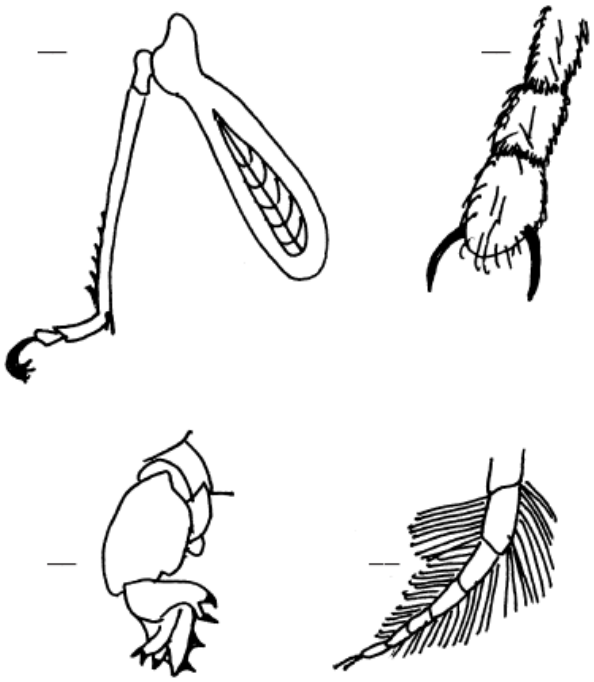
Scientific Name

Using the knowledge that you have gained through this workbook, create your own insect. It must have the following features: head, thorax, abdomen, six legs, one pair of antenna, a mouth, two eyes, two or four wings, and either camouflage or warning coloration.

Habitat:_____

Foods:_____

• • • Leg Kinds • • •



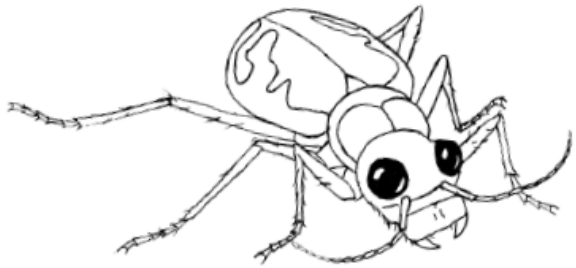
Leg Purposes:
A) climbing, B) jumping, C) swimming, D) digging

-13-

Match the leg with its purpose.

• • • Great Sand Dunes • • •
Tiger Beetle

Cicindela theatina



Found only at Great Sand Dunes, this tiger beetle has an irridescent (sparklely and shiny) coloration. Color this insect's head and thorax greenish-blue. The middle part of this beetle's forewings should be colored greenish-brown (hint: see page 11).

-2-

• • • Great Sand Dunes • • •
Darkling

Eleodes hirtipennis

This scavenger beetle searches for fallen leaves and plant parts in the dunes. Draw a dune habitat around this insect.

-3-

• • • Mouth Parts • • •

__grasshopper or beetle

__fly

__mosquito

__butterfly

Feeding Types:
A) piercing and sucking, B) biting and chewing, C) siphoning, D) sponging

Match the feeding type with the insect.

-12-

• • • Wing Types • • •

Insects use wing coloration and pattern for camouflage and warning. Color examples of camouflage and warning above.

-11-

• • Giant Sand-treader • •
Camel Cricket

Daihinibaenetes giganteus

This special species of camel cricket has hind legs that are perfectly designed for digging and burrowing in the sand. Draw a night time dune scene around this nocturnal cricket.

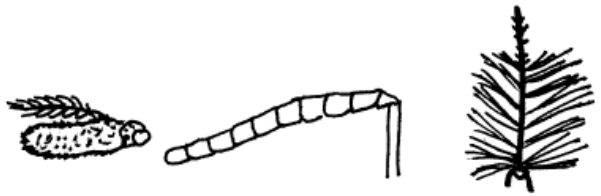
-4-

• • • Ten-lined • • •
June Beetle

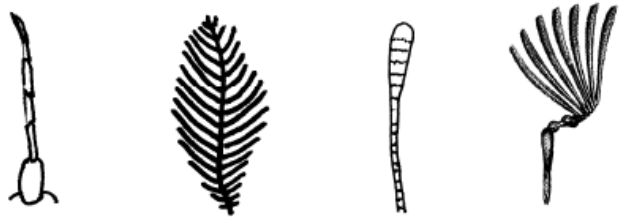
Polyphylla decimlineata

Draw this greenish June beetle feeding on plants within the dunes.

• • • Antennae • • •
Guess



fly ant mosquito



dragonfly moth butterfly beetle

Insect antennae differ greatly in size and shape, but they all perform simlarly. The antenna's main functions are to feel or touch and to smell. Some are even used to hear.

Think about why the antennae above are shaped the way they are, so that when you invent your own insect on page 14, your insect's antenna will be shaped in a way that helps it survive.

• • • Red Velvet-Ant • • •

Dasymutilla sp.

Velvet-ants are actually wasps. Females lack wings. Draw this velvet-ant seaching for nectar from a flower.

-6-

• • • Grasshoppers • • •

When in flight, the hind wings show a burst of color. While at rest, this grasshopper's coloration and pattern provide camouflage. Show this grasshopper escaping from a predator.

-9-

• • • Sand Wasp • • •

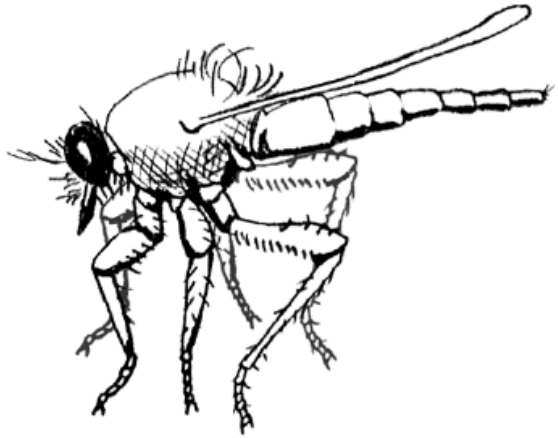
Species: *Bembix pruinosa, Bembix americana spinolae, Microbembix monodontaix*

Sand wasps lay their eggs in holes that they dig. Show this one digging a hole in the sand.

-7-

• • • Robber Fly • • •

Species: *Stenopogon martini, Promachus nigripes, Proctacanthus micans*



Robber flies are fierce predators. Draw a prey insect in its clutches.

-8-

Topic 2: Session 2.3 – Insect Math

Session Supplies:

- *Insect Safari* sheet from Topic 2, Session 2.2 (pg. 37)
- *Graphing Sheet* (pg. 49)
- Strips of paper cut ahead of time – approximately four strips per 8" X 11" piece of paper (Each team of two students will need four strips of paper.)

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 a, h, i	2.7 e	2.5 2.6 2.7 2.8 2.9 2.17 2.19	

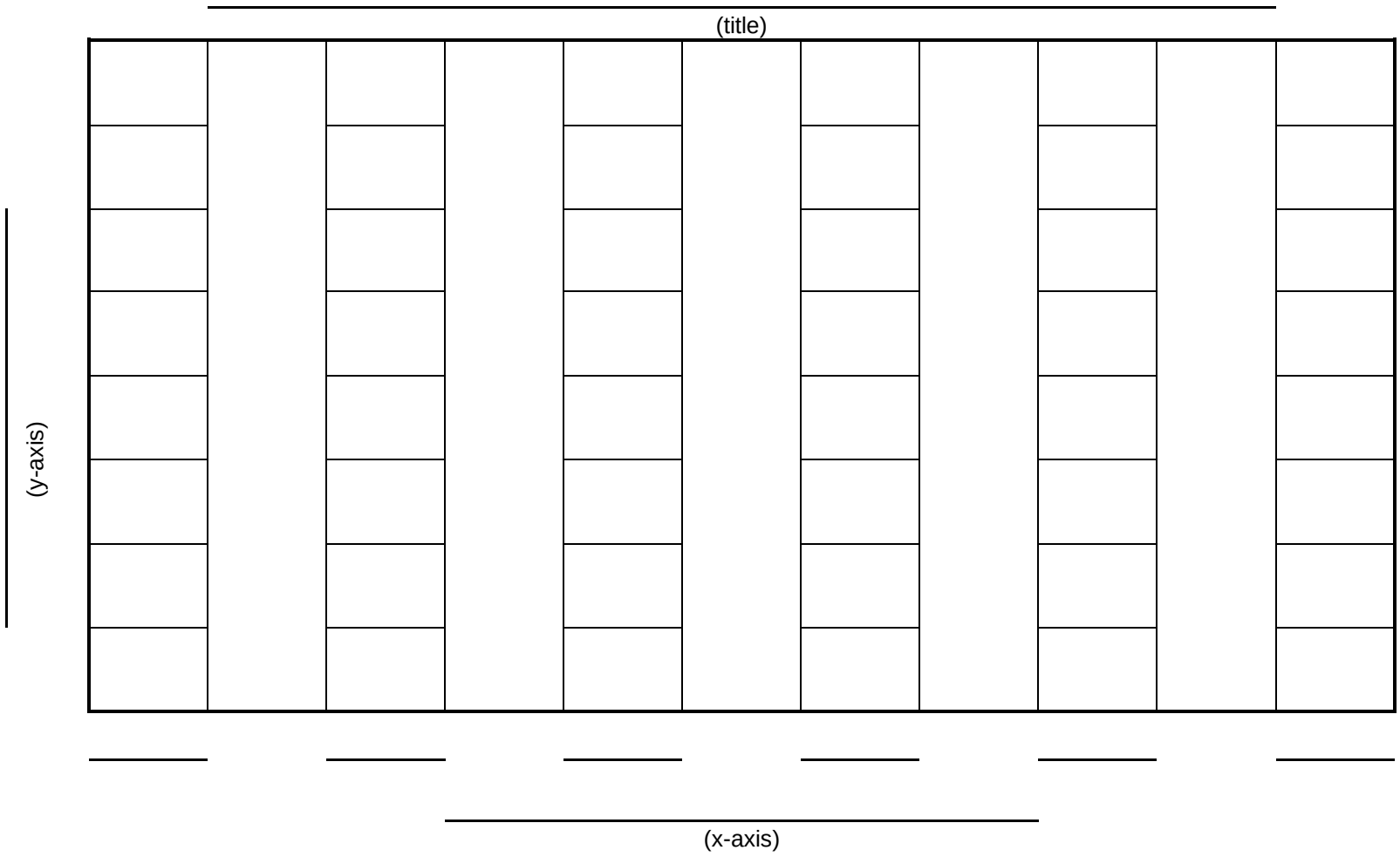
Session 2.3 – Insect Math

Teacher Questions & Notes	Procedures
	1. Refer back to the *Insect Safari* sheet (pg. 37) from Topic 2, Session 2.2.
	2. Use tallies to record class data on insect colors.
-What information do you need to include in your graph of insect colors?	3. Have each student use the data to create a bar graph of insect colors using the *Graphing Sheet* (pg. 49). Students can then put their graph in their journals.
	4. Together create a bar graph on the board or using an overhead projector. Have students compare their individual graphs to the class graph and make changes if necessary.
-What does your graph tell you?	5. Divide the students into two-person teams. 6. Give each team of students four precut strips of paper. 7. Have students write a word problem on each separate strip of paper using information for the word problems from the class graph. a. Students create addition and subtraction problems with a partner. b. Each team will share their problems with the class. c. Select a few problems to solve emphasizing problem solving

Session 2.3 – Insect Math	
Teacher Questions & Notes	**Procedures**
	strategies. d. Gather the problems to create a class word problem book.

Name: _____

Graphing Sheet – Student Sheet



Topic 2: Session 2.4 – Animal Poetry Introduction

Session Supplies:

- Teacher-selected book on wetlands that was read during Topic 2, Session 2.1
- *Cinquain Brainstorming* sheet (pg. 52) (This page will be used again for Topic 2, Session 2.5.)
- *Animal Reading Response* sheet from Topic 2, Session 2.1 (pg. 18)

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 k	2.2 a, b, c, e 2.3 a, b 2.7 d, e 2.12 a, c, d		

Session 2.4 – Animal Poetry Introduction

Teacher Questions & Notes	Procedures
	1. Refer students to the teacher-selected book on wetlands that was read during Topic 2, Session 2.1. 2. Review with the students their responses to the bottom two statements on the *Animal Reading Response* sheet (pg. 18). 3. Select a section in the book about one of the animals it describes. a. Ask students to close their eyes while you reread the page(s) about the animal you chose. b. Tell the students to picture the animal in its habitat, and listen for the describing words as you read the selected passage.
-What animal was described? -What words were used to describe the animal(s)?	4. List the animal and the describing words on the board. 5. If you have time, do the same thing with other selections in the book.
-What rhyming words could you use to describe the animal and its habitat? -What kind of writing uses rhyming words? -Does all poetry rhyme?	6. Introduce the cinquain poem. 7. Read an example of a cinquain. Hawk Large, Strong Soaring, Diving, Twisting Beautiful in the sky Bird

Session 2.4 – Animal Poetry Introduction

Teacher Questions & Notes	Procedures
	8. Model and write a class cinquain using the animal and describing words from the class book. 9. Have each student select an animal that they will write a cinquain about. Students can look at the seven-column chart that was made by the class during Topic 2, Session 2.1 to get an idea for an animal if they are unsure what animal to select.
	10. Begin to prepare students to write a cinquain in the next session. To prepare for writing the cinquain, have students brainstorm and organize their ideas in their journal. Use the *Cinquain Brainstorming* sheet (pg. 52). (This page will be used again in Topic 2, Session 2.5.)

"Animal Poetry" (pg. 282) is a Project WILD activity that use poetry as a method to learn about the environment. *"Water Wings"* (pg. 110) is another activity that uses poetry and can be found in Project WILD Aquatic.

Name: _____

Cinquain Brainstorming – Student Sheet

Adjectives that describe your animal:	Verbs ending in –ing that describe your animal:
A short phrase that describes your animal:	Other names for you animal:

_____
(Your Animal Name)

Topic 2: Session 2.5 – Animal Poetry Work Session

Session Supplies:

- *Cinquain Brainstorming* sheet (pg. 52) from Topic 2, Session 2.4
- *Cinquain Draft* sheet (pg. 54)

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 k	2.2 a, b, c, e 2.7 d, e 2.12 a, c, d		

Session 2.5 – Animal Poetry Work Session

Teacher Questions & Notes	Procedures
	1. Read the example below of a cinquain poem. Snake Long, Thin Slithering, Coiling, Sunbathing Hiding in the grass Reptile
	2. Have students refer to the *Cinquain Brainstorming* sheet (pg. 52) in their journal. 3. Have students write a draft of a cinquain using the *Cinquain Draft* sheet (pg. 54).

Name: _____

Cinquain Draft – Student Sheet

_____
(Subject)

_____ _____
(Adjective) (Adjective)

_____ _____ _____
(-ing Verb) (-ing Verb) (-ing Verb)

_____
(A short phrase that describes your subject)

_____
(Synonym for the Subject)

Topic 2: Session 2.6 – Animal Poetry Completion

Session Supplies:

- *Animal Cinquain Final Copy* sheet (pg. 56)

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 k	2.2 a, b, c, e 2.6 a, d 2.7 e 2.12 d		

Session 2.6 – Animal Poetry Completion

Teacher Questions & Notes	Procedures
	1. Pair students with a buddy to read and edit each other's cinquain and provide suggestions for improvement, if needed.
	2. Have students write and illustrate the final copy of their cinquain on the *Animal Cinquain Final Copy* sheet (pg. 56).
	Suggested Extensions 3. Make a class book using the student cinquains. The book may be placed in the classroom library for students to reread later. 4. Students may write cinquains about other familiar objects. 5. Students may write a different type of poem about the animal they chose for their cinquain.

Name: _____

Animal Cinquain Final Copy – Student Sheet

_____

_____ _____

_____ _____ _____

_____

_____

Topic 2: Session 2.7 – Student Team Project Introduction

Session Supplies:

- *Virginia Animals Brainstorming Graphic Organizer* sheet (pg. 19) from Topic 2, Session 2.1
- Large Virginia map with as few details on it as possible (source of possible map to use is http://www.dgif.virginia.gov/education/sol/va-watersheds-bw.pdf)
- *Student Virginia Map* (pg. 61) – one copy per student team *[Used with permission from the Virginia Department of Game and Inland Fisheries, Headquarters, 4010 West Broad Street, P.O. Box 11104, Richmond, VA 23230]* www.dgif.virginia.gov
- Teacher directions for the team project – found in the *Unit Project Information, Appendix A* (pg. 234), at the end of the unit
- *Virginia Native Animals List* – list of a sampling of Virginia animals – found in the *Unit Project Information, Appendix A* (pg. 237), at the end of the unit
- Team project notebooks *(notebooks can be actual 3-ring binders or can be student-made)*
- Materials to decorate team project notebooks
- *Group Reflection* sheet – can be used at the end of every Group Project work session – found in the *Unit Project Information, Appendix A* (pg. 239), at the end of the unit and at the end of this session's directions (pg. 62)
- A collection of books on various Virginia animals
- *Virginia Wildlife* magazines from the school's library
- If computers are available for research, bookmark several Web sites where information about Virginia animals might be found

Session Virginia SOL

Science	English	Mathematics	History & Social Science
2.1 k, l, m	2.7 e 2.9 f 2.10 2.14		2.5 2.6

A good source of several different Virginia maps is the Virginia Department of Game and Inland Fisheries Web site. (http://www.dgif.virginia.gov/education/sol/watersheds.asp)

Session 2.7 – Student Team Project Introduction

Teacher Questions & Notes	Procedures
-Do all animals live in every part of Virginia? -Why is it important to know where an animal lives?	1. Have students refer to their list of Virginia animals in their journals that they generated on the *Virginia Animals Brainstorming Graphic Organizer* sheet (pg. 19) (from Topic 2, Session 2.1) and share the names of some examples of Virginia animals. .
-What do we need to add to our map?	2. Display a large outline of Virginia. (If you do not have a map of Virginia that is just an outline of the state, the outline can be drawn on chart paper, on the board, or using an overhead.).

Session 2.7 – Student Team Project Introduction

Teacher Questions & Notes	Procedures
	a. Add a title and a compass rose to the map. b. Have a student point out where he/she thinks the school is located in Virginia on the outline. c. Have students who disagree with the location use cardinal directions to direct the student to a more appropriate location on the outline. d. Use an actual Virginia state map to confirm the location of the school. e. Label your school's location on the outline map of Virginia.
-Using cardinal directions, tell me where the Atlantic Ocean is in relation to Virginia? -Starting from where we live, which direction would you go to reach the Appalachian Mountains? -Where is the James River located?	f. Review and label the locations of the Appalachian Mountains, the James River, and the Atlantic Ocean.
	PROJECT WORK TIME: 3. Introduce the unit project. a. Describe the overall project. *(Refer to the "Teacher Directions for Project" (pg. 234) found in Appendix A at the back of the unit.)* Explain that each team will select a Virginia animal that they will study for the next few weeks. b. Explain that by the end of this particular project work time each team will select the animal that the team will study for their project. Each team should also find information about where in Virginia their animal lives. c. Briefly describe the three project product components *(written report, visual product, and class presentation).* *NOTE: Descriptions of the three project components can be found in Appendix A:* *1) Virginia Animals and their Habitats Design Brief (pg. 235)* *2) Written Report Rubric (pg. 240)* *3) Visual Product Rubric (pg. 241)*

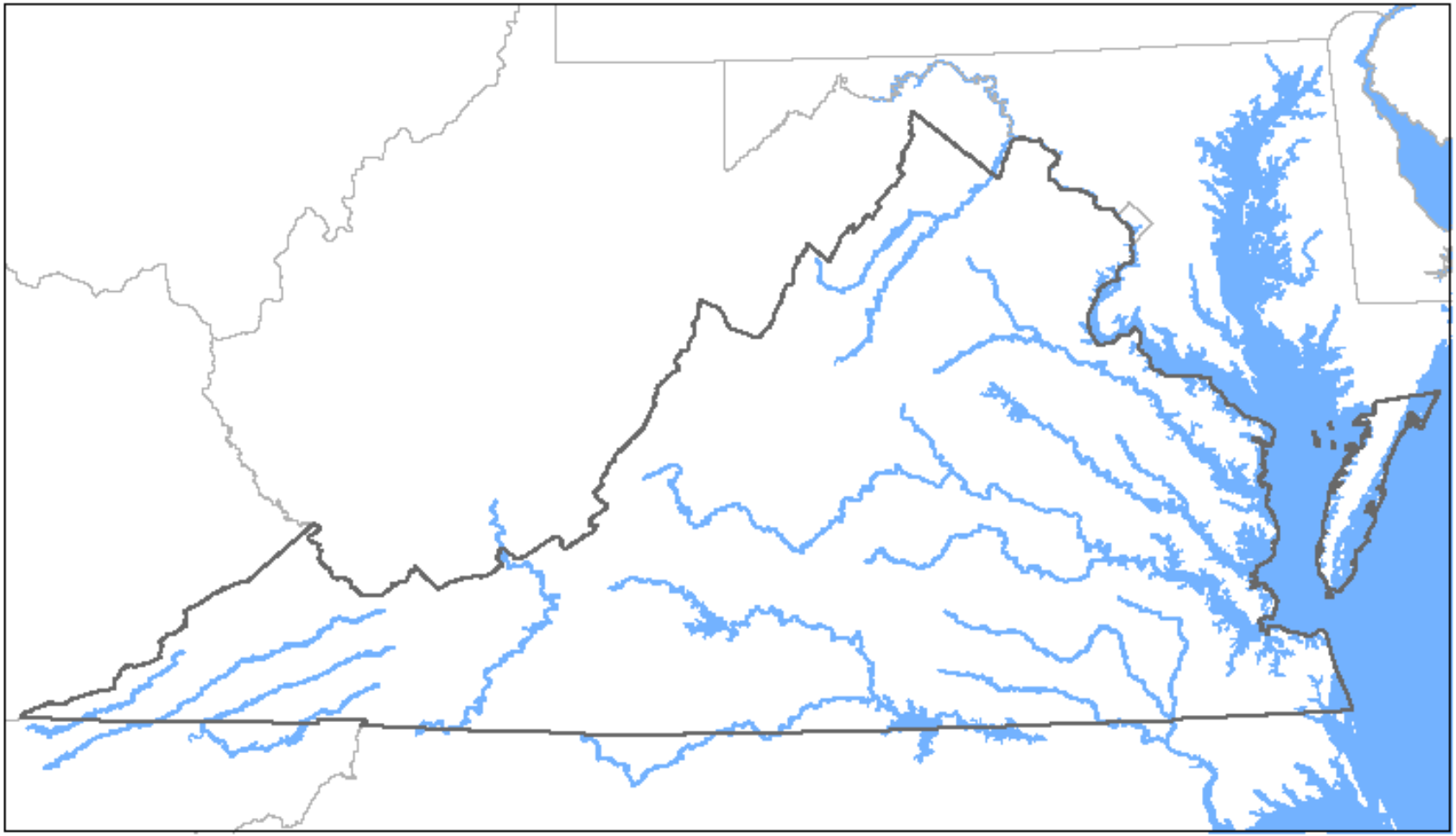
Session 2.7 – Student Team Project Introduction

Teacher Questions & Notes	Procedures
	4) Presentation Rubric (pg. 242) *DO NOT review the four documents above in detail with your students at this time. Each of the documents will be reviewed with the students at a later time in the unit.* d. Assign students to teams of three to four students per team. These groups are the student project teams. e. Give the project teams time to look at various books on different Virginia animals. Students can also look for animals at http://www.dgif.virginia.gov or other teacher preselected Web sites, or search through *Virginia Wildlife* magazines which can be found in the school library. f. Give the project teams time to discuss and come to a consensus about which animal their team will research for their project. g. Bring the class back together. List the selected animal for each team on a piece of chart paper. Display the chart in the classroom for the remainder of the unit. h. Using the Virginia map, help each group determine approximately where in Virginia their group's chosen animal lives. Discuss the fact that some animals can be found in every area of the state (e.g. whitetailed deer, bullfrogs). *(As student groups continue project work, they may narrow or expand the area in Virginia where their animal lives.)* i. Have students return to their teams. Each team needs to create a team notebook that will be used for organizing all project information and research results that will be gathered throughout their project. Help students organize their team project notebooks so that they have an introductory section for overall project documents (e.g., rubrics, design briefs), sections for each research topic (e.g., habitats, life cycles), sections for project products (e.g., report, presentation), and sections for any other items that relate to their project. j. Give teams time to decorate their team notebook. *(Decorating the team notebook can be an ongoing activity. Teams may want to "plan" how they will decorate their notebook and continue the decorating in future project times.)*

Session 2.7 – Student Team Project Introduction

Teacher Questions & Notes	Procedures
	k. Each team should be given a *Student Virginia Map* (pg. 61) to put in their team notebook. Have the teams note on their map where their selected animal can be found in Virginia. *(Notations on their team map should be made with pencil so that if during future research they need to expand or narrow the area where their animal is found, they can easily make the changes on their map.)* l. At the end of the discussion, have each student fill in a *Group Reflection* sheet (pg. 62 and pg. 239). *(The Group Reflection sheet can be used at the end of each project group worktime and can be kept in the team project notebook.)*

Virginia Map – Student Sheet



Group Reflection – Student Sheet

What did my group do?

What did I do?

Reflection Window

Date: _____

What questions do we still have?

How well did we work together?

We worked at a level: _____

3 – Everyone contributed and cooperated.

2 – Most of us contributed and cooperated.

1 – Some of us contributed and cooperated.

I think this because

Acknowledgments

by the
Virginia Department of Education
P. O. Box 2120
Richmond, Virginia 23218-2120
http://www.doe.virginia.gov

in partnership with the
Virginia Department of Game and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230
http://www.dgif.virginia.gov

Virginia Department of Education

Superintendent of Public Instruction
Patricia I. Wright

Assistant Superintendent for Instruction
Linda M. Wallinger

Office of Standards, Curriculum and Instruction
Mark R. Allan, Director
Barbara P. Young, Science Specialist
Deborah Wickham, Mathematics Specialist
Thomas Santangelo, Reading Specialist
Betsy Barton, History and Social Science Specialist

Virginia Department of Game and Inland Fisheries

Executive Director
Robert W. Duncan

Wildlife Education Coordinator / Project WILD Coordinator
Suzie Gilley

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We wish to express our gratitude to the following for granting permission for the use of photographs and/or lessons in *Virginia Animals and their Habitats* grade two cross-curricular unit.

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Roo-Rats Elementary Teachers Lesson Plans
**Insect Workbook*

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Twenty/Twenty-Projects and Activities for WILD School Sites
**Insect Safari*

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Insect Image Gallery
**Tailed Jay Butterfly* *(Jon Lelito, photographer)*
**Postman Butterfly* *(Jon Lelito, photographer)*
**Julia Butterfly* *(Jon Lelito, photographer)*
**Isabella Butterfly* *(Jon Lelito, photographer)*
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**Imperial Moth* *(Maryann Frazier, photographer)*
**Io Moth* *(Maryann Frazier, photographer)*
**Giant Swallowtail Butterfly Caterpillar* *(Maryann Frazier, photographer)*
**Pandora Sphinx Moth Caterpillar* *(Maryann Frazier, photographer)*

Smithsonian National Zoological Park
Washington, DC
Animals – Backyard Biology
**Black Swallowtail Butterfly*
**American Painted Lady Butterfly*
**Great Spangled Fritillary*
**Monarch Butterfly*
**Tiger Swallowtail Butterfly*

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University of Kentucky Entomology Kentucky Critters

**Waved Sphinx Moth (Blake Newton, photographer)*
**Clearwing Sphinx Moth (Blake Newton, photographer)*
**Pipevine Swallowtail Caterpillar (Ric Bessin, photographer)*
**Spicebush Butterfly Caterpillar (Ric Bessin, photographer)*
**Fritillary Caterpillar (Ric Bessin, photographer)*
**Monarch Caterpillar (Ric Bessin, photographer)*

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The NatureWatch, Wildlife, Fish, and Threatened and Endangered Species Program's Photograph Library

**Prince Baskettail (David Arboux, photographer)*
**Argiope Spider (David Arboux, photographer)*

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**Measuring Tree Height*

Virginia Department of Game and Inland Fisheries
Richmond, Virginia

Wildlife Information

**Eastern Gray Fox (Dave Schaffer, USFWS, photographer)*
**Virginia Opossum (John White, photographer)*
**White-tailed Deer (Lee Walker, photographer)*
**White-tailed Deer Fawn (WJ Berg, USFWS, photographer)*
**Black Bear (Steven Ferguson, photographer)*
**Eastern Gartersnake (John White, photographer)*
**Black Vulture*
**Gray Squirrel (Jeff Trollinger, photographer)*
**Eastern Box Turtle (John White, photographer)*
**Osprey*
**American Toad (John White, photographer)*
**Largemouth Bass*
**Bullfrog (Bob Greenlee, photographer)*
**Little Grass Frog (Paul Sattler, photographer)*
**Mountain Chorus Frog (Paul Sattler, photographer)*
**Northern Green Frog (Paul Sattler, photographer)*
**Pickerel Frog (John White, photographer)*
**Insects student sheet*
**A Look Outside DVD*

**Compare Yourself to a Black Bear student sheet*
**Virginia map with no labels*
**Tundra Swan 888 Migration Path*
**Tundra Swan 893 Migration Path*
**Tundra Swan 894 Migration Path*

Virginia Tech – Department of Entomology
Blacksburg, Virginia

Insect Identification Lab

**Gypsy Moth (E.A. Roberts, Senior Research Associate, Department of Entomology; Virginia Tech)*
**Tent Caterpillar*
**Green-striped Mapleworm*
**Gypsy Moth Caterpillar (E.A. Roberts, Senior Research Associate, Department of Entomology; Virginia Tech)*
**Hickory-Horned Devil*
**Saddleback Caterpillar*
**Fall Webworm Caterpillars*