Buggy About Dragonflies

AN IMPORTANT ST. JOHNS RIVER INSECT

SKILLS: identifying causes and effects, researching a topic

COMMON CORE STANDARDS/FLORIDA STANDARDS:
RI.4.3; RI.5.3; W.4.7; W.5.7
NEXT GENERATION SUNSHINE STATE STANDARDS:
SC.4.L.17.2; SC.5.L.15.1; SC.5.L.17.1
NEXT GENERATION SCIENCE STANDARD: 4-LS1-1

MATERIALS:
12 sheets unlined white paper
12 sheets unlined colorful paper
tape

GETTING READY:
Write each adaptation shown in the chart on two sheets of white paper. Write each benefit on two sheets of colorful paper. (Do not write the statements' numbers.)

Dragonfly Adaptations	Benefits
1. Its mouth has a fork-and-spoon-shaped part that can be extended forward from underneath the head very quickly.	1. The dragonfly can capture its prey before the animal has time to react.
2. A dragonfly nymph (larva) lives underwater and is well camouflaged.	2. The hard-to-see nymph can ambush its prey and also escape predators.
3. The dragonfly's wings are criss-crossed by many small veins.	3. The wings have added strength and flexibility.
4. The dragonfly can hover in midair.	4. It can catch other insects as they fly by.
5. The dragonfly is an extremely agile flier.	5. It can fly away from predators like birds, lizards, frogs, spiders, fish, water bugs, and even other dragonflies.
6. Dragonflies are not fussy eaters.	6. There's more food available to them.

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STEPS:

1. Divide the class into groups. Share about a time when you saw someone or something small make a big difference, such as when a single person achieved something great. Give students several minutes to discuss examples. Then have each group share one of its examples.

2. Explain to students that today they will learn about a small insect that makes a big difference in the health of an ecosystem like the St. Johns River watershed. (If needed, review with students the characteristics of insects using the information in the sidebar on this page.)

3. Show students photographs of dragonflies from the Internet and the websites on page 12. Have students use the photos to predict why these insects might be so important to an ecosystem. After students share, explain that dragonflies are an **indicator species**. If an indicator species thrives, the ecosystem is healthy. But if an indicator species dies or moves away, that indicates the ecosystem is having problems. Because dragonflies spend most of their lives underwater and require clean water to live, they can signify water quality. So if dragonflies are not found year-round near a water body, there could be problems, such as the presence of pesticides, excessive nutrients, a buildup of silt, or other contaminants in the water.

4. To share with students the unique adaptations that help dragonflies survive in an aquatic ecosystem, tape one of the labeled papers prepared in "Getting Ready" on page 9 on the front of each student's shirt. Explain that the dragonfly's adaptations are written on white paper and the benefits of the adaptations on colorful paper. Then challenge each student to walk around the room and find a matching classmate.

What Characterizes an Insect?

Most adult insects have these characteristics:

- a rigid exoskeleton
- a body divided into three parts (head, thorax, abdomen)
- three pairs of legs
- usually one pair of antennae and a pair of compound eyes
- usually two pairs of wings (though some insects have no wings and some have only one pair)
- lay eggs

Insects include beetles, cockroaches, ants, bees, wasps, butterflies, moths, flies, dragonflies, grasshoppers, and crickets.

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5 If two students believe they are a match, have them sit down together. When everyone is sitting, review the students' matches and make any corrections.

6 If desired, have students do more research on dragonflies, focusing on how they get their basic needs met. Share an example of a newspaper want ad. Then have each student create a want ad written by a dragonfly looking for an appropriate habitat in which to settle.

Habitat Needed!

Family of dragonflies looking for an aquatic ecosystem such as a river, lake, pond, or other open body of freshwater. A large supply of healthy aquatic vegetation is a must, as is a clean water supply. Food supply must be plentiful; we're not picky and will eat just about anything but we are particularly looking for a habitat with an abundant supply of small insects, especially flies.

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Grades 2-3 Extensions:

Using the information in the sidebar on this page, have students illustrate the stages of the dragonfly's life cycle and compare it to those of other animals the class has studied. As an alternative, have students create Venn diagrams to compare the dragonfly to an animal of the St. Johns River watershed that belongs to another class of animals, such as the alligator (reptile), bald eagle (bird), manatee (mammal), or the green tree frog (amphibian). Require that students include information about how the habitat meets the needs of each of the animals. *Common Core Standards/Florida Standards W.2.7; W.3.7; Next Generation Sunshine State Standards SC.2.L.16.1; SC.2.L.17.1; SC.2.L.17.2; SC.3.L.15.1; Next Generation Science Standards 2-LS4-1; 3-LS1-1*

Grades 6-8 Extensions:

Divide the class into four groups and assign each group one of the following insects that inhabit the St. Johns River watershed: dragonfly, grasshopper, mosquito, wasp. Have each group research to find out the factors—including environmental interactions with other living things and with nonliving factors—that its insect depends upon for survival. Have each group choose a creative way to present its findings, such as a skit, a readers' theatre or a song. *Common Core Standards/ Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Sunshine State Standard SC.7.L.17.2; Next Generation Science Standards MS-LS1-5; MS-LS2-1*

For more information on dragonflies, see these resources:

- http://entnemdept.ifas.ufl.edu/bug_club/100_insects/odonata.shtml
- http://www.espsciencetime.org/student_life.cfm?subpage=326983
- http://www.ucmp.berkeley.edu/arthropoda/uniramia/odonatoida.html
- http://www.dragonfly-site.com/dragonfly-life-cycle.html

For more information about the St. Johns River, check out these resources:

- http://www.sjrwmd.com/stjohnsriver/
- http://www.theriverreturns.org/
- http://dep.state.fl.us/Northeast/stjohns/

The Life Cycle of a Dragonfly

The dragonfly life cycle includes three stages: egg, nymph (larva), and adult.

- After two dragonflies mate, the female lays eggs on a plant in the water. If the female cannot find a suitable plant, she will drop the eggs in the water.
- A larva called a nymph hatches from each egg. The dragonfly nymph lives in the water while it grows and develops, using gills to breathe. It can take up to four years to complete its development.
- The nymph climbs up the stem of a plant during the night and starts to breathe. Its skin splits, and the adult dragonfly emerges.
- The adult dragonfly flies away to look for food and a mate. Adult dragonflies only live for about two months.

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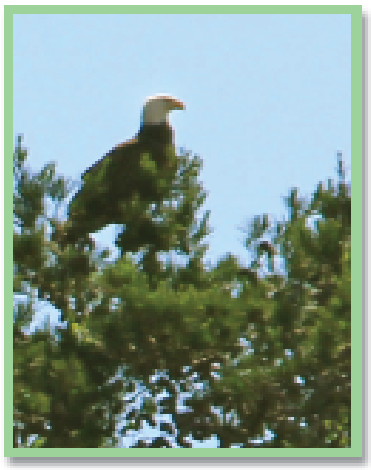
Name _____ Reading informational text, vocabulary

THE BALD EAGLE MAKES A COMEBACK



It's one of the most **impressive** birds in the animal kingdom. The bald eagle calls Florida and the St. Johns River home. It's also our national symbol. This snowy-feathered bird may be easy to recognize, but it has not been easy to protect. Not too long ago, this eagle was in danger of becoming **extinct**. Today it is the main character in its own success story!

So why was the bald eagle in danger? In the 1700s, an estimated 100,000 nesting bald eagles lived in the lower 48 states (all states but Hawaii and Alaska). By 1963, only 417 nesting pairs of bald eagles remained. Bald eagles were in danger for several reasons. Some were **illegally** shot. The habitats where bald eagles built their nests were destroyed. Another problem affected fish, the main food of the bald eagle. A poison called DDT was used to control insects. The poison washed into nearby waterways, where the fish absorbed it. Bald eagles ate the fish and were poisoned with DDT. The poison made the eggshells of bald eagles weak. The shells often broke or the eggs failed to hatch.

Concerned people knew something had to be done. In 1972, the US government **banned** the use of DDT in the United States. It also passed a law called the Endangered Species Act. This law listed bald eagles as an endangered species in the lower 48 states. It protected the bald eagle and worked to **conserve** its habitat. The US Fish and Wildlife Service took other steps, such as protecting sites where bald eagles nested. All of these steps together made a difference! In 2007, the bald eagle was taken off the list of threatened and endangered species. Scientists estimate that there are now at least 9,789 nesting pairs of bald eagles in the lower 48 states. Now that's a success story!

Answer the questions about this text on your own paper.

1. What past problem is described in this passage?
2. Underline in red the text that supports your answer to number 1.
3. What solutions to the problem are described in the text?
4. Underline in blue the text that supports your answer to number 2.
5. Use context clues to write the boldfaced word that matches each definition.
   a. done against the law
   b. when the last member of a species is dead or unable to reproduce
   c. deserving attention, admiration, or respect
   d. to try to protect or preserve something or to limit how much of a resource you use
   e. said something couldn't be used or done

Bonus: What special body structures or behaviors help bald eagles survive? Research to find out.

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Common Core Standards/Florida Standards RI.4.1; RI.4.3; RI.4.5; RI.5.1; RI.5.3; RI.5.5
Next Generation Sunshine State Standard SC.4.L.17.4
Next Generation Science Standard 4-LS1-1

Note to the teacher: Help grades 2–3 students research other birds that inhabit the St. John's River watershed (such as the great blue heron, osprey, or white ibis) and create brochures that showcase each species. *Common Core Standards/Florida Standards W.2.7; W.3.7; Next Generation Sunshine State Standard SC.2.L.17.2; Next Generation Science Standards 2-LS4-1; 3-LS4-3; 3-LS4-4.* Have students in grades 6–8 research extinct birds such as the great auk and passenger pigeon and create short documentary videos or slide shows that include reasons why the steps taken to save bald eagles were critical. *Common Core Standards/Florida Standards W.6.6; W.7.6; W.8.6; Next Generation Science Standards MS-LS2-2; MS-LS2-4*

Name _____ Reading informational text

SAFE FOR THE WINTER

Read the article.

Long ago, sailors saw mysterious creatures in the water that they thought were mermaids. But what they really saw were West Indian manatees, one of the largest aquatic mammals in North America. These manatees usually have a gray body, and they have a pair of flippers. The manatee's tail is shaped like a paddle and its head and face are wrinkled with whiskers. The average adult manatee is no pip-squeak; it can be about ten feet long and weigh 800 to 1,000 pounds! West Indian manatees inhabit shallow, slow-moving rivers, estuaries, and coastal waters up and down the eastern coast of the United States and along the Gulf of Mexico. Because they are mammals, these manatees must surface the water to breathe air. They are generally slow-moving and feed on submersed, emergent, and floating plants.

Besides needing access to aquatic plants and fresh water to drink, West Indian manatees also need to be able to get to natural springs or places of man-made warm water when the weather turns colder. For this reason, these manatees migrate to warmer waters when water temperatures dip below about 68° F. Manatees in the US return to Florida waters in the winter. From November to April, you're likely to spot them around sites like the St. Johns River, including the naturally warm waters of Blue Spring State Park where the water is a perfect 72° F all year long.

West Indian manatees are an endangered marine mammal in the US. Threats to these gentle giants are human-related. The loss of their habitat, along with water pollution, threatens them. They can also be injured or killed by boat propellers. Often manatees die from the impact of a collision with a boat. Manatees that eat long-lost fish hooks, fishing line, or litter can be harmed. Under several laws, including the Endangered Species Act and the Florida Manatee Sanctuary Act, the West Indian manatee is protected as an endangered species.

Use ideas and details from the passage to complete each sentence on your own paper.

1. West Indian manatees are on the endangered list because…
2. *Migratory* describes West Indian manatees because…
3. The West Indian manatee is generally an herbivorous animal since…
4. The West Indian manatee has a body that is suited for aquatic life because…
5. Florida is a haven for manatees in winter because…
6. Manatees must surface for air because they…

Bonus: Research to identify at least three steps that are being taken to protect manatees today. Create a unique way to share your findings with others.

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Common Core Standards/Florida Standards RI.4.1; RI.4.3; RI.4.4; RI.4.10; ; RI.5.1; RI.5.4; RI.5.10
Next Generation Sunshine State Standards SC.4.L.17.1; SC.5.L.17.1

Note to the teacher: Complete this page as a class for students in grades 2–3. Discuss why manatees are classified as mammals. Have students research another aquatic mammal and compare it to the manatee. *Common Core Standards/Florida Standards RL.2.3; RL.2.9; RL.3.3; RL.3.9; Next Generation Sunshine State Standards SC.2.L.17.2; SC.3.L.17.1; Next Generation Science Standard 2-LS4-1.* Have students in grades 6–8 identify and research other endangered or threatened species in Florida. *Common Core Standards/Florida Standards W.6.7; W.7.7; W.8.7; Next Generation Science Standards MS-LS1-4; MS-LS2-2*

SAFE FOR THE WINTER

ANSWER KEY

Answers will vary.

For more information on West Indian manatees, see these resources:

- http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A007
- http://www.fws.gov/verobeach/msrppdfs/westindianmanatee.pdf
- http://www.floridasprings.org/learn/life/birds
- http://www.floridastateparks.org/bluespring

For more information about the St. Johns River, check out these resources:

- http://www.sjrwmd.com/stjohnsriver/
- http://www.theriverreturns.org/
- http://dep.state.fl.us/Northeast/stjohns/

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