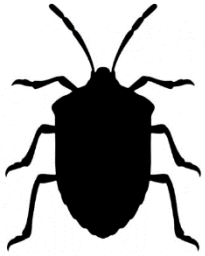
Flutter and Fly



Purpose:

- In this activity, students get to know of the different types of insect wings.

Time Required: 1 hour
Appropriate grades: 4th- 5th, 8th grade
NGSS and Common Core Standards:
2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.
4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Objectives:

- Students will identify different wing types and associate wings with their functions in the survival of insects.

Materials:

Provided in this kit:

- 15 Insect boxes
- Bag of corks
- Various insects (in insect boxes)
    - Can also collect live insects in schoolyard
- "Insect Wing Types" question sheet
- "Insect Wings" cross-word puzzle
- Laminated pictures of 5 insect wing types (teacher use only)
- 6 magnifying hand lenses (in insect collection materials)

Activity:

Introduction	• Discuss what an insect is. Ask students what they think makes up an insect. • Ask students what wings are helpful for. Are all wings the same?
Body	• Divide students into groups of 4. Have each group sit together at a table or group of desks.

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	• Distribute the following items to each group: a box of insects, hand lenses, and the "Insect Wing Types" question sheet. • Have the students look closely at the wings of the insects in their container, and answer the questions on the sheet. • When the students have completed their observations and indicated the answers on their sheets, review the answers. Ask each group one question and have that group present the answer for the class. • Tape a picture of each wing type on the board and label them with the proper names (indicated in the Background material). • Hand out the cross-word puzzle to the students and give them time to complete it.
Closure	• Review the correct responses for the cross-word puzzle. • Provide each student with a worksheet displaying pictures of the five wing types (but without the labels). Ask each student to write down the following for each of the five wing illustrations: the name of the wing type, one descriptive feature, and at least one example of an insect with those wings. • Have students think/pair/share what they learned and what they found the most interesting. What other questions do they still have? • Additional work for 8th grade students: Have students pick a winged insect and do a short research paper on it.

Modifications:

For 4th/5th grade:

- Have students research an insect of their choice and write a short paper on it.
- Students may write a short story about an insect from an insect's point of view. What is it like to fly or not to fly?
- Have students design their own insect model (encourage innovative tools and supplies) and have them present this to the class. Does it have wings? Why or why not?

For 8th grade:

- To modify this lesson for 8th grade, have the students learn the classification of the insects. The kit contains labels of the insect Orders that will be created in the activity (some magnetic labels are located in the Insect Puzzle Activity). Once the students create an insect, have them identify what Order the insect belongs to (see Background Information about each Order).
- Have students research a flying insect and explain its niche in its habitat. What would happen if this insect were to disappear?

Insect Wing Types
Question Sheet

1. Look at the insects in the container on your table. Describe the different wing types of each insect. Are they hard, soft, leathery, opaque, translucent? What other words can you think of to describe these wing types?

2. Why do you think there are different types of insect wings?

3. Do you see lines in the wings? These lines are called veins. What do you think is the purpose of these veins?

4. How does having wings help an insect?

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Insect Wing Types
Question Sheet (Teacher's Copy)

1. Look at the insects in the container on your table. Describe the different wing types of each insect. Are they hard, pliable, leathery, opaque, translucent? What other words can you think of to describe these wing types?

Beetle – hard, opaque outer wing (forewing), membranous (translucent and pliable) inner wing (hind wing)

Stink bug (or any Hemipteran) - leathery and opaque at the base (next to the body), pliable at the tip. Sometimes the tip is opaque, sometimes it is translucent.

Grasshopper (or any Orthopteran) – the forewing (or outer wing) is parchment-like, the hind wing (or inner wing) is pliable and translucent.

House fly/mosquito/crane fly – these insects have only one pair of membranous wings (pliable and translucent), and a set of halteres (knob-like structures on a stalk).

Dragonfly – two pairs of membranous wings.

2. Why do you think there are different types of insect wings?

Different types of wings provide different functions. In the beetles, the elytra protect the thin membranous wings beneath. The tegmina of grasshoppers probably serve the same function of protection, as well as allow the insect to make sounds. The hemelytra of true bugs are strengthened at the base of the wing where most of the stress occurs during flight. The halteres of flies are necessary for balance and stability of flight.

Different insects need these different wing types in order to be successful in their niche.

3. Do you see lines in the wings? These lines are called veins. What do you think is the purpose of these veins?

Veins provide a supportive framework for the wings. Hemolymph (equivalent to human blood) runs through the veins providing oxygen, water and nutrients to the wings. Without the water, the wings will become brittle and break.

4. How does having wings help an insect?

Wings help insects to escape predation, to find mates, and to disperse to find food (if they could not disperse, there would not be enough food in one place for them all). Wings also allow insects to inhabit niches that otherwise would remain off-limits to them (i.e. the canopy in the rain forest). In terms of evolution, wings increased their chances of survival.

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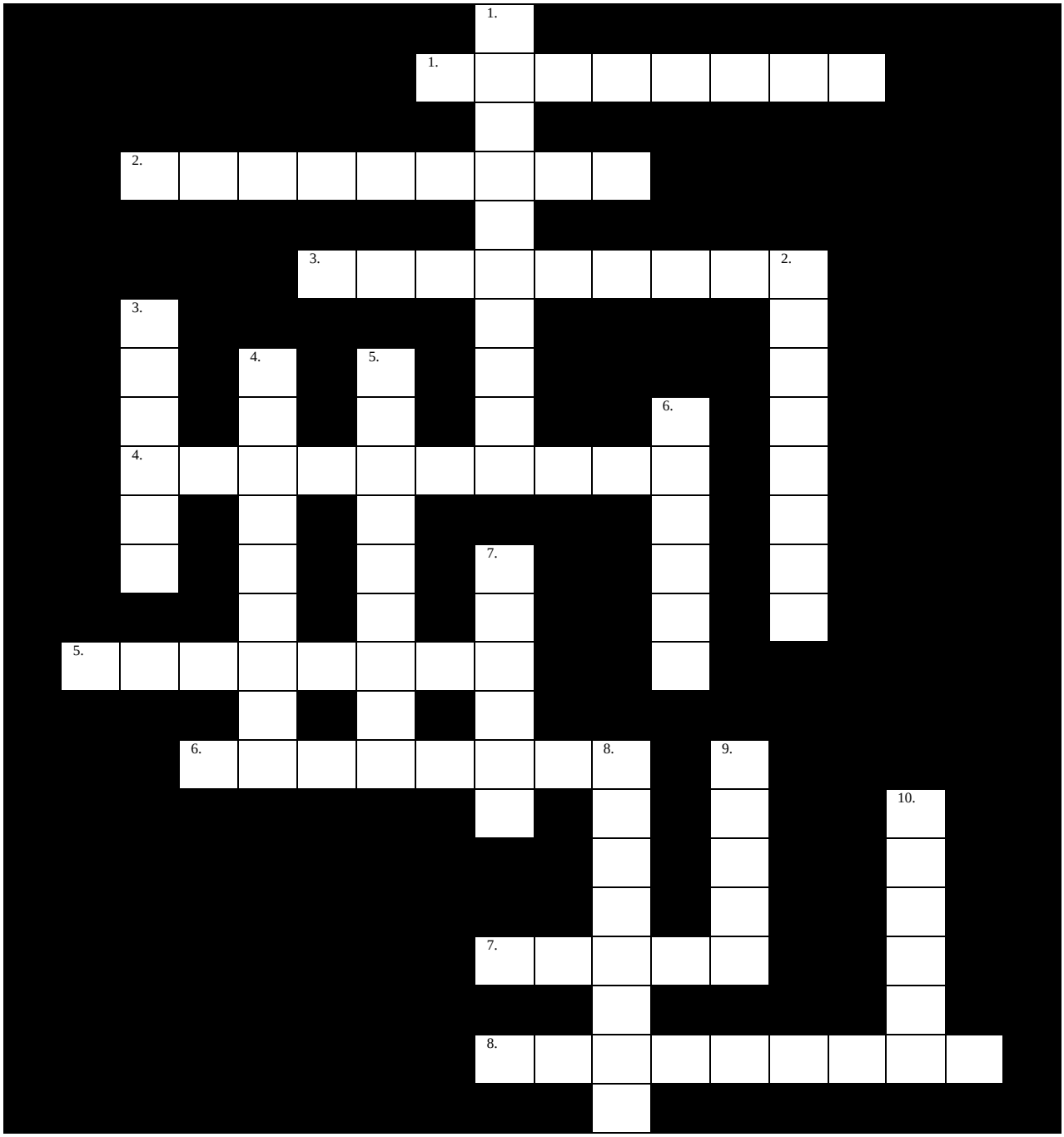
Insect Wing Types
Crossword Puzzle



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Insect Wing Types

Crossword Puzzle Clues

Across

1. The wing closest to the insect's head.
2. The veins create a supportive _____ in the wings.
3. Insect blood that circulates through the wing veins.
4. A wing type that is translucent and thin.
5. On true bugs, the base of the forewing is _____ (descriptive word).
6. These structures provide stability in flight for flies.
7. These structures provide oxygen, water, and nutrientsto the wings.
8. Without halteres, flies would not have _____ in flight.

Down

1. Wings provide the primary means of _____ for many insects.
2. The wing closest to the insect's abdomen.
3. One forewing of a grasshoppers is called a _____.
4. The forewings of true bugs.
5. A word to describe the forewings of grasshoppers.
6. Without wings, many insects would not be able to _____ predation.
7. The outer wings of beetles.
8. An insect's _____ often depends on its ability to fly.
9. Structures that allow insects to fly.
10. Without wings, _____ would be impossible.

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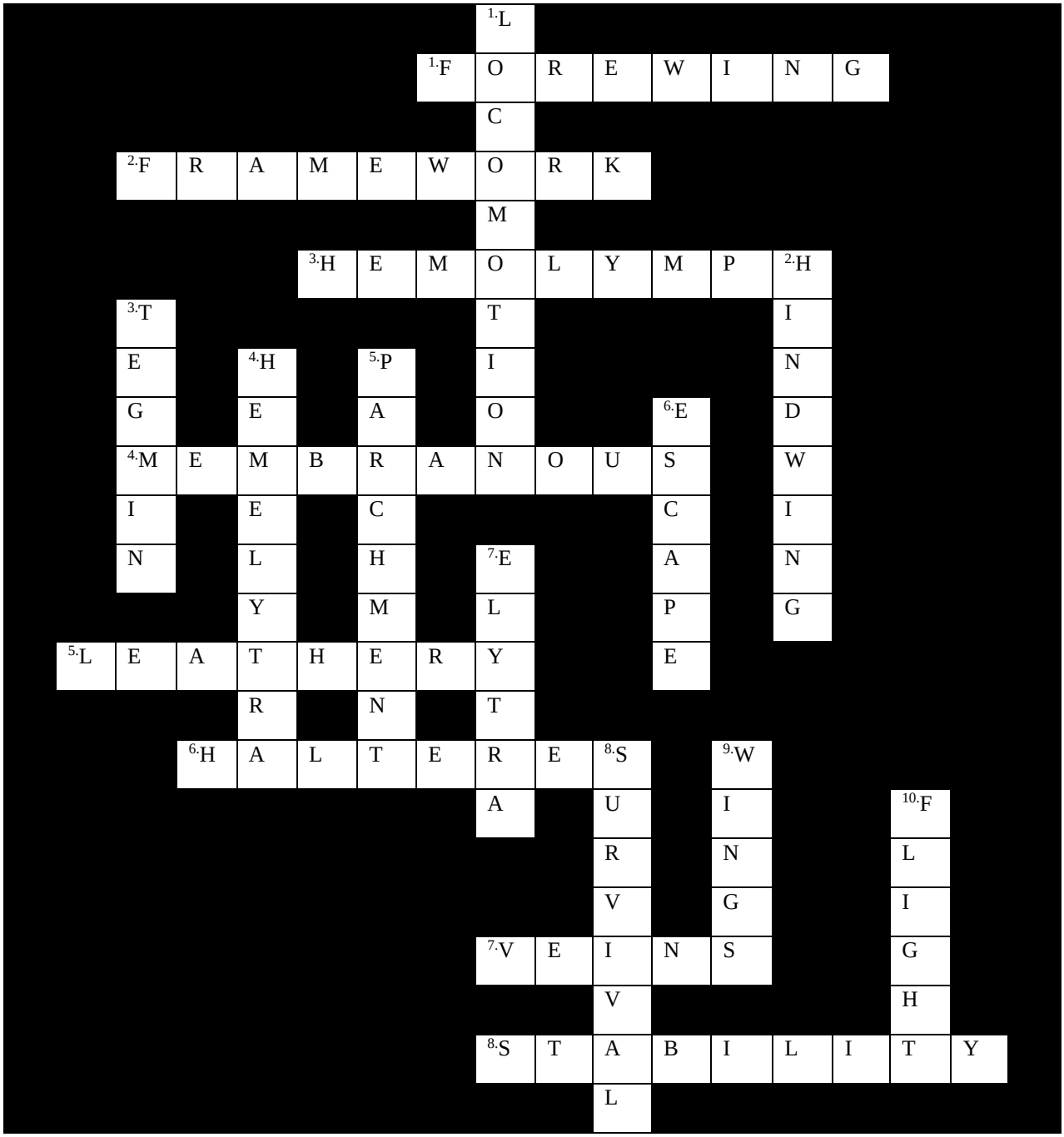
Insect Wing Types
Crossword Puzzle (Teacher's Copy)



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Insect Wing Types

Crossword Puzzle Clues (Teacher's Copy)

Across

1. The wing closest to the insect's head. (forewing)
2. The veins create a supportive framework in the wings.
3. Insect blood that circulates through the wing veins. (hemolymph)
4. A wing type that is translucent and thin. (membranous)
5. On true bugs, the base of the forewing is leathery (descriptive word).
6. These structures provide stability in flight for flies. (halteres)
7. These structures provide oxygen, water, and nutrientsto the wings. (veins)
8. Without halteres, flies would not have stability in flight.

Down

1. Wings provide the primary means of locomotion for many insects.
2. The wing closest to the insect's abdomen. (hindwing)
3. One forewing of a grasshoppers is called a tegmin.
4. The forewings of true bugs. (hemelytra)
5. A word to describe the forewings of grasshoppers. (parchment)
6. Without wings, many insects would not be able to escape predation.
7. The outer wings of beetles. (elytra)
8. An insect's survival often depends on its ability to fly.
9. Structures that allow insects to fly. (wings)
10. Without wings, flight would be impossible.

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