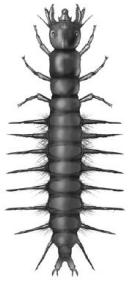
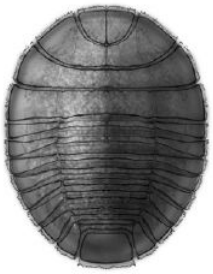
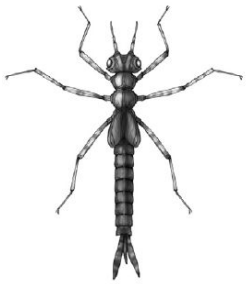
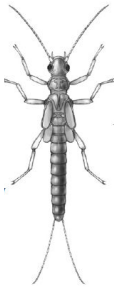
Chapter 4: Aquatic Animals

Name that Macroinvertebrate!

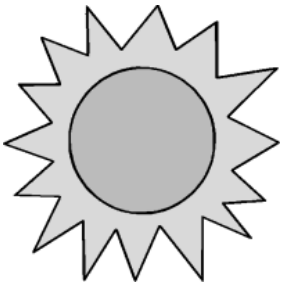
Write the name of the macroinvertebrate under its picture from the list at the bottom of the page.

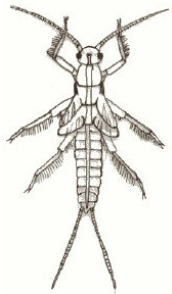
 _____	_____	 _____
 _____	_____	_____
 _____	_____	_____

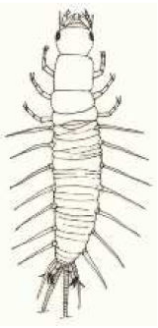
caddisfly larvae
dragonfly nymph
stonefly nymph
water penny
black fly larvae
damselfly nymph
mayfly nymph
hellgrammite
midge fly larvae

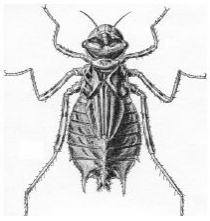
Web of Life

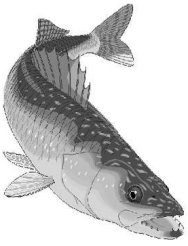
Draw lines to create a food web. Remember that the arrows point towards the predator or the organism that does the eating.





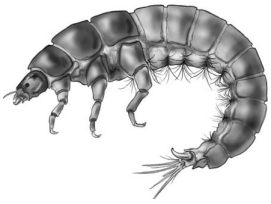


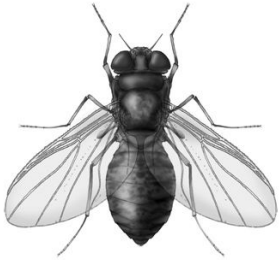


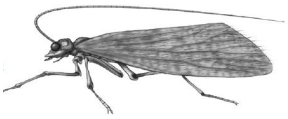


Magical Metamorphosis

Draw lines from the larvae or nymph stage of the macroinvertebrate to the adult. Write the name of each insect on the connecting line.







Macroinvertebrate Drawing

Draw a large, detailed picture of a macroinvertebrate of your choice. Show as much detail as your eyes can see.

Describe how the macroinvertebrate moves. What shape is it? What color is it? What does it eat? Does anything eat it? Is it a larvae, nymph or adult? Is it sensitive, somewhat sensitive, or tolerant to pollution?

Volunteer Biomonitoring Macroinvertebrate Data Sheet

Additional Information:

_____ Number of people sorting X 1 hour = _____ Total elapsed time-spent sorting

_____ Fraction of the portion selected X _____ Percentage of sample sorted = _____ Total sample sorted

Site Number_____Stream Name_____Town_____

Volunteer Group_____

Staff Present_____Date_____Replicate Number_____

	Group		# Individuals (Raw Tally)	Totals
Insects	Ephemeroptera	Mayfly Nymph		
	Plecoptera	Stonefly Nymph		
	Trichoptera	Caddisfly Larvae		
	Odonata	Dragonfly Nymph		
		Damselfly Nymph		
	Diptera	Black fly larvae		
		Midge larvae		
		Most True Flies		
	Megaloptera	Alderfly		
		Fishfly or Helgrammite		
	Coleoptera	Riffle Beetle		
		Water Penny		
		Beetle & Beetle-like		
Non-Insects	Others	Crayfish		
		Snails		
		Aquatic Worms		
		Scuds		
		Sowbugs		
		Clams and Mussels		

**Aim to identify >100 organisms.

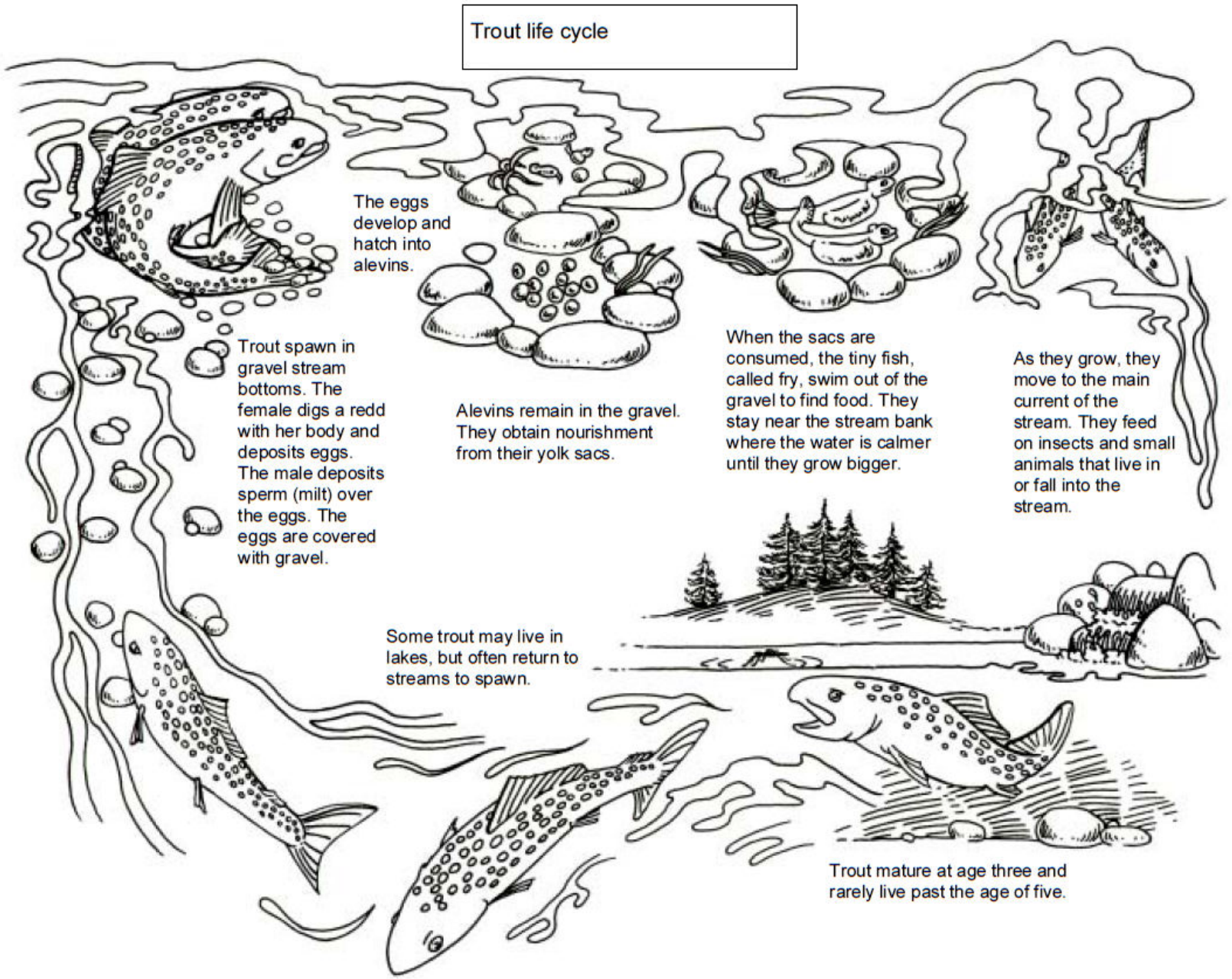
Total # Individuals Counted for all Groups _____

Second sorter Quality Control (i.e. numbers found by second sorter)

Bugs found remaining in the kick net after emptying the net into the pan after 5 kicks_____

Bugs found in each debris pile after initial sort: Square1_____Square2_____Square3_____Square4_____

**Refer to instructions at Step 3 for these two sorting Quality Control recordings.*


Trout life cycle
The eggs develop and hatch into alevins.
Trout spawn in gravel stream bottoms. The female digs a redd with her body and deposits eggs. The male deposits sperm (milt) over the eggs. The eggs are covered with gravel.
Alevins remain in the gravel. They obtain nourishment from their yolk sacs.
When the sacs are consumed, the tiny fish, called fry, swim out of the gravel to find food. They stay near the stream bank where the water is calmer until they grow bigger.
As they grow, they move to the main current of the stream. They feed on insects and small animals that live in or fall into the stream.
Some trout may live in lakes, but often return to streams to spawn.
Trout mature at age three and rarely live past the age of five.

Glossary

Benthic macroinvertebrate: Animal without a backbone that is large enough to see without a microscope and lives at least part of its life cycle on the bottom of a stream.

Biodiversity (biological diversity): The variety of all forms of life that occur within a region.

Biomonitoring: Using stream organisms as biological indicators of water quality.

Carnivore: A meat eater.

Complete metamorphosis: A process where insects go through a complete life cycle and all four stages of development: egg, larva, pupa, and adult.

Consumer: The first part of an ecosystem is the nonliving substance; the second part consists of those organisms that are called "producers", or food makers; the third part of this system is called the "consumer" because it uses the producer for its food; it may in turn be used as food by a secondary consumer.

Food chain: The transfer of energy from one organism to another as each consumes a lower member and is in turn preyed upon by a higher member.

Food web: A network of many food chains that more accurately reflects the complexity of the ecosystem.

Fry: Small young fish that have recently hatched.

Habitat: A place that includes everything that an animal or plant needs to live and grow. It includes food resources and the physical characteristics of the environment, as well as places and materials to build nests, raise young, and keep them safe from predators.

Hatchery: A place where fish eggs are hatched and raised.

Herbivore: A plant eater.

Incomplete metamorphosis: A process where insects do not go through all four stages of development and do not have a pupa stage. These insects have three stages in their life cycle: egg, nymph, and adult.

Indicator (species): Any species that defines a trait or characteristic of the environment.

Insectivore: An insect eater.

Metamorphosis: The biological process through which a juvenile transforms into a mature adult.

Omnivore: An animal that eats both plants and animals.

Piscivore: An animal that eats fish.

Planktivore: An animal that eats plankton.

Predator: An animal that kills and eats other animals.

Prey: Animals that are killed and eaten by other animals.

Primary producer: Organisms that are able to manufacture food from simple organic substances.

Tolerance: The ability to withstand a particular condition; for example, pollution-tolerant indicates the ability to live in polluted waters.

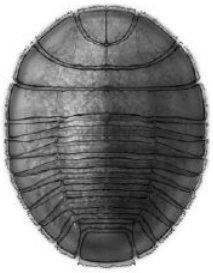
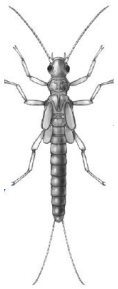
Trophic level: The position an organism occupies on the food chain.

Water quality: The physical, chemical, and biological characteristics of water in relationship to a set of standards. Water quality standards are determined to protect drinking water, human contact with water, and the health of ecosystems.

Wildlife management: The application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of wildlife and its habitat.

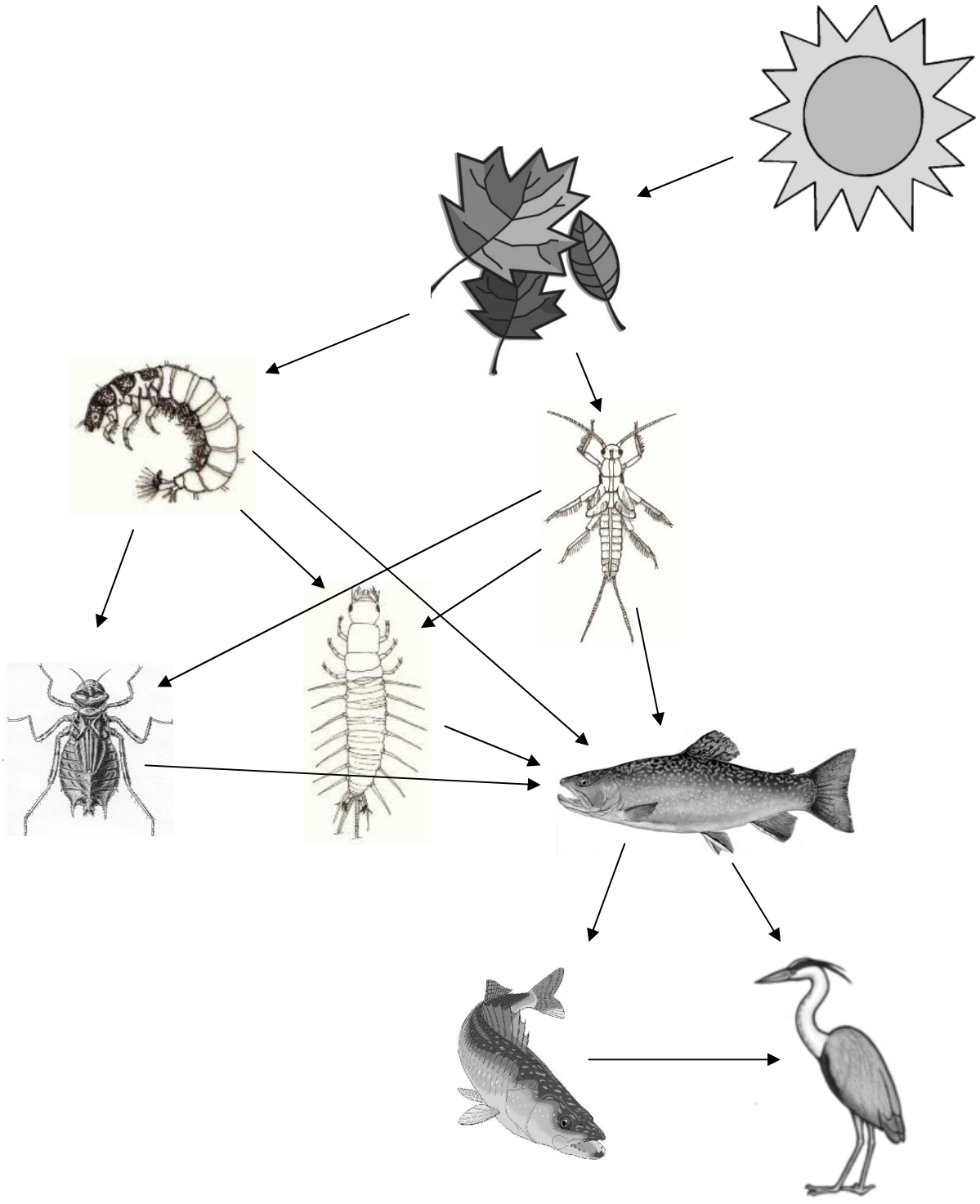
Answers

Name that Macroinvertebrate!

 __Hellgrammite__	 __Mayfly nymph__	 __Water penny__
 __Damselfly nymph__	 __Caddisfly larvae__	 __Black fly larvae__
 __Stonefly nymph__	 __Dragonfly nymph__	 __Midge fly larvae__

caddisfly larvae
dragonfly nymph
stonefly nymph
water penny
black fly larvae
damselfly nymph
mayfly nymph
hellgrammite
midge fly larvae

Web of Life



Magical Metamorphosis

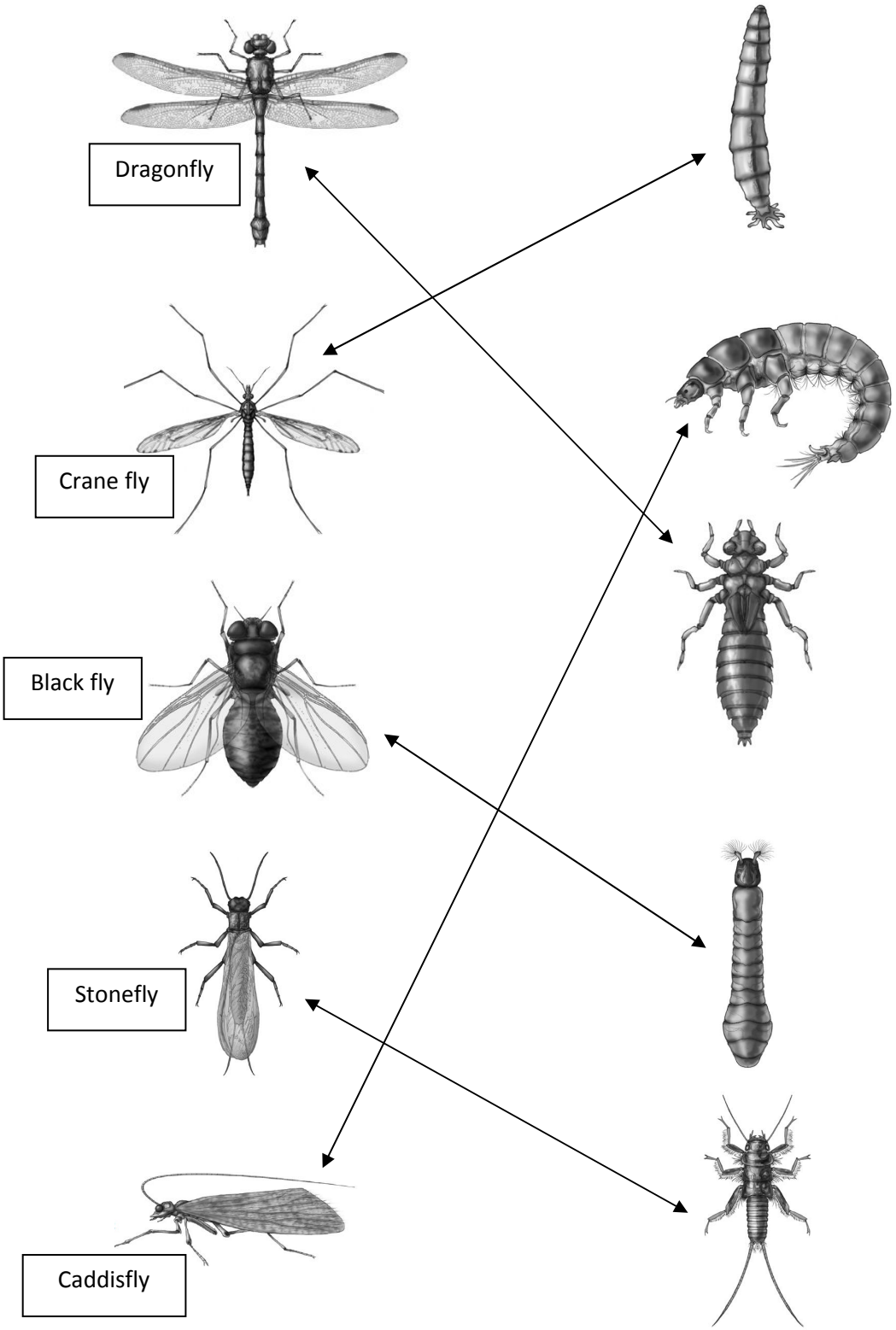


Image Credits

Page 7
New Jersey Trout in the Classroom. (2009). *Trout in the Classroom: Activity Guide and Reference for Teachers*. Retrieved from http://www.njtroutintheclassroom.org/index.php/articles/detail/tic_activity_guide/

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Georgia Adopt-A-Stream. (2006). *Aquatic Macroinvertebrate Field Guide for Georgia's Streams*. Retrieved from http://aesl.ces.uga.edu/aascd/Manuals_etc/Bio_Chem/Macro_Key.pdf

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