

Critter Cube Counting – modified

Description: Learners will simulate a biotic water sampling adventure to a stream.

Duration: 15 – 30 minutes

Skills: Interpreting, calculating, recording data

Objectives: Learners will use macroinvertebrate data gathered (from tossing cubes) to evaluate the health of their simulated stream visit

Materials for teams of 4 students:

Recording form for the Citizen Monitoring Biotic Index, a form used by actual volunteers with Water Action Volunteers (WAV) DUPLEXED with an *identification and recording page*, also used by WAV

4 critter cubes

A clear surface (floor or desk)

Directions:

PLEASE note: you can play this sampling game many ways! Do what works for your classroom. This is just one scenario.

- Students take turns rolling the 4 cubes; The total rolls will be 16.
- After each roll, ALL students evaluate the up-facing sides of the cubes. ALL must agree on the identification of the macroinvertebrate before it is circled on the *identification and recording page*.

There will be duplicate findings! The animal only needs to be circled once.

Critical observation is needed – legs? How many? Head or no head? Etc.

With the snails – one must hold the cube in the hand with the point of the snail to the fingers. Is the opening on the LEFT? (Pouch snail) or is the opening on the RIGHT? (Gilled snail) or no point, opening in the middle, bottom (Orb snail).

- Diversity is the desired outcome. The number of animals counted is not the important point – it is the variety of different types (species) of macroinvertebrates and their tolerance to pollution that gives the biotic index score.
- Transfer numbers in the boxes from the *identification and recording page* to the *Recording Form for the Citizen Monitoring Biotic Index page* – lower left
- Calculate the values (multiplication)
- Divide the Totaled Value (b) by Total number of animals (a) for the Biotic Index
- Evaluate the stream!

Paraphrased Background information – from Holding onto the GREEN Zone – Leader Guide

Riparian vegetation maintains or improves the quality of water in a stream by trapping sediment and other pollutants from runoff and keeping them out of the stream. Both colonizing and stabilizing plants play critical roles in the ability of the riparian area to function properly. Each stream or riverbank must grow and maintain adequate numbers and varieties of species in order to stabilize the bank and prevent erosion. When the erosion and deposition forces within the stream channel are out of balance, sediments begin to accumulate and degrade the quality of water. Fish and other organisms are harmed.

Plants in and near the stream can be useful in absorbing chemical pollutants from the soil and water.

Riparian specialists use many methods to test the quality of the surface water, including water clarity testing (turbidity and Secchi disk), chemical testing and biological testing.

Turbidity testing measures suspended particles in the water. The more the particles that are suspended in the water, the less light can penetrate the water.

Chemical testing usually includes testing for dissolved oxygen that is present in the water (which changes with temperature.), and pH levels. Plants and animals live within their ideal range of water pH levels, and it does vary from species to species.

Biological testing is usually a macroinvertebrate sampling, which is this game simulation. New technologies, include genetic evaluation of strands of DNA found floating in the surface water.

Group 1: These are sensitive to pollutants. Circle each animal found.



Stonefly Larva



Dobsonfly Larva



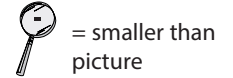
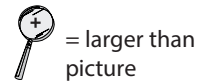
Alderfly Larva



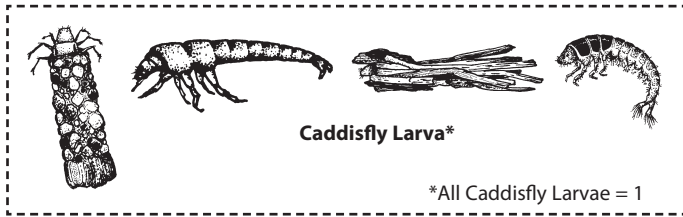
Water Snipe Fly Larva

No. of group 1 animals circled:

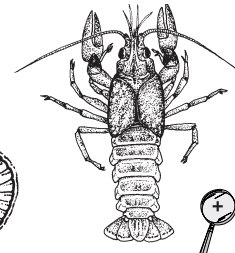
Relative Size Key:



Group 2: These are semi-sensitive to pollutants. Circle each animal found.



Dragonfly Larva



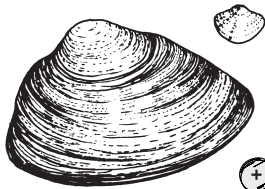
Crawfish



Water Penny



Crane Fly Larva



Freshwater Mussel or Fingernail clam



Mayfly Larva



Damselfly Larva



Damselfly tail (side view)



Riffle Beetle Larva*



Riffle Beetle Adult*

*All Riffle Beetles = 1

No. of group 2 animals circled:

Group 3: These are semi-tolerant of pollutants. Circle each animal found.



Black Fly Larva

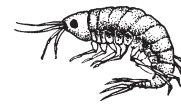


Non-Red Midge Larva



Snails: Orb or Gilled (right side opening)

*All Snails = 1



Amphipod or Scud

No. of group 3 animals circled:

Group 4: These are tolerant of pollutants. Circle each animal found.



Pouch Snail (left side opening)



Isopod or Aquatic Sowbug



Bloodworm Midge Larva (red)



Leech



Tubifex Worm

No. of group 4 animals circled:

For more information, call (608) 265-3887 or (608) 264-8948.

Download and print data sheets from watermonitoring.uwex.edu/wav/monitoring/sheets.html

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Water Action Volunteers

Unit 2, Station 3, Activity 3—Critter Cube Count

Macroinvertebrate Tally Sheet Recording Form *

Name: _____ Date: _____

Stream Name: _____ Time: _____
(make up a name)

Number of animal types from Group 1: Sensitive _____ x 4 = _____

Number of animal types from Group 2: Semi-sensitive _____ x 3 = _____

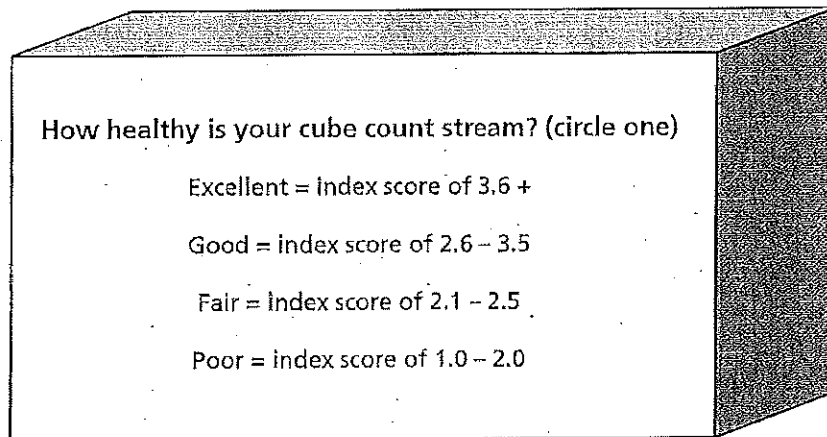
Number of animal types from Group 3: Semi-tolerant _____ x 2 = _____

Number of animal types from Group 4: Tolerant _____ x 1 = _____

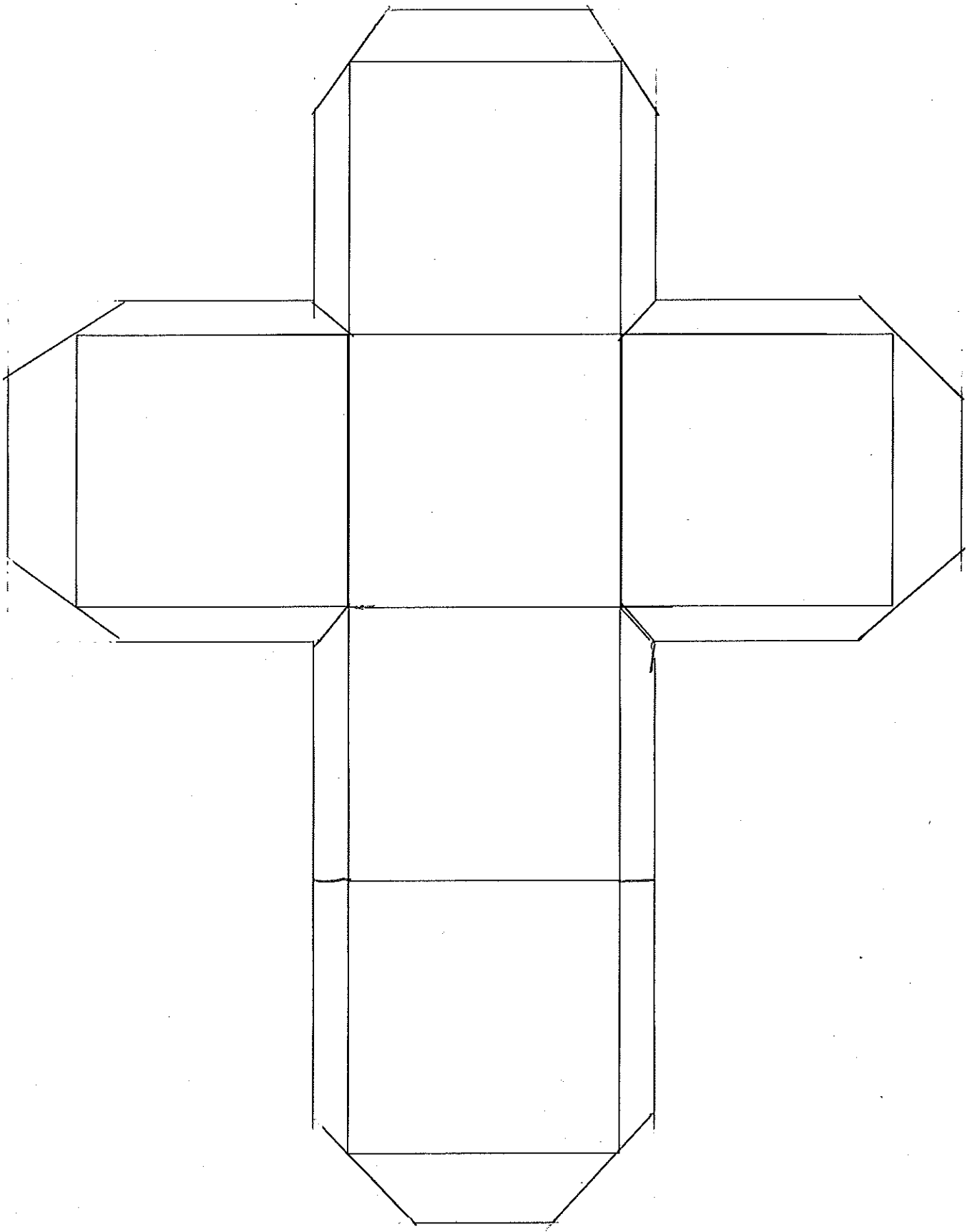
TOTAL NUMBER OF ANIMAL TYPES (A) _____ TOTAL VALUE (B) _____

Index score (C) = The total value (B) divided by the total number of animal type (A)
(C = B / A)

My stream had an index score of: _____



* Adapted from *Water Action Volunteers*, Univ. of Wisconsin-Extension and Wisconsin Dept. of Natural Resources, 2008.

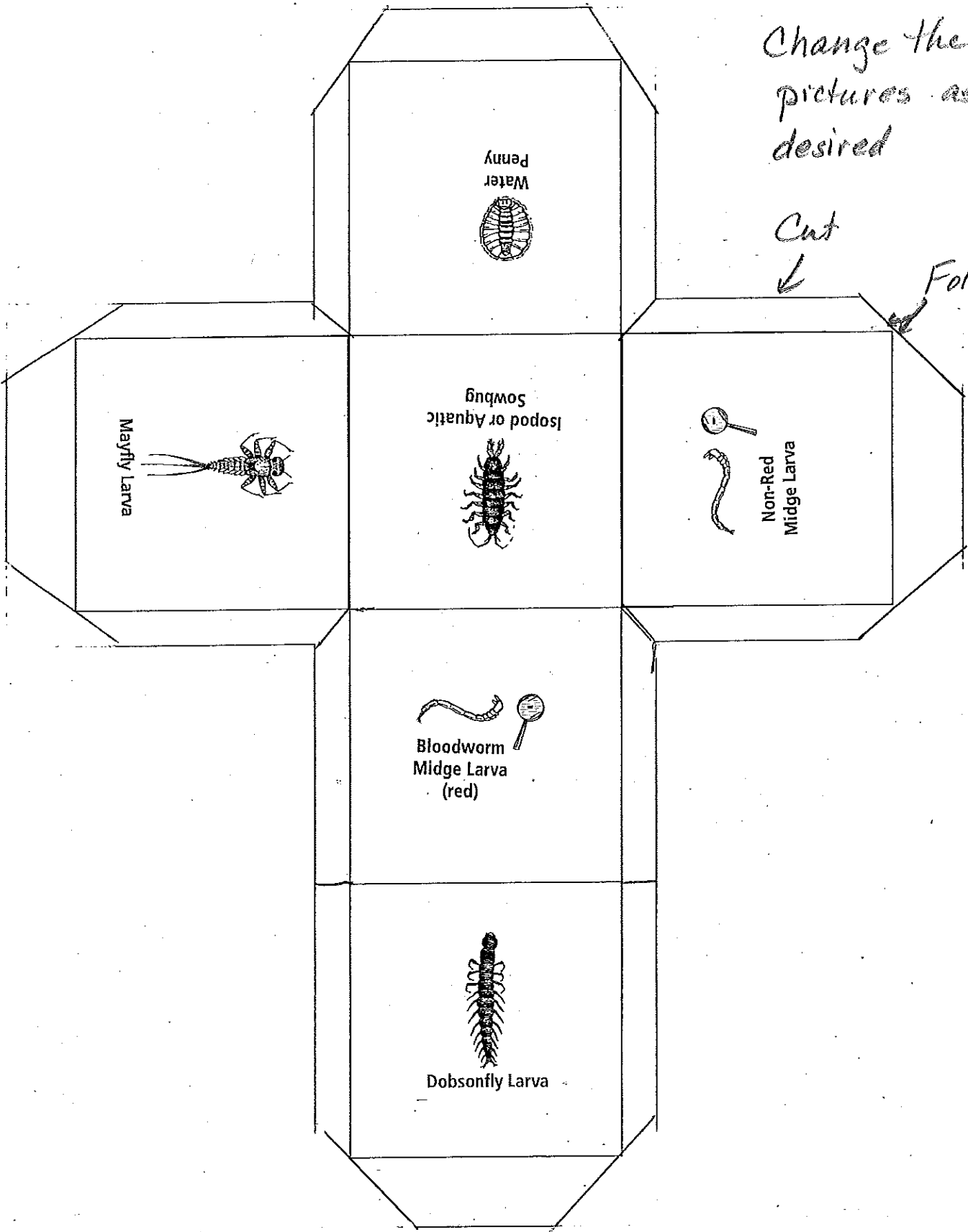


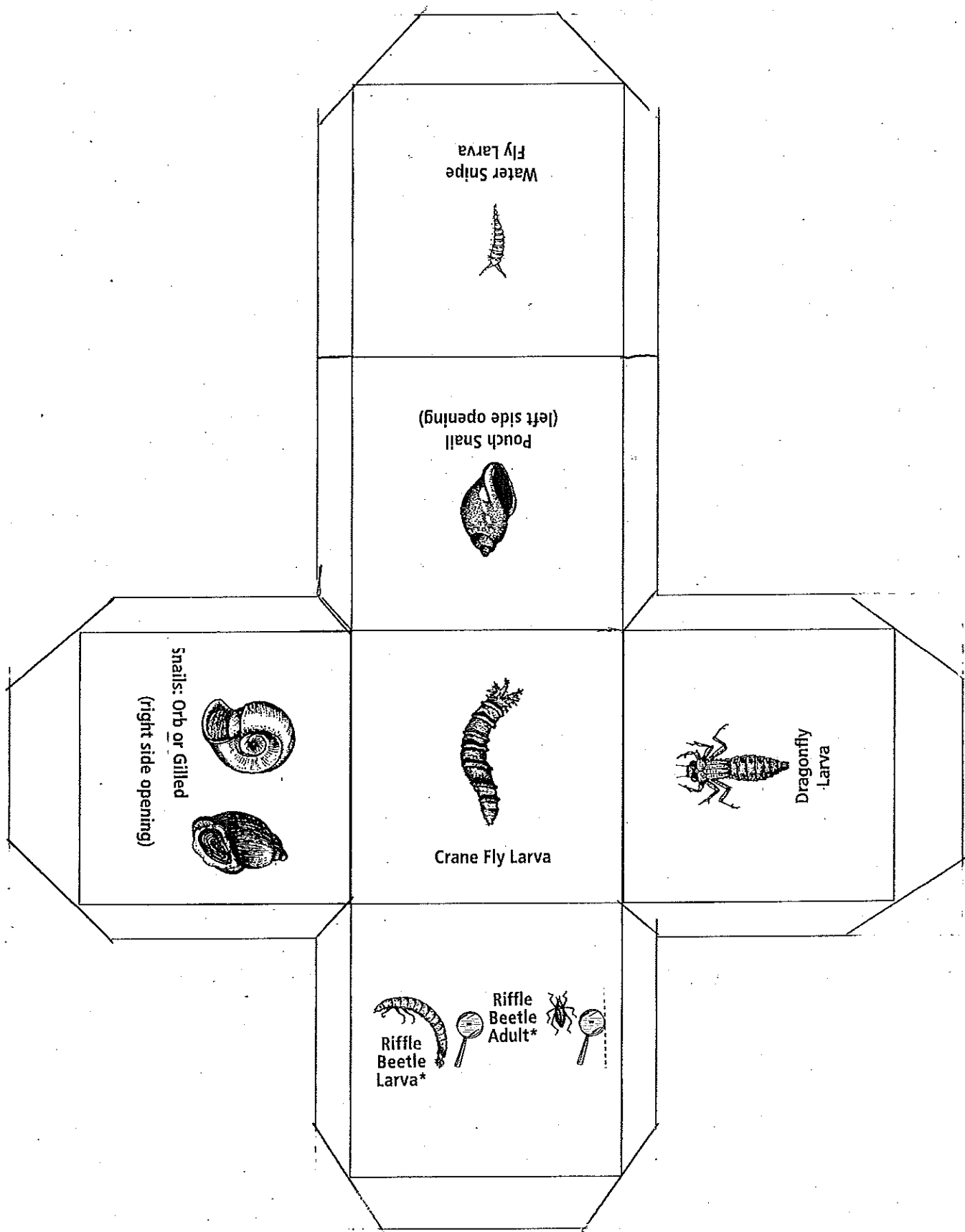
Change the pictures as desired

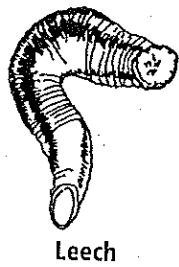
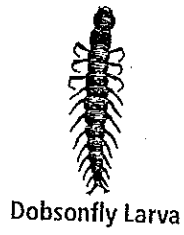
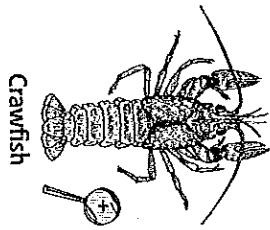
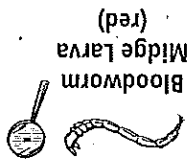
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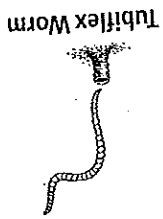
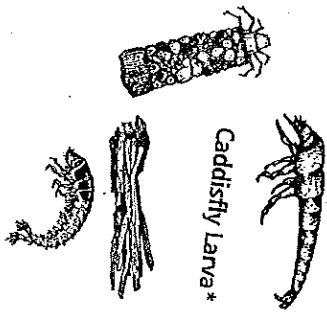
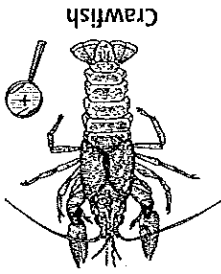
Fold

Tape
or
Glue









Isopod or Aquatic Sowbug



Alderfly Larva

Crane Fly Larva



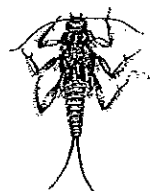
Freshwater Mussel
or fingernail clam



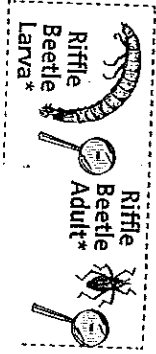
Black Fly Larva



Stonefly Larva



Pouch Snail
(left side opening)



Riffle Beetle Larva*

Riffle Beetle Adult**

Dragonfly
Larva



(right side opening)

Snails: Orb or Gilled



Water
Penny

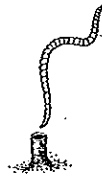


Non-Red
Midge Larva

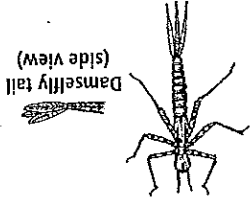
Alderfly Larva



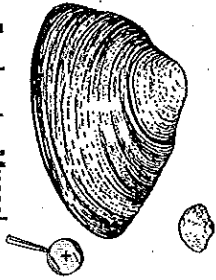
Tubiflex Worm



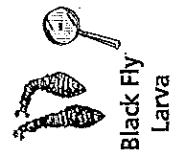
Damselfly Larva



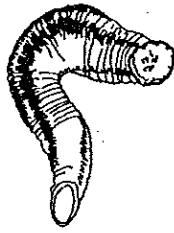
Freshwater Mussel
or Fingernail clam



Water Snipe
Fly Larva



Black Fly
Larva



Leech



Stonefly Larva