2008

Water Bug Watch

K-5 Outdoor Version

ACT Waterwatch
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ACT Essential Learning Achievement Links:

Student uses a range of strategies to think and learn:

Early Childhood

- Uses pictures and diagrams to help thinking
- Uses appropriate thinking tools and processes or strategies
- Uses vocabulary of the thinking tools, processes or strategies
- Understands the importance of thinking and talking about their thinking and learning

Later Childhood

- Uses broad steps to undertake a straightforward analysis
- Uses simple logic
- Understands how visual representations can assist thinking
- Harnesses imagination to solve problems
- Orders and sequences their ideas
- Reflects on and discusses aspect of their thinking processes as they deal with a problem
- Values and seeks help when needed
- Values explicit thinking skills
- Values imagination as a thinking skill

Student understands and applies the inquiry process

Early Childhood

- Understands inquiry as a process for creating new information
- Sees inquiry as a useful process available to them
- Uses the inquiry process in authentic situations
- Engages with their world by asking questions about familiar situations
- Makes predictions and conjectures based on their everyday experience and thinks though ways to test them
- Plan and carry out investigations that are related to their questions, conjectures and predictions which involve several steps
- Makes observations about what is happening around them using their senses
- Gathers information or data from a small range of sources
- Attempt to convince themselves and others about whether their findings were accurate
- Share and communicate observations, results, ideas and understandings.

Later Childhood

- Discuss and compare the results of the investigation with their predictions, offer and explain conclusions and communicate ideas and understandings
- Maintains and strengthens their curiosity

Student makes considered decisions

Early Childhood

- Understand the implications of having a choice
- Values the delay of self-gratification
- Is aware when they have a choice
- Delay a decision until they have thought about it
- Identify criterion of making a good decisions
- Change their plans if they have a new idea or gain new information
- Make decisions and put them into effect in authentic situations

Late Childhood

- Knows what an option is

Lists advantages and disadvantages and risks of various options using the inquiry

- ♦process to gather information
- ♦Identify possible consequences of different decisions
- ♦Make decisions and put them into effect in authentic situations

Student understands and applies scientific knowledge

Early childhood

- ♦ Living and non-living things and their identifications and description according to features, characteristics and properties
- ♦Change in the physical and natural world
- ♦Distinguish between living and non-living things
- ♦Observe structural features in animals
- ♦Observe how living things change as they grow
- ♦Evaluate ways in which living things are effected by their environment and how they impact on it and other living things
- ♦Observe, explore identify and describe natural phenomenon
- ♦ Value curiosity in exploring the physical and natural world

Later Childhood

- ♦ Understand features and characteristics, properties and classifications of natural phenomenon
- ♦How and why change occurs in the physical and natural world
- ♦Interdependence of living things on each other and their environment
- ♦Application of scientific knowledge to their own lives
- ♦Structure and function of systems that enable living things to survive
- ♦Grouping living things using observable characteristics
- ♦Different environments support different living things
- ♦Interactions between living things, and between living things and their environment
- ♦Life cycles and reproductive processes of different types of living things
- ♦Observe, explore, identify, describe compare , order and classify natural phenomenon.
- ♦Understand ethical issues in science related contexts
- ♦Carefully and safely handles living things

Students acts for an environmentally sustainable future:

Early Childhood:

- ♦Understands how humans and other living things depend on the environment around them for essential elements they need for survival
- ♦Understands how their local environment changes over time
- ♦Understands the connections between their own actions and environmentally friendly strategies
- ♦Identify parts of familiar environments and describe some simple relationships
- ♦Value the scope and beauty of the natural world
- ♦Feel responsibility within their community for the quality of their immediate environment and resource conservation
- ♦Understand the importance of conserving resources, protecting the environment and participating in positive environmental education

Later Childhood

- ♦Understand systems in the natural environment and how changes in elements of them affect the system as a whole
- ♦Understand elements that make up significant local, national, and global natural and built environments and the ways in which the features of these environments are connected
- ♦Understand the effects of change on local national and global natural environments
- ♦Understand the need for and ways to conserve finite natural resources

- Understand care of places and the values held by involved individuals, and groups, including indigenous groups
- Observe, record and make inferences about small local ecosystems
- Reflect on ecological issues and form a view on them
- Understand how the actions of communities and individuals, including their own, contribute to the sustainability of resources and local environments and shape the future for future generations

Student creates artistic works

Early Childhood

- Understands how qualities such as colour, thickness, length, and density can assist them to depict things in painting and drawing

Later Childhood

- Understands how to use different materials, techniques, skills and processes to make 2D and 3D artistic works

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Australian Insects http://australian-insects.com/gallery.php

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Australian Museum Fact sheets www.amonline.net.au/factSheets/#insects

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Objectives:

Students will describe the meaning indicated by the diversity of macro-invertebrates
Students will define vocabulary
Students will use macro invertebrates to investigate the health of their catchments
Students will identify macro-invertebrates and describe what their presence indicates
Students will discuss threats to water quality in their catchments
Students will create a poster (in class) or discuss (in field) ways humans can improve water quality in their catchments

Duration: 1 hour

Materials:

Nets
Boots
Buckets
Cat trays
Ice cube containers
Pipettes
Spoons
Tweezers

Vocabulary

Macro invertebrate
Gill
Larvae
Sensitivity
Pollution
Water quality
Nymph
Adaptation

Suggested Pre-Activity

Read: *Song of the Water Boatman* (available from your Waterwatch coordinator)
Put up: '*Bidgee Bugs Poster* (available from your Waterwatch coordinator)

Procedure:

Divide students into groups of 4-6

Intro: (5 minutes)

What is Waterwatch,
Ask students why monitoring is important
Tell students these insects talk to you. Ask them to take the time to get to know them and learn what they are saying
Ask students to attempt to define macro-invertebrate and express their importance to the eco-systems in which they live.
Challenge students to explain why monitor bugs is important as well as chemical parameters

Work with students to set macro-invertebrate handling rules
Identify different micro habitats with in stream area, such as riffles, pools and weedy edges.
Challenge students to theorize on the sorts of animals that might live in each area.

How might they be adapted to their environment?

Write theories down to revisit after investigations

Discuss ways that macro-invertebrates can be affected by human and nonhuman events in the catchment.

Investigation: (30 minutes)

Have students develop their own ideas about proper behaviour around a body of water
Show and demonstrate the use of equipment to the students.
Remind students that not everyone will be getting in the water or using the nets.
Identify different micro habitats with in stream area, such as riffles, pools and weedy edges.
Discuss what needs animals could be expected to have in differing habitats.
Instruct students to capture, pick out of nets, sort and identify macro-invertebrates. *(Younger students will need more assistance)*

Instructor travels between groups offering help on capture techniques and identification. It is very important that students discover the identity of the organism, not told by a teacher.

Instruct students to each capture 1 creature: (this can be done as an entry in a Water Watch Journal)

Draw it,
Identify it, (if possible)
Identify it's habitat,
Indicate sensitivity to pollution
Indicate its adaptations to its habitat

Discussion:(10 minutes)

Ask students to present their macro invertebrates.
List creatures discovered and sensitivity to pollution
Challenge students to make judgements about water quality based on their discoveries
Ask students to extrapolate from their water quality assessments issues associated with the water body and how the body of water might be improved

Broadening:(10 minutes)

Form students into groups of 2-4 individuals. Give each group a "Habitat" "Food" and "Protection" card from the Macro-Modelling Deck

Challenge them to use materials from the "Art Box" to create a macro-invertebrate that fits their cards

Invite groups to tell about their creations, the parameters they were asked to meet and allow the class to vote on it's success or lack there of

Wrap Up: (5 minutes)

Ask students how humans might affect the water quality of their catchments
Challenge students to think of ways they themselves could improve aquatic habitats.

Extensions:

The Macro Movie:

Have students write and produce a film/play staring the adventures of several macro-invertebrates. (techniques could involve costumed children, or even stop-action 'claymation')

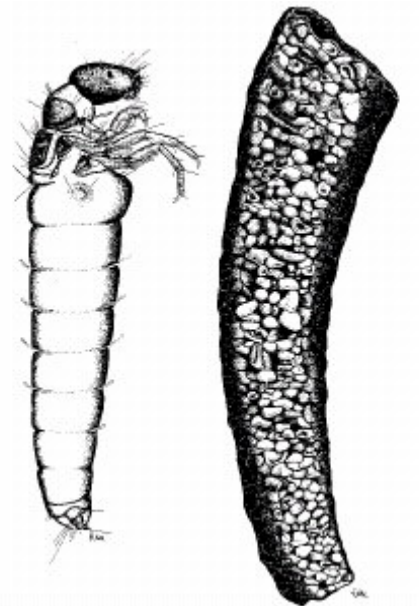
Macro Media

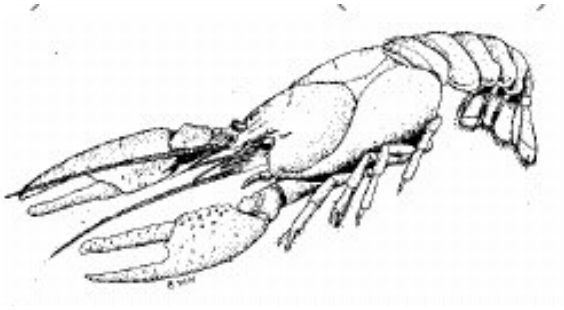
Students create and display posters to explain the importance and role of macro-invertebrates in the catchment.

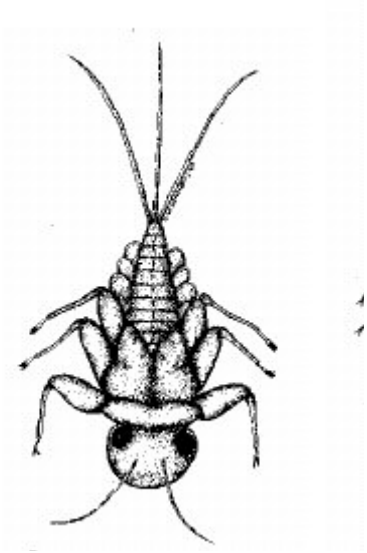
Water Bug Worksheet

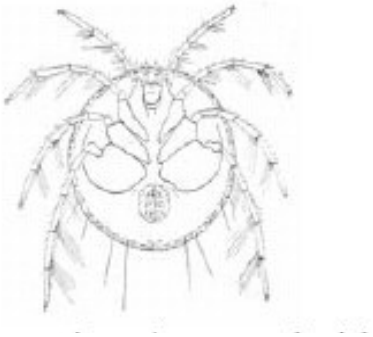
Follow the Directions carefully!

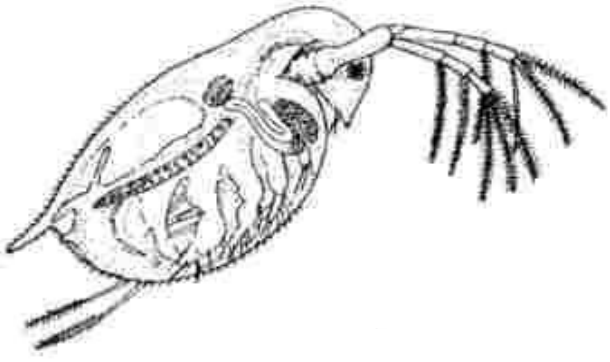
1. Colour the very pollution tolerant creature brown
2. Colour the very pollution sensitive animal green
3. Colour the caddis fly larvae yellow
4. Colour the arachnid red
5. Colour the crustacean blue
6. Colour the animal which lives only in ponds purple











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