

Aquatic Macroinvertebrates *playing cards*



Introduction

The Aquatic Macroinvertebrates playing cards are designed to help young people become familiar with some of the most common bugs found in local waterways.

The pack includes background information relating to the classification of aquatic macroinvertebrates, along with some suggested activities to assist student learning about macros from local environments.

Three classic card games (memory, go fish, and snap) have been adapted for use with the cards, and instructions of how to play are included in this pack. We encourage participants to modify the rules or develop their own games and activities using the cards.

Please **print two copies** of each of the card sheets (or four if you want to expand the playing time of the games). They are designed to be double-sided. If your printer doesn't allow double-sided printing, print out the face cards first and then flip the paper and run it through again to print the back of the cards. Cut out the cards along the lines, one species per card. You might like to print them on card to make them more durable.

Although these cards are a great way to develop young people's interest in the environment, they are not intended to be a substitute for getting out of the house or classroom to investigate local ecosystems. Please visit our website to download free identification charts and other resources to assist in your learning.

Furthermore, we have produced card packs for other creatures, such as common urban and bushland birds, which you may like to combine with these cards to expand the three classic games and learn more about our ecosystems.

We sincerely hope you enjoy playing the games and trust that you will learn a little more about the wonderful creatures living in the Green Adelaide region.

Classification

Background information

Many kinds (species) of macro-invertebrates can be found in our waterways. Each species has its own unique features and it may be grouped with other species that have similar features.

There are a huge number of different aquatic macro-invertebrates, but many of the common ones in SA can be sorted into just a few major groups. There are seven groups represented in this pack of cards, each with their own unique characteristics:

Flatworms

- no legs
- flat, unsegmented soft bodies
- a blind gut with single opening for feeding and excreting (or waste is excreted directly out of the body wall)
- eyespots to detect light.

Annelid/Segmented worms (e.g. earthworms, freshwater worms & leeches)

- no legs
- soft bodies; segmented a bit like a string of sausages
- some, like leeches, have suckers at each end that they use to aid movements or for eating
- *Note:* some insect larvae are often called worms (e.g. bloodworm) but are not real worms.

Molluscs (e.g. octopus, squid, snails & clams)

- soft unsegmented body, often with a protective shell or shells
- although the body is unsegmented, it is loosely divided into 3 parts – foot, visceral mass (holds body organs) and mantle (tissue that covers visceral mass and secretes the shell).
- some have legs (e.g. squid & octopus).

Arachnids (e.g. spiders, mites & scorpions)

- segmented body split into two parts (cephalothorax & abdomen)
- four pairs of jointed walking legs plus two pairs of feeding legs (eg pincers on scorpion)
- no antennae or wings
- shed their exoskeleton to grow.

Crustaceans (e.g. crabs, lobsters, shrimp)

- segmented body, usually with the head and thorax fused together
- chitinous "crusty" exoskeleton – thick like a crab or thin like a water flea
- many pairs of jointed legs
- shed their exoskeleton to grow.

Springtails

- soft, segmented body made up of three parts (head, thorax and abdomen)
- three pairs of legs, one pair of antennae
- no wings
- spring-loaded tail used in jumping
- water-repellant hairs and scales to keep afloat on the surface of the water.

Insects

- segmented body made up of three parts (head, thorax and abdomen)
- three pairs of jointed legs – larvae may have extra legs (pro-legs) without joints to help them move around
- usually two pairs of wings
- usually have some form of metamorphosis from juvenile to adult (many flying insects have aquatic stages in their lifecycle)
- shed their exoskeleton (outer skin) to grow.

Macroinvertebrate features activity

On the board write the names of the seven macro groups included in this pack (Flatworm, Segmented worm, Mollusc, Arachnid, Crustacean, Springtail and Insect).

Give each student a card and ask them to work out which group their animal belongs to.

As a group, brainstorm the features of the macros in each of these groups.

What things do the macros in each group have in common? Write these on the board

Macroinvertebrate art activity

Give out one card to each student.

Ask them to draw or make a model of the bug on their card (or enlarge and photocopy the bug cards).

Put up signs around the classroom showing the seven macro groups and display students' models or drawings near these signs.

Macroinvertebrate environments activity

Using student drawings, models or the cards themselves, create a river or wetland scene on the classroom floor.

Use a tarp or cloth as the water.

Use any other materials at hand to represent reeds, trees, shrubs, grasses, rocks, snags and soil which help make a healthy watery habitat.

Add the bug cards, models or drawings.

Once the area is set up, add other animals (students could play these roles) such as fish, birds, frogs and turtles.

Discussion points could include:

- Who eats who?
- What happens if cows are allowed to eat and drink along the river?
- What happens when chemicals are dumped in the river?
- What can you do to help keep the river environment clean and healthy?
- What happens if dog poo, litter, oil or detergent is allowed to wash into the river?

Bug Hunt

A game of memory and observation.

NUMBER OF PLAYERS: Unlimited.

OBJECTIVE: To collect as many matching sets as you can.

HOW TO PLAY

Shuffle all cards and lay them face down on the floor or table. Cards must not touch each other, but can be placed in any order or direction.

The youngest player chooses who goes first.

The first player picks any two cards and shows them to the other players. If they match, keep the matched set and select two more cards. Continue this way until two non-matching cards are selected.

If the cards do not match, they must be returned face-down to their original positions. The next player then takes their turn.

WINNING

The winner is the player with the most matching sets when all cards have been matched or when the time limit is reached.

The key to winning is to remember where the cards are located.

Go Fish

Based upon the traditional card game.

NUMBER OF PLAYERS: 2 to 6.

OBJECTIVE: To get rid of all of your cards.

HOW TO PLAY

Shuffle cards and deal equally face-down to all players, with one extra hand dealt for the pile. If there aren't enough cards for all players to get an equal number, the extras get placed on the pile (i.e. an equal number of cards for each player, but more cards in the pile).

If you only have two copies of each card, students must make up sets consisting of both identical cards. If you printed four copies, students need four identical cards to make a set.

Without letting other players see their cards, players look at their cards and group them into sets. If players are dealt a full set, these are placed face up in front of them. Completed sets must be shown to other players.

Play starts with the player sitting clockwise next to the dealer.

The player asks any other player for a particular card, but the asking player must have at least one of the cards making up that set. If the player asked has that particular card, it must be handed over. The asking player can then ask any other player for another card.

Once a player gets all cards for a completed set, they must be placed face up in front of them. Completed sets must be shown to other players.

This continues until the player asks for a card that is not held by the player being asked. The asked player then calls **GO FISH** and the asking player must pick up a card from the pile. Play is then passed to the asked player.

WINNING

The first player to discard all of their cards by making sets is the winner.

Snap!

Based upon the traditional card game.

NUMBER OF PLAYERS: 2 or more.

OBJECTIVE: To be the only player remaining holding cards.

HOW TO PLAY

Shuffle cards and deal equally face-down to all players. If there are not enough cards for all players to get an equal number, the extras get placed on a central pile (i.e. an equal number of cards for each player, with all extra cards in the pile).

Players are not allowed to look at their cards. The youngest player chooses who goes first.

The first player turns over their top card and places it face up on the central pile, or creates a new pile if there are no cards on the pile.

If the card played is the same as the top card on the pile, players must call out **SNAP** and place their hand on the pile. The first player to do so wins the pile and places them at the bottom of their deck. It is then their turn to play a card.

In a 2-person game, if the cards do not match and a player calls "Snap!" they forfeit the cards to the other player.

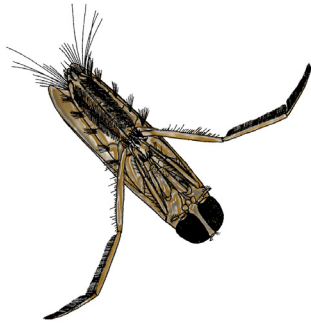
In a 3 or more-person game, if the cards do not match and a player calls **SNAP** they forfeit a turn and cannot rejoin the game until there has been a successful **SNAP**. The cards remain in the pile.

If the card played does not match the top card on the pile, the next player turns over their top card and places it face up on the central pile.

When a player has no more cards in their hand, they are eliminated from the game. Play continues until only one player has cards or until the designated time limit is reached.

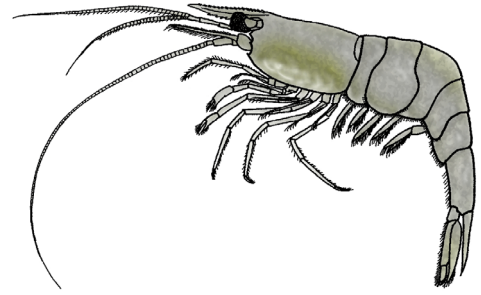
WINNING

The winner is the only player with cards remaining or is the one with the most cards when the time limit is reached.



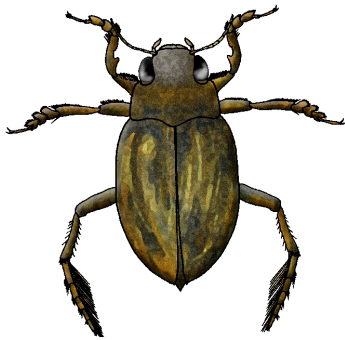
Backswimmer

I am a carnivore who likes to suck the body juices of other insects, tadpoles and small fish!



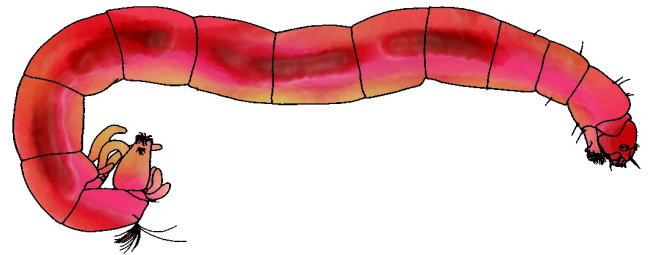
Freshwater Shrimp

I mainly eat rotting vegetation, bacteria and algae. I use my first two pairs of legs to grab the food and put it in my mouth.



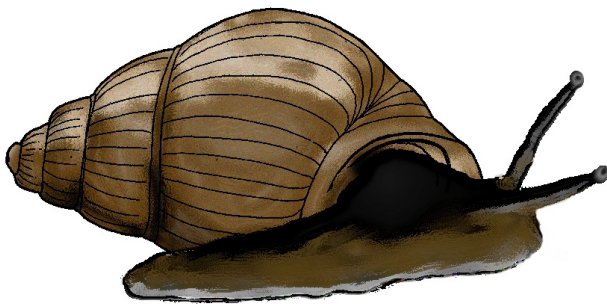
Predacious Diving Beetle

I have chewing mouthparts which helps me eat other aquatic invertebrates, small fish and tadpoles!



Non-biting Midge larva

I am red because of iron in my blood which helps me live in water low in oxygen. Sometimes I called a Bloodworm.



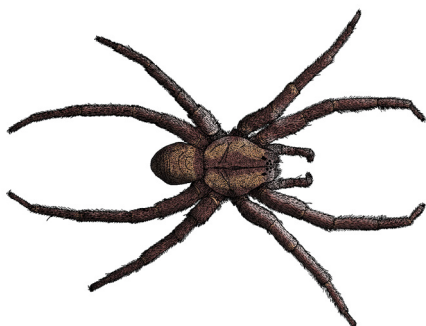
Freshwater Snail

I am a herbivore and I scrape algae from the surface of rocks and plants.



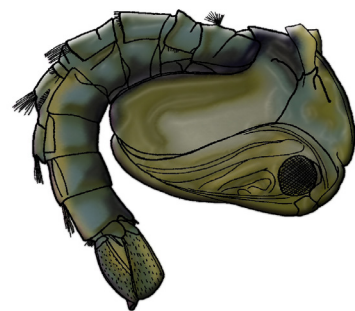
Caddisfly larva

I build myself a protective case out of leaves, sand, reeds or sticks. I am very sensitive to pollution.



Fishing Spider

I dive beneath the surface of the water to hunt. Fine hairs on my abdomen trap air bubbles so I can breathe underwater.



Mosquito pupa

As a pupa I do not eat at all, so I had make sure I ate enough when I was a larva to make it through to becoming an adult!

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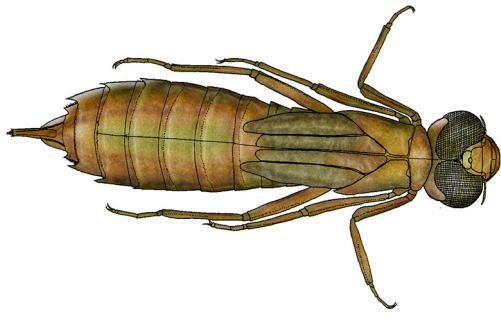


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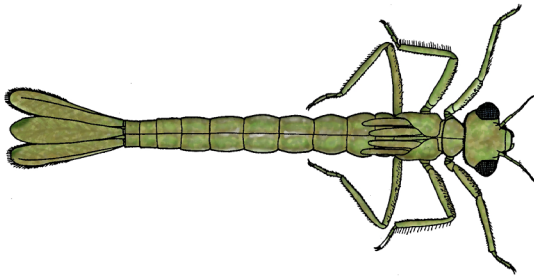
Dragonfly nymph

My gills are inside my bottom, so I have to pump water in and out of it to breathe. I can also jet propel through the water!



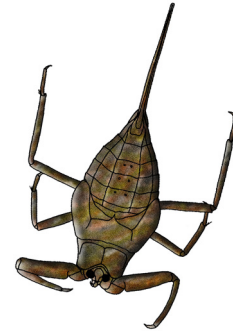
Soldier Fly larva

I hold my tail at the surface and breathe through little holes. The hairs help to repel water so that I don't suffocate.



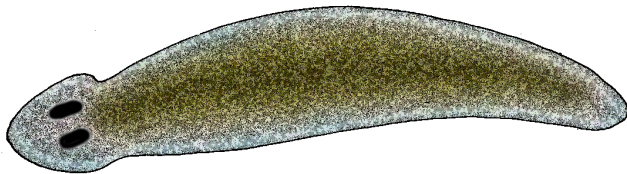
Damselfly nymph

The three tails at the end of my body are actually gills that help me to breathe. I eat other insects, fish and tadpoles.



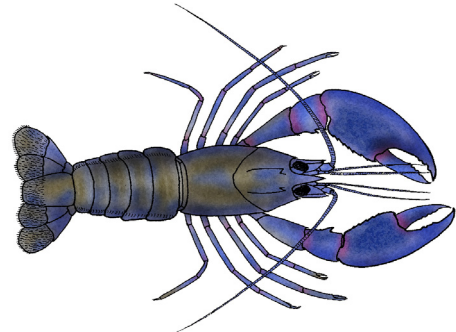
Water Scorpion

I'm not really a scorpion, I'm an insect. My long tail works like a snorkel so I can breathe underwater when hunting.



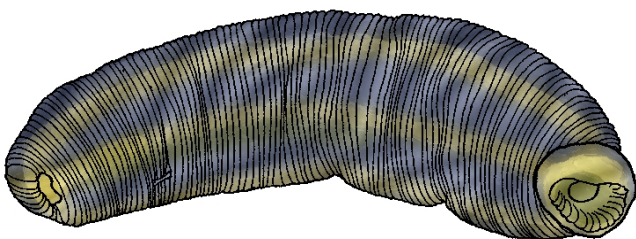
Flatworm

I like to eat decomposing plant matter and my mouth is in the middle of my body. I also use it to get rid of my waste!



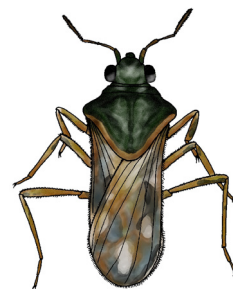
Yabbie

I have a hard exoskeleton which I will shed as I grow. In very clean water I can turn blue, but in muddy water I'm brown.



Leech

I mainly feed on the blood and juices of snails and other aquatic animals. I have suckers at each end of my body.



Small Water Strider

I run on the surface hunting small animals. My mouth is like a straw which I use to stab prey and drink their juices with.

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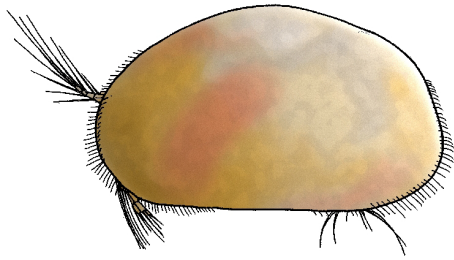


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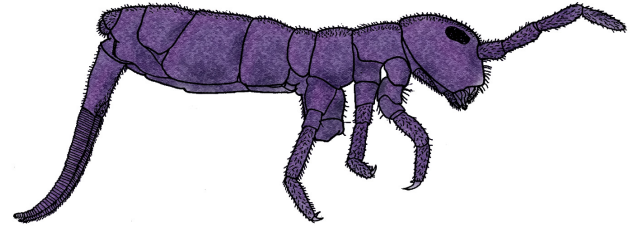


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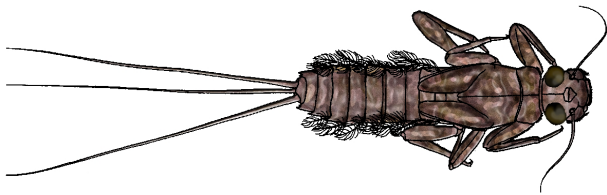
Seed Shrimp

I use my antennae for locomotion and I have a hinged, bivalve shell that I can close up around me.



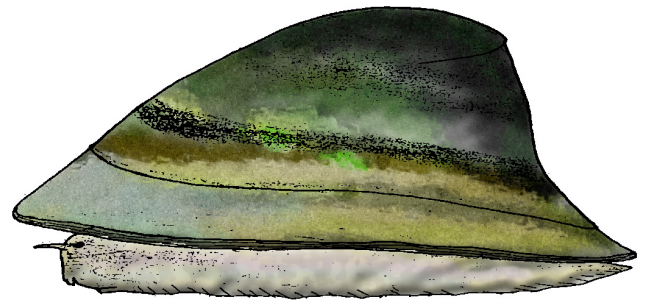
Springtail

I'm only about 3mm long but my spring-loaded tail lets me jump over 30cm in the air to avoid danger!



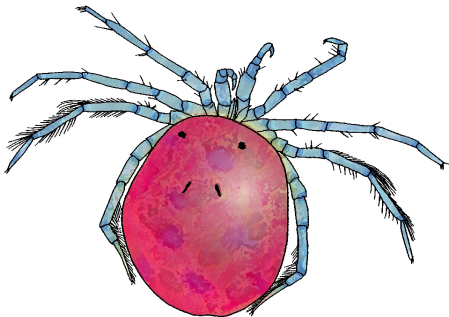
Mayfly nymph

As a nymph I may take two years to develop, but once I turn into an adult I may only live for a few weeks.



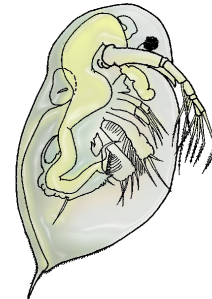
Freshwater Limpet

My cone-shaped shell which points backwards at the top is designed to help me live in fast-flowing water.



Water Mite

I feed on small animals by sucking their juices. When I'm a baby I only have six legs but when I grow up I have eight.



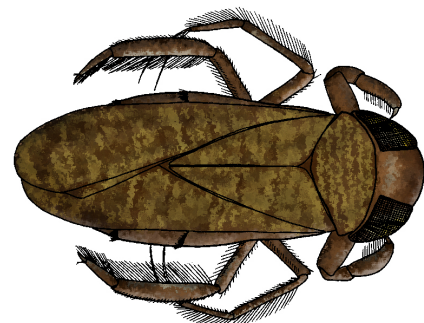
Water Flea

Unlike the fleas on a dog, I won't bite you. I eat by filtering small items out of the water with the hairs on my legs.



Whirligig Beetle

I'm a strong swimmer and can dive to avoid predators. I'm often seen swimming in groups on the surface of the water.



Water Boatman

If you listen you may hear me call. Males rub their legs or beaks to make a loud click which attracts females.

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