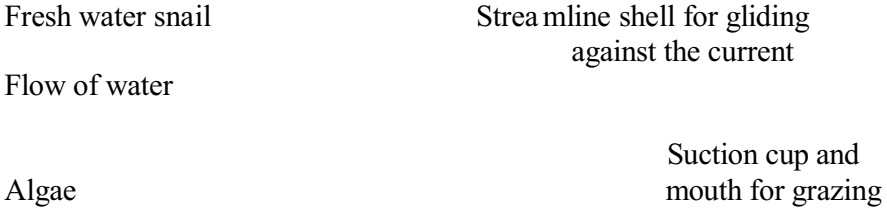
Freshwater Snail Populations Investigation

Aim:
I aim to investigate how the flow rate of a stream affects the distribution of freshwater snails.

Prediction:
Freshwater-snails are a type of mollusc; they graze on algae encrusting the stones of the streambed. They have a spiralled, streamline shell that helps them to move more easily through the water against stronger currents. Algae grow in a large supply in well-oxygenated water where the oxygen is trapped by flying water in the fast current. The algae cling to stones where the fast water sweeps away all the mud from the seabed, leaving bare stones. The snails have adapted to their lifestyle with their streamlined shell for gliding against the current. If the temperature becomes too cold, then the snails will not feed and become inactive, as they are cold-blooded.
I predict that the snails will be found in the faster stretches of the stream, (where the bare algae encrusted stones lay).



Variables:

Variable	**Effect on the experiment**
Temperature	If the temperature is too cold then the snails will seek refuge under rocks and plants to try and conserve heat. They become inactive and will not feast on the algae.
Oxygenated water	Snails feast on algae and algae are found in highly oxygenated water.
pH balance	Most snails do best in harder, alkaline water. If the pH drops below a certain point, their shells will start to dissolve and/or grow improperly.
Depth	The most oxygenated water is found in shallow stretches of the stream, this is where the algae is and consequently where the snails are.
Dissolved phosphates and	With the stream running through farming fields there is a danger of fertilisers running into the stream. This causes eutrophication

nitrates	and subsequently a 'boom' in snail populations. The increase in snail populations will then be followed by a decrease because of the competition for food.

None of these variables will have a tremendous affect on the experiment, as none of them could change so drastically in the short space of time it takes to complete the experiment. None of these should affect my results. However we will try to keep all the factors as constant as possible by completing the investigation quickly and efficiently.

Plan:

I will measure the flow rate of the stream at 6 different locations at a variety of speeds. Once these are recorded (m/s) using a flow meter and C.B.L, placing the propeller upstream we will complete a controlled kick sample. The streambed will be kicked 20 times (facing downstream) into a plankton net (facing upstream). After the sample has been taken we will carefully pour the contents of the nets into a sample tray with some water. The sample will then be left for 5 minutes to settle. After this period I will remove the majority of the water, all the large stones and all the large organisms e.g. fish and eels etc. We will then begin the process of hand counting the snails. Once the snails are counted we will pour the sample back where we found, so not to disturb the streams Eco-system. Each experiment will be repeated so my results can be reliable as possible.

The experiment will be controlled and fair as well as safe, with particular care taken when wading through the stream as it disturbs the wildlife and carries a caution of drowning in deeper stretches of water.

Preliminary experiment:

I think my results will be sufficient enough to use as evidence to support my prediction as a preliminary experiment showed that generally more organisms thrived in the faster moving stretches of the stream.

Flow rate (m/s)	**Number of organisms**
0	4
0.56	59
0.96	122

Results:

Flow-rate (m/s)	Depth (cm)	Number of snails		
		Test 1	Test 2	Average
0	37	0	0	0
0.073	35	0	1	0.5
0.23	55	4	6	5
0.68	34	37	35	36
1.21	38	82	102	92
1.32	23	16	11	13.5

The above graph shows that flow-rate and the number of snails found in that location are directly proportionate.

Conclusion:

My hypothesis was that the snails would be found in the faster stretches of the stream, (where the bare algae encrusted stones lay). The experiment supported my prediction strongly. The algae were most abundant in faster stretches of the stream, this is also where the snails were most affluent. The snails have adapted to this with spiral shaped shells, which are streamline (unlike their cousins – the everyday garden snail) for gliding against strong currents. I obtained good results as both graphs show a positive correlation between snail distribution and flow-rates because there are two very definite curves. I have found that as the speed of the river increases so does the freshwater snail population.

It appears that there was only one anomalous result (in the fastest stretch of stream), however under analysis you can see that it is confirmed by the second experiment. This can be explained, the water is just too fast for the snails to cling onto the rocks, which results in them clinging to the underside of larger heavier rocks.

I believe the second possibility to be the most likely because there would probably be a noticeable difference throughout the experiment with all the snail numbers low.

Evaluation:

I believe the experiment was a success, as my prediction was proved correct. I found out that the flow-rate of a stream has a direct affect on the distribution of freshwater snail populations that inhabit the stream. I think our results were accurate because each test was repeated and our results were incredibly similar. All the factors were just right for the experiment; the temperature (being my main concern) was ideal and despite the rain the snails (who are cold-blooded) were not reluctant to feed.

There was only one result that did not fit the pattern; we believe that this was not an anomalous result because it was repeated in the second set of test. This 'odd' result occurred on both graphs where the stream was fastest, this is because the water was moving too fast for the snails to cling to the rocks.

The experiment was fair and controlled; this is reflected in our results, which are very encouraging. I think I could improve the experiment by completing another sample in faster flowing water than the result that did not fit the pattern. This will then test if the.