

Investigation 1

THE OVERARCHING QUESTION: How do biotic and abiotic factors in Talbot Forest allow the different plants to germinate and grow?

Pātai/ My Question: What are the abiotic and biotic factors that affect plants in Talbot forest?

Name and describe the type of investigation and what I did

- Exploring and Observing

We travelled to Talbot Forest and while we were there we searched for biotic and abiotic factors that affect the plants in Talbot Forest.

I had a sheet of paper and I drew a map of a section of the forest and then labelled the plants and other things I could recognise on my drawing.

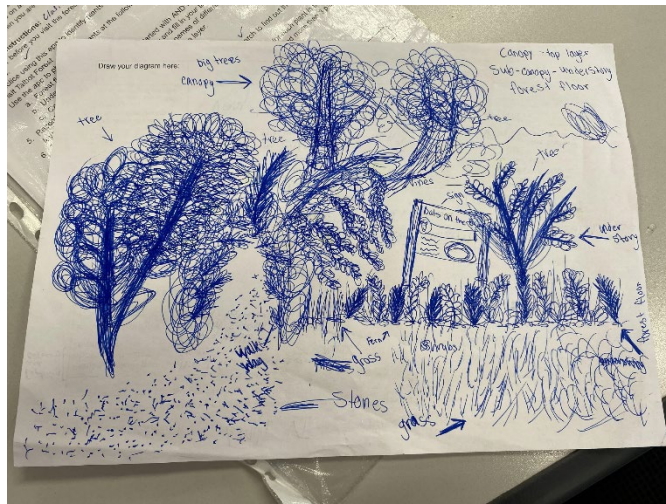
I then wrote down what temperature, light intensity, humidity of the air, exposure to wind and the exposure to sunlight on all three of the different layers in the forest (forest floor, understory, canopy).

This investigation let us find out what the forest looks like and it showed us all of the layers in the forest such as the forest floor, the understory and the canopy layer. It also showed us what the temperature, light intensity, humidity of the air, exposure to wind and the exposure to sunlight on all three of the different layers in the forest. I found out what some of the plants are in the forest from briefly looking and taking a guess.

Type of data I collected

I used annotated diagrams and drawings to find our data. I drew all of the layers in the forest on a map and what abiotic factors and biotic I could see in them. The abiotic factors that I found in my drawing were stones, rocks and a sign with information about the forest. The biotic factors that I found were small and large trees, vines, grass, ferns, small shrubs, bushes and moss in some areas.

I labelled my drawing and wrote down the abiotic factors that I could see and feel in the different layers of the forest such as the temperature, light intensity, humidity of the air, exposure to wind and exposure to sunlight. I wrote this down on the other side of the paper that my map was on so that I could further investigate it.



Talbot forest information Emily VT Date:

Overarching question: How do biotic and abiotic factors in Talbot Forest allow the different plants to grow?

	Layer 1 (Forest floor)	Layer 2 (Understory)	Layer 3 (Canopy)
Plant species - get photos and name them later You can use your phone for this. Note: later you will add the call length of each plant by researching online.	Hon & chicken fern Clusia Creeping Mistle Common Safford Creeping buttercup	Tillandsia Mahoe Torena Rubus cissoides Karoahi	Karoahi 2-3 m Clusia 2-3 m Pleurothamnium 10-20 m Macleaya 2-3 m
Temperature Hot/ warm/ cold	14 Cold - Less sunlight caught by the big trees	15 Medium - some sunlight	19 Hot - lots of sunlight/heat rises
Light intensity / medium/ high levels	10 Low sunlight	180 Medium - some light	973 High - lots of light
Humidity of the air from 1 to 5. 1 = very dry 5 = very damp	4 Moisture not evaporated Rain adds the moisture to the ground level & leaves (less)	2	1 Evaporating the moisture from the trees
Exposure to wind medium/ high	Low the stuff on the ground is protected	medium	high not sheltered by anything
Exposure to sunlight from the top	Very little	some times	all the time
Time/ some of the / little of the time.			

is secondary data from teacher

Conclusion/ What did you find out

I found out how abiotic factors such as the temperature, light intensity, humidity of the air, exposure to wind and exposure to sunlight in the different layers of the forest allow the different plants to germinate and grow in Talbot Forest.

The forest floor was cold (14 degrees Celsius), it had low light intensity as the larger trees blocked the sunlight (15 lux), the humidity was at a 4 on a scale from 1-5 (1 being very dry and 5 being very damp), the exposure to wind was low as it is protected by the larger trees, the exposure to sunlight was very little as the trees above blocked it out.

The understory was medium heat (15 degrees Celsius), it had a medium light intensity (180 lux), the humidity was at a 2, the exposure to wind was medium as it was slightly protected by larger trees but not as much as the forest floor was, the exposure to sunlight is sometimes as it is slightly blocked out by the larger trees but not too much.

The canopy layer was hot (19 degrees Celsius) as it had lots of sunlight and the heat also rises to the top, it had high light intensity (973 lux) as the sunlight got all parts of it, the humidity was at a 1 as most of the moisture from the trees is evaporated, the exposure to the wind was high because there is nothing to shelter the trees up there, the exposure to sunlight was all the time as it is not blocked at all.

Give evidence to explain WHY this investigation type was useful (or not) to answer this question. Quote your data.

This investigation type was useful because exploring and observing allowed us to stand back and make detailed notes and a detailed drawing about many of the biotic and abiotic factors that we could see at Talbot Forest like the temperature, light intensity, humidity of the air, exposure to wind and exposure to sunlight.

A disadvantage of using exploring and observing is that it only gives you a quick look at an area so your drawing/notes may not be fully accurate so you may find that you need to go back and have another look at that area again to make sure you have all the information that you need.

This investigation let us find out what the forest looks like and it showed us all of the layers in the forest such as the forest floor, the understory and the canopy layer. It also showed us what the temperature, light intensity, humidity of the air, exposure to wind and the exposure to sunlight on all three of the different layers in the forest. I found out what some of the plants are in the forest from briefly looking and taking a guess.

Investigation 2

Pātai/ My Question: What plants live in the forest and what size leaves do they have?

Type of investigation and what I did

The purpose of this investigation was to show us what plants are living in Talbot Forest and help us know what they look like and how to identify them.

- Classifying and Identifying

We downloaded an app called “Aotearoa Species Classifier” on one person in our groups phone so that we could accurately classify what plants we found.

We then scanned the different plants that we found in the different layers of the forest.

We then wrote down what the names of the plants we found on the same sheet of paper that we wrote down the temperature, light intensity etc.

This investigation allowed us to find out what plants are living in Talbot Forest. We found out that there are multiple different plant species living in the forest and in the different layers. In total we found 16 different species across all of the layers. We found 5 in the forest floor, 5 in the understory and 6 in the canopy.

The species we found in the forest floor are Fern hen & chicken, white clover, creeping thistle, common seal heal and creeping buttercup.

The species we found in the understory are titoki, mahoe, tarata, kamahi and five finger.

The species we found in the canopy are kahikatea, kauri, pukatea, totara, pahautea and matai.

Type of data I collected

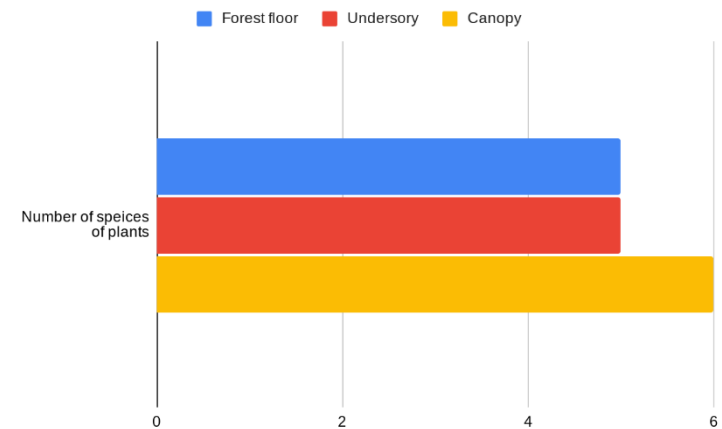
We used a graph to display our data.

The graph is showing that we found 5 different plant species in both the forest floor and understory, and that we found 6 different plant species in the canopy.

Forest Floor: *Asplenium bulbiferum* (Fern hen & chicken), *Trifolium repens* (white clover), *Cirsium arvense* (creeping thistle), *Prunella vulgaris* (common seal heal), *Ranunculus repens* (creeping buttercup).

Understory: *Alectryon excelsus* (titoki), *Melicytus ramiflorus* (mahoe), *Pittosporum eugenioides* (tarata), *Weinmannia racemosa* (kamahi), *Pseudopanax arboreus* (five finger).

Canopy: *Dacrycarpus dacrydioides* (kahikatea) , *Agathis* (kauri), *Laurelia novae-zelandiae* (pukatea), *Podocarpus totara* (totara), *Libocedrus bidwillii* (pahautea), *Prumnopitys taxifolia* (matai).



Conclusion/ What did you find out

From the data that I collected, I found out that the forest floor and the understory both have the same amount of different plant species (5) and that the canopy has a slightly larger amount (6). That means in total we found 16 different species across all three of the layers. I also found out what plant species are living in each layer.

The species of plants that we found on the forest floor were: *Asplenium bulbiferum* (Fern hen & chicken), *Trifolium repens* (white clover), *Cirsium arvense* (creeping thistle), *Prunella vulgaris* (common seal heal), *Ranunculus repens* (creeping buttercup).

The species of plants that we found in the understory were: *Alectryon excelsus* (titoki), *Melicytus ramiflorus* (mahoe), *Pittosporum eugenioides* (tarata), *Weinmannia racemosa* (kamahi), *Pseudopanax arboreus* (five finger).

The species of plants that we found in the canopy were: *Dacrycarpus dacrydioides* (kahikatea) , *Agathis* (kauri), *Laurelia novae-zelandiae* (pukatea), *Podocarpus totara* (totara), *Libocedrus bidwillii* (pahautea), *Prumnopitys taxifolia* (matai).

Give evidence to explain WHY this investigation type was useful (or not) to answer this question. Quote your data.

This investigation type was useful because classifying and identifying allowed us to find out what plant species are living at Talbot Forest and made it really simple for us to make detailed notes about it.

A disadvantage of classifying and identifying is that it is quite limited and doesn't give any information about the relationship between the plants and the layers that they are living in.

This investigation allowed us to find out what plants are living in Talbot Forest. We found out that there are multiple different plant species living in the forest and in the different layers. In total we found 16 different species across all of the layers. We found 5 in the forest floor, 5 in the understory and 6 in the canopy.

The species we found in the forest floor are Fern hen & chicken, white clover, creeping thistle, common seal heal and creeping buttercup.

The species we found in the understory are titoki, mahoe, tarata, kamahi and five finger.

The species we found in the canopy are kahikatea, kauri, pukatea, totara, pahautea and matai.

Investigation 3

Pātai/ My Question: Do the layers in the forest allow the seeds of the native plants to germinate better than no layers?

Type of investigation and what I did

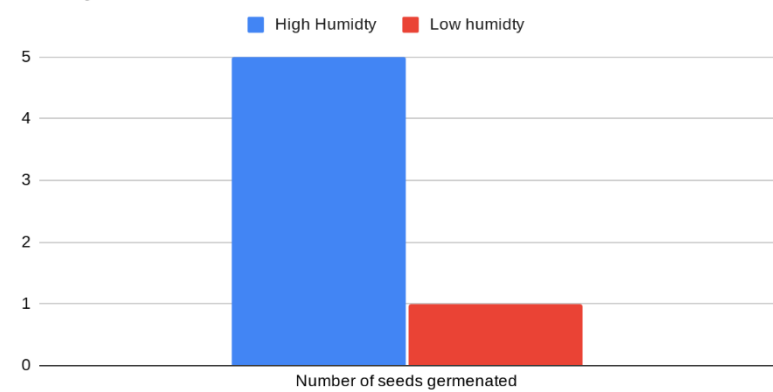
- Modelling
 - We had 2 yellow lids and a tile
 - We put a cotton ball in each lid and spread it out so the cotton ball covered the whole lid
 - We added the same amount of water to each of the cotton balls (using a pipette) so it was slightly wet
 - We then placed 7 mung beans in each of the lids on top of the cotton ball and made sure that they were all evenly spread out
 - Then we placed both of the lids on the tile
 - We placed a cut-in-half bottle on top of one of the lids secured it with blue tack and left the other lid uncovered
 - We left the seeds for 48 hours (2 days) to germinate and then came back and recorded what happened

The purpose of this investigation is to help us see if seeds germinate differently if they are covered which means they will have higher humidity or if they are uncovered which means they will have low humidity.
This investigation let us find out that seeds that are covered and have a higher humidity are more likely to germinate and will germinate faster than seeds that aren't covered and have a low humidity which will take much longer.

Type of data I collected

The graph shows that in total we had 5/7 seeds start to germinate in the lid that was covered (high humidity) and that only 1/7 seeds started to germinate in the lid that was not covered.

High Humidity and Low humidity from 48hrs out of 7 seeds per humidity lvl



Conclusion/ What did you find out

During this investigation, I found out that seeds covered by the forest's layers are more likely to germinate. This is because the layers that protect them create humidity in the air which helps the seeds to germinate better. I also found that the seeds that were not covered by anything were dehydrated and the cotton ball had no moisture left in it but the seeds and cotton balls that were covered were still very hydrated and moist.

In total, 5/7 seeds had germinated in the lid that was covered.

In total, 1/7 seeds had germinated in the lid that wasn't covered.

Give evidence to explain WHY this investigation type was useful (or not) to answer this question. Quote your data.

This investigation type was useful because modelling allowed us to see how seeds would germinate in the forest without having to leave the classroom as the forest is a large area and would be harder to control the environment.

A disadvantage of using modelling is that doing the modelling experiment in the classroom will not be the exact same of what is actually happening in the forest.

This investigation let us find out that seeds that are covered and have a higher humidity are more likely to germinate and will germinate faster than seeds that aren't covered and have a low humidity which will take much longer.

Short overall conclusion

How your investigations all contribute to the overarching question

All of my investigations contribute to the overarching question because they all show a small amount of what is happening in the forest and how it is affecting the seeds to germinate and grow into plants. Exploring and observing contributed because it gave me a good overview of what the forest looked like and helped me to find out things such as temperature, light intensity, humidity of the air, exposure to wind and exposure to sunlight which helped me because seeds need a few of those things to germinate and it also helps show how it can affect plants to survive in that habitat. Identifying and classifying contributed because it showed me how many plant species are living in each layer and helped me be able to go into further inspection about what adaptations they have and need to survive. Modelling contributed because it helped show me what it looks like when a plant is germinating and what will help it to germinate. For example, it germinated better when it was covered by the plastic bottle which represents the trees covering the seeds in the forest floor. All of the investigations contribute in their own way to make this investigation easier for me to do and figure out how seeds germinate and how plants grow in Talbot Forest.