



**Prize Winner**

# **Scientific Inquiry**

## **Year 3-4**

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# **Say Bye-Bye to Weeds**

**By Jasmine Helwig**

## **INTRODUCTION**

In winter, a lot of weeds grow at home especially over pavement. Much time is spent pulling up weeds. You can use chemical weed killer from Garden Shop, which often contains glyphosate which may not be healthy and has links to cancer (reference 1).

I want to see if natural household products are effective in killing weeds and looked at various methods (references 2 and 3).

## **AIMS**

I have selected 3 commonly available products at home: hot water, cleaning vinegar and salt. The questions and hypothesis I want to test are:

### **Question 1**

Are the various natural household products equally effective in killing weeds?

Hypothesis – all the various natural household products are equally effective in killing weeds. Weeds in control group will remain green.

### **Question 2**

Which natural household product is the most cost effective?

## **METHODS**

The pavement area with weeds was marked out as below:

Area 1 – clumps of weeds

Area 2 – strip of weeds in sun

Area 3 - strip of weeds in shade

Each area was divided further into 4 sections: boiling water, vinegar, salty water and control. The weeds were trimmed to about 2cm from the ground to better see the roots.

Each section was applied with either 100ml of boiling water, 100ml of cleaning vinegar, 100ml of salty water or nothing which is control. I washed hands after handling vinegar and got mum to boil the water in the kettle and helped to pour it on the weeds.

We went back to each area every week and monitored the effect, took photographs and logged the colour of the weeds.

Initially I only did area 1, but as the natural home products worked so well in this area, 10 days later, I decided to test out a strip of weed in the sun (area 2) and compare that with a strip of weed in shade (area 3).

## **COST OF MATERIALS**

For a 2000W kettle, it took 5 minutes to boil 1.5L water. Electricity cost is \$0.3682 per kWh, so for 300ml hot water = \$0.02, Dad helped me with this bit of maths.

Cleaning vinegar contains 3-4% acetic acid in water. It is \$3 for 2L and I used 300ml, so that is \$0.45 in total.

The salty water was made up by putting 200g salt in 300ml water (reference 4). Iodised cooking salt is \$1.09 for 1kg and I used 200g, so that is \$0.21 in total

## START OF EXPERIMENT

### AREA 1



### AREA 2





### AREA 3



### RESULTS

Colour of weed	Area 1 Boiling water	Area 2 Boiling water	Area 3 Boiling Water
10/6/2021 (day 0)	Green	Not started yet	Not started yet
11/6/2021 (day 1)	Green	Not started yet	Not started yet
20/6/2021 (day 10)	Part brown/ green	Green	Green
28/6/2021 (day 18)	Brown	Part brown/ green	Brown
5/7/2021 (day 25)	Brown	Brown	Brown
14/7/2021 (day 34)	Brown	Brown	Brown

Colour of weed	Area 1 Vinegar	Area 2 Vinegar	Area 3 Vinegar
10/6/2021 (day 0)	Green	Not started yet	Not started yet
11/6/2021 (day 1)	Part green/ brown	Not started yet	Not started yet
20/6/2021 (day 10)	Brown	Green	Green
28/6/2021 (day 18)	Brown	Brown	Part green/ brown
5/7/2021 (day 25)	Brown	Brown	Part brown/ green
14/7/2021 (day 34)	Brown	Brown	Part brown/ green

<b>Colour of weed</b>	<b>Area 1 Salty water</b>	<b>Area 2 Salty water</b>	<b>Area 3 Salty water</b>
<b>10/6/2021 (day 0)</b>	Green	Not started yet	Not started yet
<b>11/6/2021 (day 1)</b>	Part green/ brown	Not started yet	Not started yet
<b>20/6/2021 (day 10)</b>	Part brown/ green	Green	Green
<b>28/6/2021 (day 18)</b>	Brown	Brown	No data (lost photo)
<b>5/7/2021 (day 25)</b>	Brown	Brown	Part brown/ green
<b>14/7/2021 (day 34)</b>	Brown	Brown	Part brown/ green

<b>Colour of weed</b>	<b>Area 1 Control</b>	<b>Area 2 Control</b>	<b>Area 3 Control</b>
<b>10/6/2021 (day 0)</b>	Green	Not started yet	Not started yet
<b>11/6/2021 (day 1)</b>	Green	Not started yet	Not started yet
<b>20/6/2021 (day 10)</b>	Part green/ brown	Green	Green
<b>28/6/2021 (day 18)</b>	Part green/ brown	Green	Green
<b>5/7/2021 (day 25)</b>	Part green/ brown	Green	Green
<b>14/7/2021 (day 34)</b>	Part green/ brown	Part green/ brown	Green

pH of soil was 7 at the start and end of the experiment

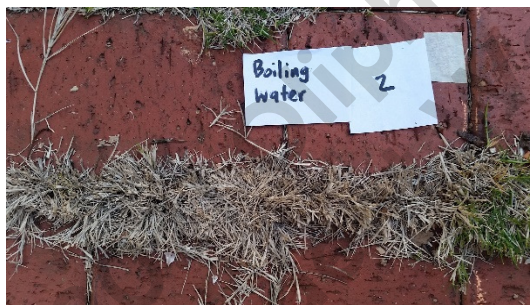


## END OF EXPERIMENT

### AREA 1

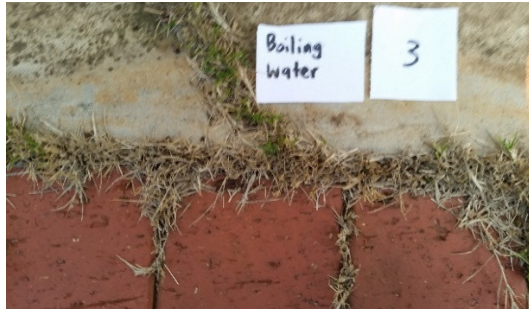


### AREA 2





### AREA 3



### DISCUSSION

Boiling water killed all of the weeds in all areas 1, 2 and 3 and appears the most cost effective. Vinegar and salty water killed weeds in sunny areas 1 and 2 but only partly in shady area 3. In the control section of sunny areas 1 and 2, some of the weeds did die partly. This may be because after trimming, the weeds were exposed to the cold weather.

Initially I guessed that all the various methods of boiling water, vinegar and salty water will be equally effective in killing the weeds in all areas and the weeds in the control section will remain green.

I did not expect vinegar and salty water to be less effective in killing weeds in shady area 3. This may be due to weeds in that area are more dormant in winter and did not grow enough to take up water and with it vinegar and salty water for them to work.

There was a lot of rain and this didn't affect the results in the sunny areas 1 and 2, as I thought the rain would dilute the effect of vinegar and salty water.

I could have started the experiment with strip of weed in sunny area 2 and shady areas 3 at the same time as area 1.

The experiment showed there are simple and effective ways to kill weeds without using chemicals that have concerns for people's health. There are further investigations that can be done like rechecking if the weeds grow back and repeating the experiment in summer when weeds are growing more.



Word count = 990 words

## ACKNOWLEDGEMENT

Thank you to mum for tips, ideas and reviewing the report and dad for helping with calculation of cost.

## REFERENCES

1. Is it safe to use glyphosate (Roundup etc) and other chemicals?  
<https://choice.community/t/is-it-safe-to-use-glyphosate-roundup-etc-and-other-chemicals/15850>
2. Herbicides and Other Weed Controls  
<https://www.abc.net.au/gardening/factsheets/herbicides-and-other-weed-controls/9433506>
3. How to Kill Weeds Naturally, Without Harming Your Other Plants  
<https://www.bhg.com/gardening/how-to-garden/how-to-kill-weeds-naturally/>
4. Salt Recipe for Weeds – How to Use Salt to Kill Weeds  
<https://www.gardeningknowhow.com>

# Experiment Journal

Date	Notes
10/6/21	marked out 4 sections in area of weeds on pavement - boiling water, vinegar, salt water and control.
10/6/21	made up salt solution by pouring 100ml of salt to 300ml water
10/6/21	I helped my mum boil water in a kettle
10/6/21	trimmed weeds so they are 2cm from the ground to better see roots.
10/6/21	applied boiling water, vinegar & salty water to areas marked.
11/6/21	noted area applied with vinegar showed good part of the weeds had died
15 <sup>th</sup> to 19/6/21	rained lots

# Experiment Journal

Date	Notes
20/6/21	marked out areas 2 and 3 area 2 - strip of lawn in full sun area 3 - strip of lawn in shade
	trimmed weeds to 2cm from ground to better see roots Applied boiling water, vinegar and salt water to marked sections
22 <sup>nd</sup> and 23 <sup>d</sup> June	of areas 2 and 3. rained
28/6/21	area 1: all weeds are dead area 2: more weeds died in vinegar section than boiling water section
	area 3: weeds dead in vinegar section about same as boiling water section but more than salt water section
29 <sup>th</sup> - 2 <sup>nd</sup> of July	rained
12/7/21	Shade area 3 still growing weeds.