

# Heron Pond Farm



**Zone Controlled Soil Steaming**

# Heron Pond Farm

South Hampton, NH

**42.8809° N, 70.9626° W**



# Winter weeds start out slow

- We farmed the first few years of winter growing weed free
- Then some brassica and rouge weeds started to come in nothing that could not be handled with a hoe
- Then the chickweed started coming in (as you see here) at this stage still nothing to get to upset about.



# Chickweed begins to expand it's turf

**Manageable weed pressure with hand tools.**



**Finding it hard to keep up even with frequent cultivations.**





Bring in the chickens! At least we will get some fertilizer out of this.



# Turns out chickens are a bad idea

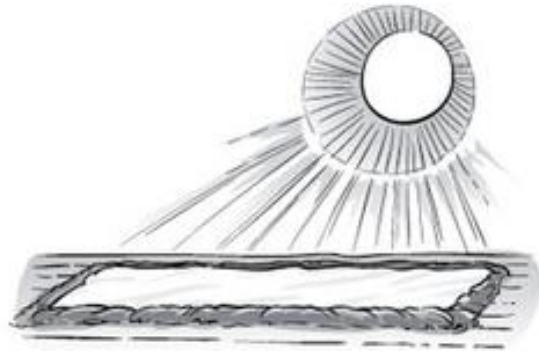
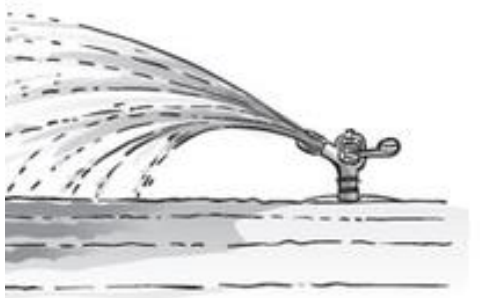
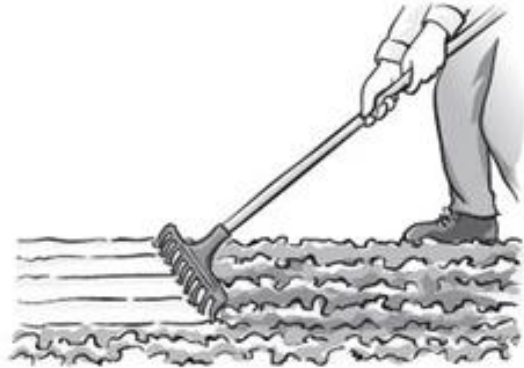
---

- Chickens don't eat that much chickweed. They tend to go after any crop first and fill up on that
- Compact the soil
- Create hot spots
- Food safety nightmare



# Sioux Model SF-20 Steam-Flo

- 20 Boiler HP (15 Boiler KW)
- 690 Lbs/Hour Steam Output (313 Kg/Hour Steam Output)
- 791,000 BTU/HR Input
- 15 PSI Maximum Operating Pressure (1.03 BAR Maximum Operating Pressure)
- 115V/1PH/60Hz Operating current 5 amps
- Oil fired burner (Diesel fuel or kerosene) with flame safe guard
- Fuel filter with water separator



## Bed prep is done prior to treatment.

- Deep and/or finish tillage will bring up viable weed seed.
- Smoothing off will allow not only for a better seed bed but for more consistent heating of soil bed.
- Watering for heat conductivity and retention. Soil must still be friable. Over saturation leads to uneven heat and unobtainable BTU load. Soil moisture should be 25%.
- Use of a power harrow post watering will aid in optimal treatment conditions.



# Soil Moisture Needs to be Just Right

---



# We Smooth Off and Mark Beds

---



Zone system uses two socks to heat each bed individually.

---

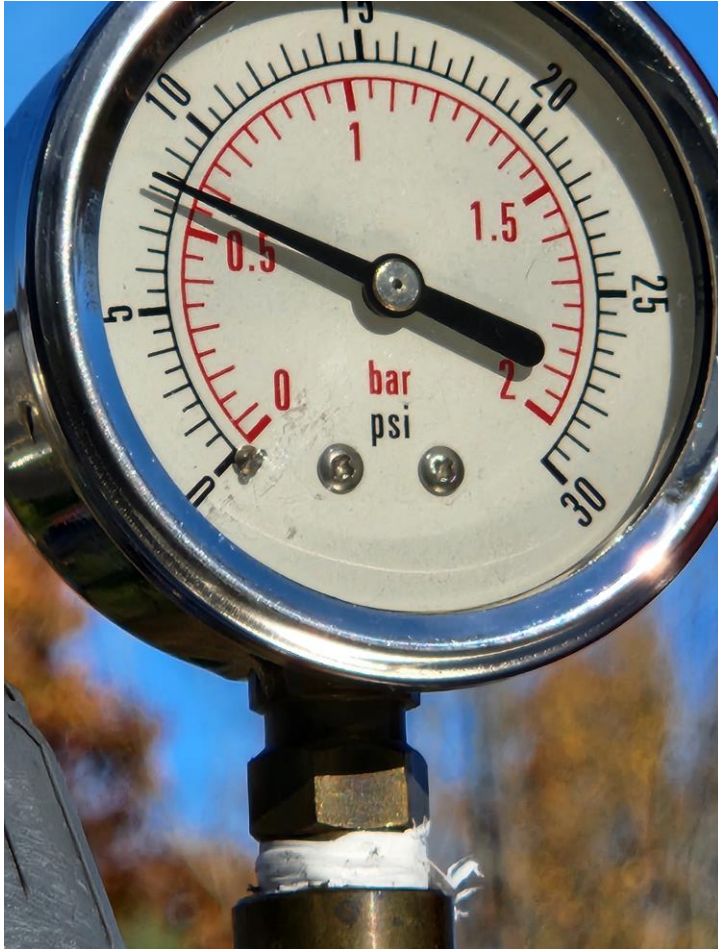




Probs are put in at depth of control

---

I like to adjust the system to about 3#’s of backpressure



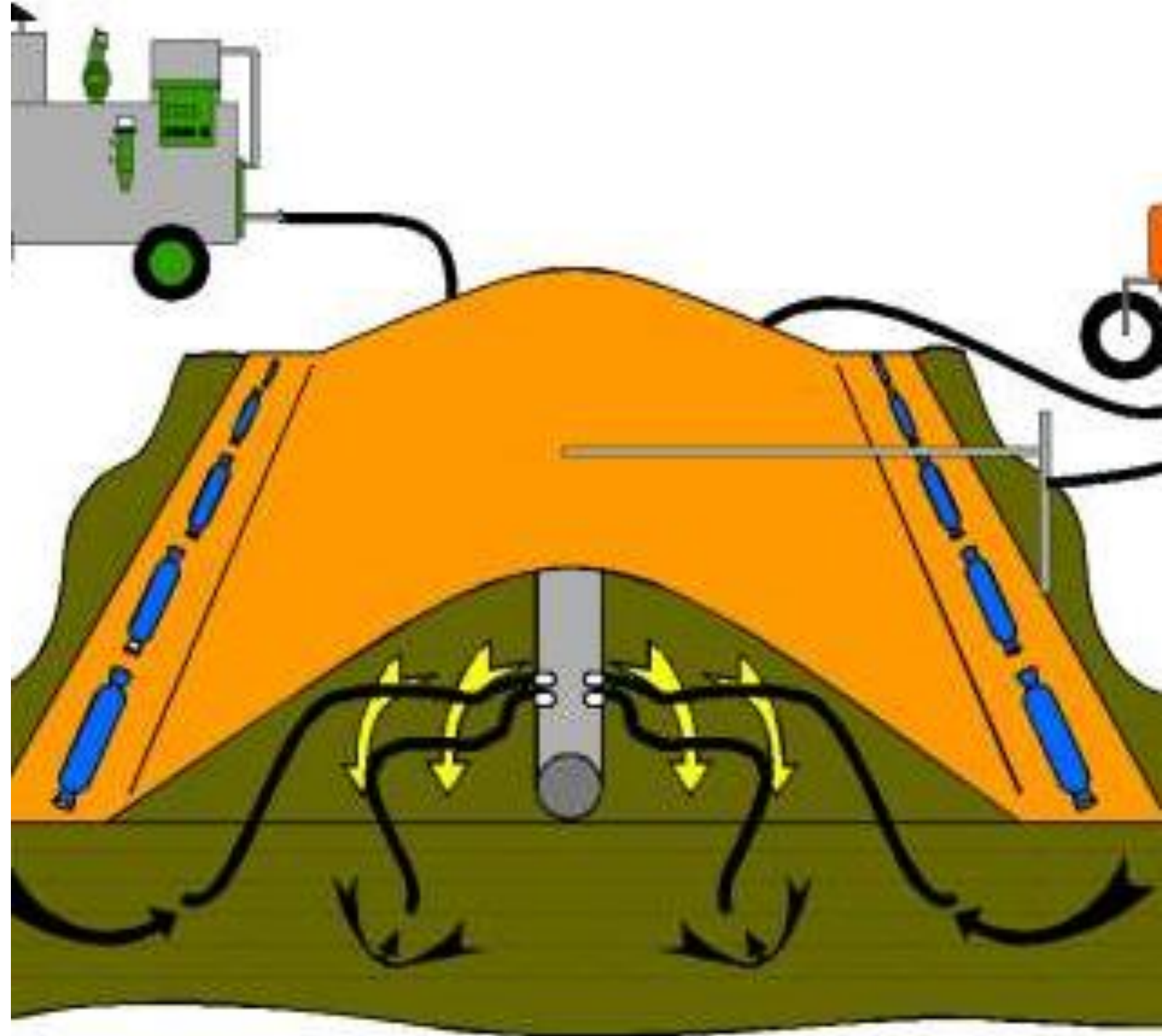
Each Zone stays within target temp while the entire bed gets up to temp

---

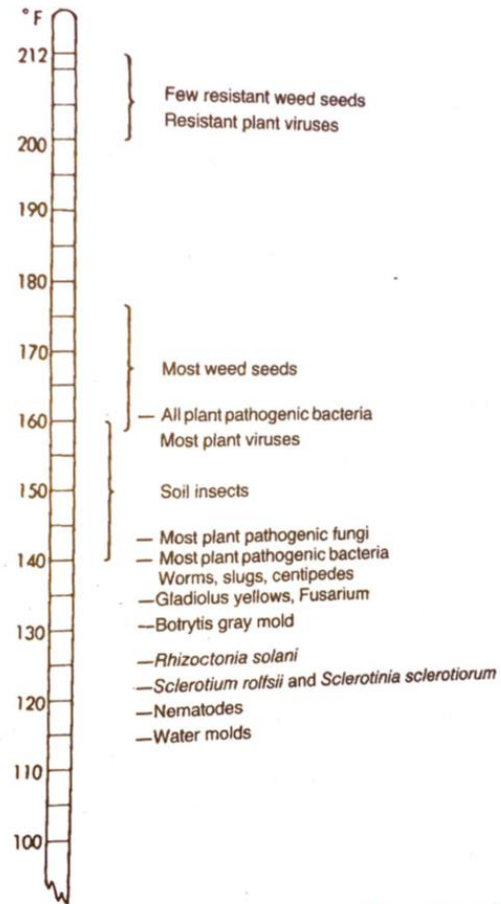


# General soil steaming set up

- Heat tube carries steam supply down entire length of treated area.
- Sides must be weighted down the entire way. No gaps. We use chain.
- Do not take test temp at beginning or end of run.
- Do not take test temp from middle or against weighted side of bed



For a guide on temperatures needed for sterilizing, see the following thermometer graph.



This graph shows temperatures necessary to kill pathogens and other organisms harmful to plants. Most of the temperatures indicated here are for 30-minute exposures under moist conditions. (From Baker, K. F., ed., "The U.C. System for Producing Healthy Container-Grown Plants," California Agriculture Experiment Station and Extension Service Manual 23, 1957.)

## Temperatures needed to effect change in weed seed bank.

- 175 degrees held for 30 min will destroy most weeds in soil.
- All plant pathogenic bacteria and most plant viruses are destroyed at 160 degrees.
- A few resistant weed seeds stay viable till help to 212 degrees. Luckily chickweed is not one of them.





HOME OF INNOVATIVE MICROBIAL SOLUTIONS

## BIO-REMEDY

CONTAINS NON PLANT FOOD INGREDIENTS.

**ACTIVE INGREDIENTS**

ter chroococcum 150,000,000 CFU per gram, Saccharomyces cerevisiae 150,000,000 CFU per gram, Bacillus firmus 100,000,000 CFU per gram, Bacillus amyloliquefaciens 100,000,000 CFU per gram, Bacillus subtilis 100,000,000 CFU per gram, Bacillus licheniformis 100,000,000 CFU per gram, Bacillus megaterium 100,000,000 CFU per gram, Bacillus pumilus 100,000,000 CFU per gram, Bacillus azotoformans 100,000,000 CFU per gram, Bacillus coagulans 100,000,000 CFU per gram, Bacillus polymyxa 100,000,000 CFU per gram, Paenibacillus durum 100,000,000 CFU per gram, Bacillus thuringiensis 50,000,000 CFU per gram, Azospirillum lipoferum 50,000,000 CFU per gram, Pseudomonas aureofaciens 20,000,000 CFU per gram, Pseudomonas fluorescens 20,000,000 CFU per gram, Pseudomonas putida 20,000,000 CFU per gram, Streptomyces coelicolor 20,000,000 CFU per gram, Streptomyces lydicus 20,000,000 CFU per gram, Streptomyces griseus 20,000,000 CFU per gram, Trichoderma harzianum 20,000,000 CFU per gram, Trichoderma reesei 20,000,000 CFU per gram, Trichoderma koningii 20,000,000 CFU per gram.

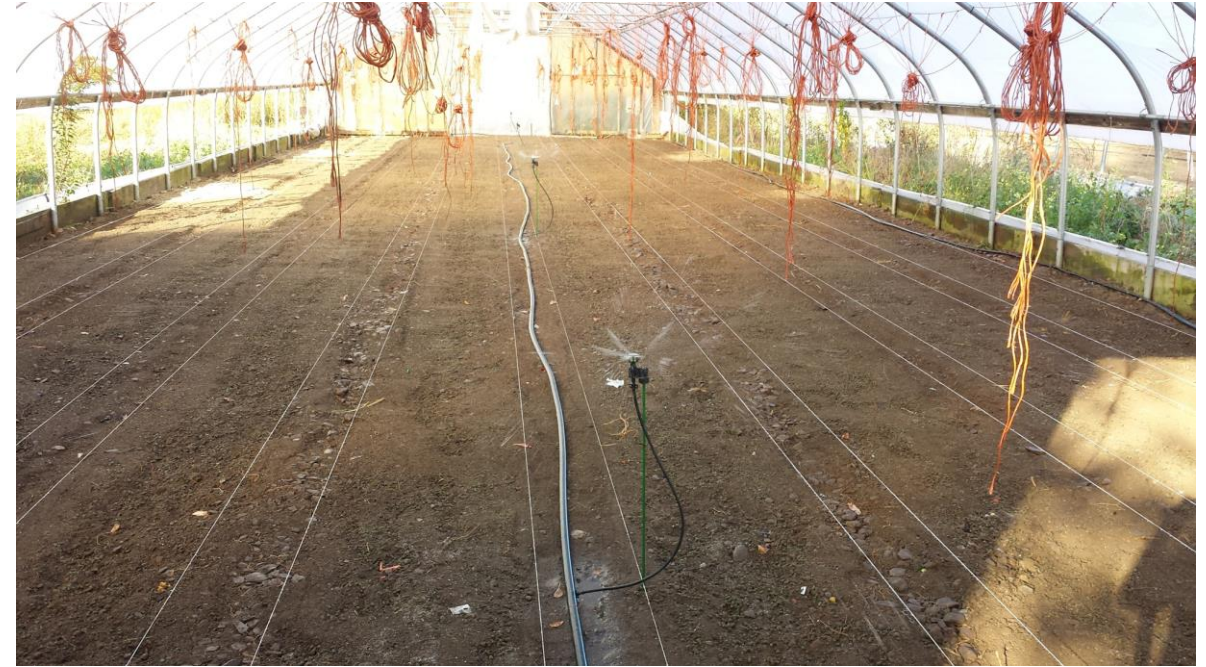
**INERT INGREDIENTS**

5.00% Dextrose, 20.00% Sucrose, 14.95% Non Calcined DE, 3.00% Hydrolyzed Soy Protein, 3.00% Brewers Yeast Extract, 2.00% Humic Acid (leonardite) 1.25% Kelp, 0.75% Hydrated Sodium Calcium Aluminosilicate (Drying Agent)

**84.30% Water Soluble By Weight**

**GENERAL INFORMATION**

be tank mixed with fertilizers, biostimulants and microbial foods (sugars, humic acids, kelp).  
 visible not to co-apply product with pesticides (fungicides, herbicides, insecticides, nematocides, fungicides) as they can compromise integrity of or kill the beneficial organisms herein contained.  
 require tank mix the product with pesticide and apply immediately (within 60 minutes).  
 When applied in rotation with pesticides its advisable to allow 5 - 7 days between application of pesticide and this product.  
 never apply product mixture just prior to a pesticide application.  
 do not tank mix with pesticides that contain imazalil, propiconazole, tebuconazole and triflumizole.  
 do not mix this product and store, apply all tank mixes within 3 - 4 hours of preparation.  
 do not shake the tank while adding product and during entire application process.



# Making use of an inoculant



## Yield and Value of Greens 30x96 Greenhouse

---

- 492.8 Pounds for First Cut x \$16.66/Pound = \$8,210
- 394.2 Pounds for Second Cut x \$16.66/Pound = \$6,567
- 315.4 Pounds for Third Cut x 16.66/Pound = \$5,254
- **Total Yield for House is 1202.4 Pounds Valued at \$20,031**

# Cost of Steaming a 30x96 Greenhouse

---

- 5 Gal Fuel/Hour x 2.5 Hours/Set x 4 x \$5.35/Gal = \$267.5
- Labor = .33 Hours/Set x 4 x \$22.50/Hour = \$29.7
- Depreciation on Steamer \$185/House
- **Total Cost of Steaming in 2022 per 30x96 House = \$482.20 or 17 cents a square foot.**
- **Could Go as High as \$572.42 with raising fuel cost Fuel or about 20 cents a square foot.**



Works for our direct seeded as well as transplanted crops

---



# 100,000 BTU Zone System Unit

---



# 5 Socks make 5 Zones Pleated by Chain

---



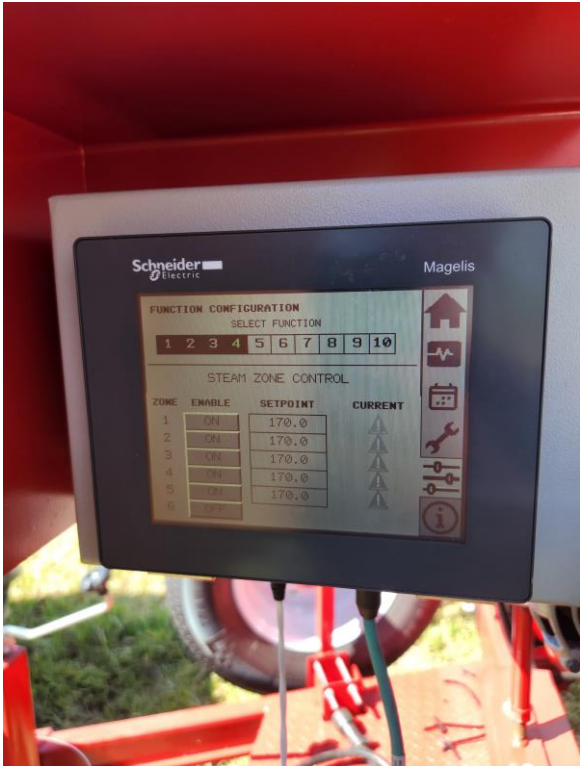
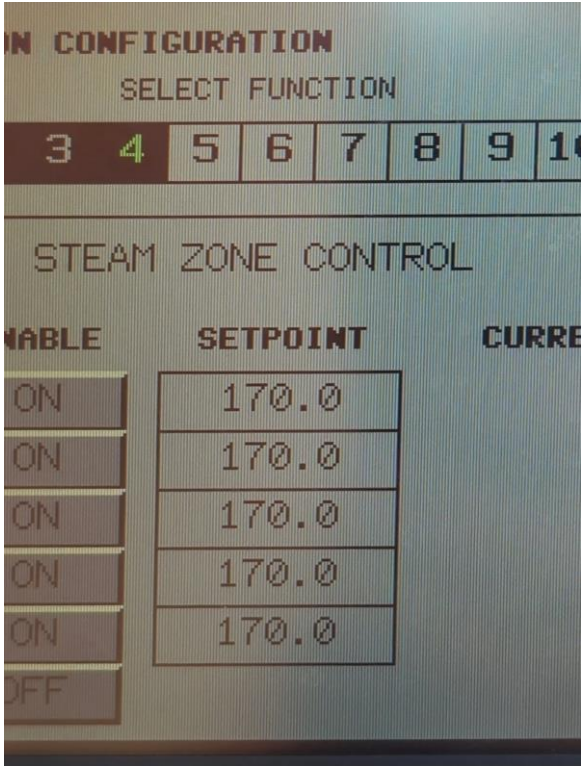
# Bucket system for handling chain

---





# Steam valves control the steam going to each Zone.





## Contact Information

Andre Cantelmo

[andre@heronpondfarm.com](mailto:andre@heronpondfarm.com)

603-591-8720



**Heron Pond Farm**