Background

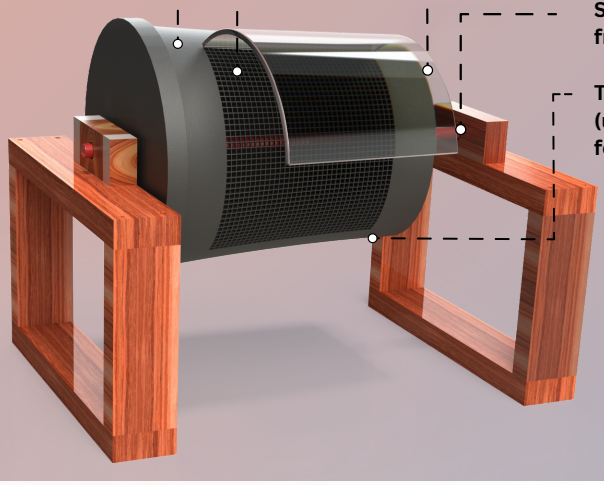
Vermicomposting is the use of worms to turn organics into nutrient-rich worm castings.

Our community, Allan Gardens, relies on large, heavy bins for vermicomposting, limiting efficiency in worm removal and requiring large amounts of physical effort from their staff.

Opportunity

To separate red wiggler worms from the vermicompost with minimal manual labour.

WORM WHEEL 360



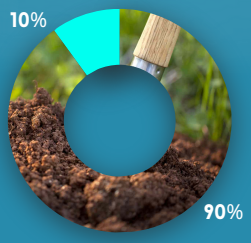
Key Objectives

Physical Effort: Reduce the effort needed to separate the worms from the soil.

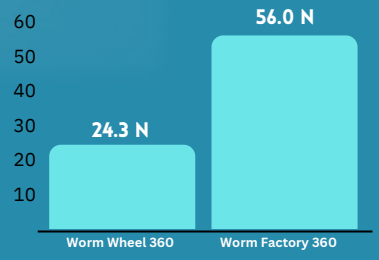
Efficiency: Reduce the time needed to separate worms from the soil.

Worm Recovery: Ensure the safety of worms for future vermicomposting.

Statistics



Worm Wheel 360 removes **90%+** of worm-free castings.



Worm Wheel 360 requires a max force of **24.3 N** to operate; Allan Garden's current solution requires **56 N.**

Key Design Decisions:

Utilization of Cylindrical Bin: Allows vermicomposting and removal of worms directly inside the bin without taking it off the frame, avoiding heavy lifting. Additionally, the bin's cylindrical structure makes it easy to rotate around the dowel, reducing the labor needed to operate Worm Wheel 360.

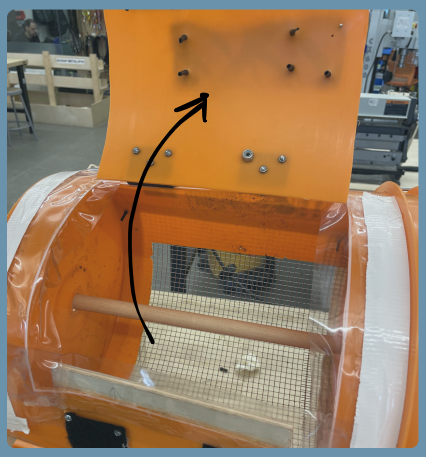
Flap with Velcro Latch: Facilitates easy addition and removal of vermicompost. Compost can be conveniently added or removed with the opening of the latch and a simple spin.

1/4" Mesh Selection: Chosen based on research and testing to optimally filter compost while retaining worms within the bin.

Mesh Cover: Serves a dual purpose of containing soil during vermicomposting and blocking light to create a comfortable environment for worms.

Vermicomposting Procedure

1. Open flap on side.



2. Add soil and worms.

3. Close flap and wait.

Removal of Castings Procedure

1. Open mesh cover.

2. Rotate bin.

3. Stop and close lid.

Next Steps:

- Make stand height adjustable to accommodate different users.
- Implement motorized bin rotation to further reduce physical effort.
- Produce multiple bins to increase efficiency.
- Create an automatic soil collection system.
- Implement an automated watering system.
- Material Selection