

Project 2 Communicating with insects

- **Project 2: Cybernetic Prosthetics:** in small groups, you will present a cluster of self-directed works as a prototype of a new relationships between a biological organism- and a machine, relating to our explorations on reimagining technology in the posthuman age. The prototypes should be materialized in 3D form, and simulate interactive feedback loops that generate emergent forms.

Biomimicry is innovation inspired by nature. What in the natural world is already solved that which I am trying to solve and mimic that.

Biomimicry.org:

Life lives on sunlight. Life does its chemistry in water. Life depends on local expertise. Life praises cooperation.

Life uses save elements and gentle intervention. Organisms use very love pressure.

We have a lot of carbon dioxide but nature uses it for coral reefs.

Coral reefs is actually co2 getting raw material for concrete.

A leaf needs to stay clean to Photogene size.

Most times it has to do with structure not toxins.

Further research.

Pick one insect species to investigate. Who eats them. What do they eat and how are they influencing the environment. What is their general place in the ecosystem. If they wouldn't exist what consequence would that have.

Read: staying with trouble.

For more inspiration on the topic.

New Roommates

Mealworms

Mealworms are bred in huge numbers. A farm in Brabant grows millions of them to use for human food supply. The animals, so the farmer says, create a great basis of protein for humans. So that we still get the protein nutrients that we need from meat without eating animals that are way more ecologically irresponsible.

Because of secreted enzymes the insects can break down the styrofoam, says, Craig Criddle, environmental engineer.

Food

wheat

havervlokken

fruits & vegetables for hydration





Experiment 1 Styrofoam & Polyethylene

That would be a good test to perform on my own mealworms.

Styrofoam

A 2015 research shows that mealworms can live out of styrofoam and can convert the material into a biodegradable fragments. These biodegradable droppings are safe to use for soil. Even though this can be a major solution to a lot of styrofoam waste, no major industry picked up on this results.

After the mealworms eat their carrots I will supply them with styrofoam to see what happens. Since mealworms are very cannibalistic creatures they will start eating each other when they do not like the styrofoam, if this is happening I will quickly supply them with their regular food.

The two kinds of plastic that mealworms can live of are:

Styrofoam and Polyethylene also called Polythene.

Polyethylene (C₂H₄)

These two materials are the base of the following products:

Plastic bags
Plastic film rolls
Plastic bottles

Styrofoam

Insulation material
Packaging material

At first I fed my mealworms styrofoam. They eat it for over a week now, and no casualties. All of them keep getting bigger and there are no signs of sickness. They dug little tunnels through the foam.

I got a bigger number of worms. About 200 of them which I am feeding Styrofoam and plastic wrapping. The wrapping was a spinach packaging that me and my roommate usually throw in the trash. I was happy to see that after a minute I gave them the plastic, they started eating it.











Silkworms

The second insect species that I am going to adopt is the Silk caterpillar. I ordered 100 eggs and they will arrive today.

The eggs will hatch in about 7 to 10 days which gives me more time to research these animals.

If insects have a new value for us humans. They always have had a value, but a new way of helping cleaning up the planet so we can all live on it longer and create better living conditions for al.

Wouldn't it be great if you can build a tiny eco system that holds itself.

I drink water at school -> using a plastic cup -> this cup can be eaten by the mealworms and -> transformed into biodegradable soil that can help new plants grow. -> this soil be can be used to plant mulberry trees that can feed -> silkworms -> silk worms -> silk worms produce silk -> this can be used to make clothing or bedding material.







Earthworms

Earthworms are the place to go to see how fertile grounds are. The healthier and the more worms the better the state of the land. Earthworms play a necessary part in the fertilization of grounds for plants to grow. Every earthworm has its own tunnel. They only come out of their tunnel to mate. While in the tunnel they eat the earth and their excrement helps fertilizing it.

<https://nlrworms.com/blogs/education/other-uses-of-worms-beyond-farming-and-composting>

1. Worms can replace fish meal: Worms are among nature's favorite foods. With worms being high in protein, omega-3 fat, and complex amino acids, they make a great food for a wide range of animals, including fish, amphibians, and reptiles. Worm meal is similar to fishmeal, which is an important food source, especially for aquaponics. Even better, worms, unlike wild caught fish, are sustainable.
2. Worms are pollution cleaners: Worms effectively bio-accumulate or bio-degrade several organic and inorganic chemicals, including heavy metals, organochlorine pesticide, and micropollutants like polycyclic aromatic hydrocarbons (PAHs).

3. Worms devour harmful bacteria and protozoa: Worms routinely devour protozoa, bacteria, and fungus in any waste materials or soil. They seem to realize instinctively that anaerobic bacteria and fungi are undesirable to other species (such as humans) and so they feed upon them preferentially. Researchers found worms living in pathogen-rich materials, such as sewage and sludge, show no evidence of pathogens beyond 5 mm of their gut when dissected. This confirms that something inside the worms destroys the pathogens, thus making excreta (vermicast) pathogen-free.
4. Worms clean hazardous waste: Worms can degrade fly-ash, which is considered hazardous waste due to heavy metal contamination, from the coal power plants. The worms degrade the fly-ash and absorb the metal, making the vermicomposting safer and usable.
5. Worms produce natural antibiotics: The earthworms release coelomic fluids that have antibacterial properties and destroy all pathogens in the waste biomass, including salmonella, E. Coli, and botulism. These natural "antibiotics" from the worms kill the pathogenic organisms in the waste and soil and render it virtually sterile.
6. Worms may even destroy cancer: Polish scientists think the digestive fluid of worms could one day be used to treat lung cancer. The researchers at the Maria Curie-Skłodowska University extracted coelomic fluid and used it on lung cancer cells. Initial lab tests showed that the coelomic fluid damaged A549 lung cancer cells in 75-80 percent of cases, leaving normal cells unharmed. More research is required.

What I should be asking myself was:

What unique properties do my mealworms have that I can mimic?

One thing that I already discussed is their ability to live off styrofoam and break it off into tiny biodegradable rabbit droppings, what they also produce while eating this material is carbon dioxide an element which can also be recycled and repurposed.

The great thing with living off plastic is that they are very easy to grow. They don't use up anything of the planet which we need. They live off our waste. So growing them is never a waste it only attributes to a healthier planet.

Turning kinetic energy into electric energy

<https://fear-of-lightning.wonderhowto.com/how-to/generate-electricity-from-kinetic-energy-0132764/>

Mealbeetles

can become a size of 1 to 1.5 inch in length

Black smooth armor like protection shell

They do have wings but they can't fly because they are fused to their bodies.

Feed on decaying plants and animal matter, also: live plants, buds, fruit and vegetables and fungi and grains.

They hardly drink since they can extract water from their food.

Active during the night

Name in latin Tenebrio which means: "The one that likes darkness"

Small eco system

Floor 1

Beetles and pupae

On this floor the pupae that grew from the mealworm floor are placed on a tiny balcony after they moulted they crawl around and fall into the bottom part of this floor. The beetles feed on dead plants and as their substrate for their eggs I will give them wheatmeal.

The bottom part of this drawer is equipped with a raster that will let through the eggs that they lay. If I don't allow for separation the female beetles will eat their own eggs.

Floor 2

Purpose: nursery

The ceiling is open and attached to floor 1. All the eggs should carefully land in this box. You don't want the eggs to fall out of the crack. Then the worms will swarm in your house and believe me, you don't want that. The little larvae will crawl out and slowly moult in their next life phases.

Floor 3

Purpose: plastic conversion

After the larvae get bigger they move into the next floor. This floor is where the magic happens. This is the place where you put your old plastic packaging for them to eat. On the bottom of this floor is another raster. After they consume the plastic they convert this into biodegradable little balls. These balls will fall through the raster.

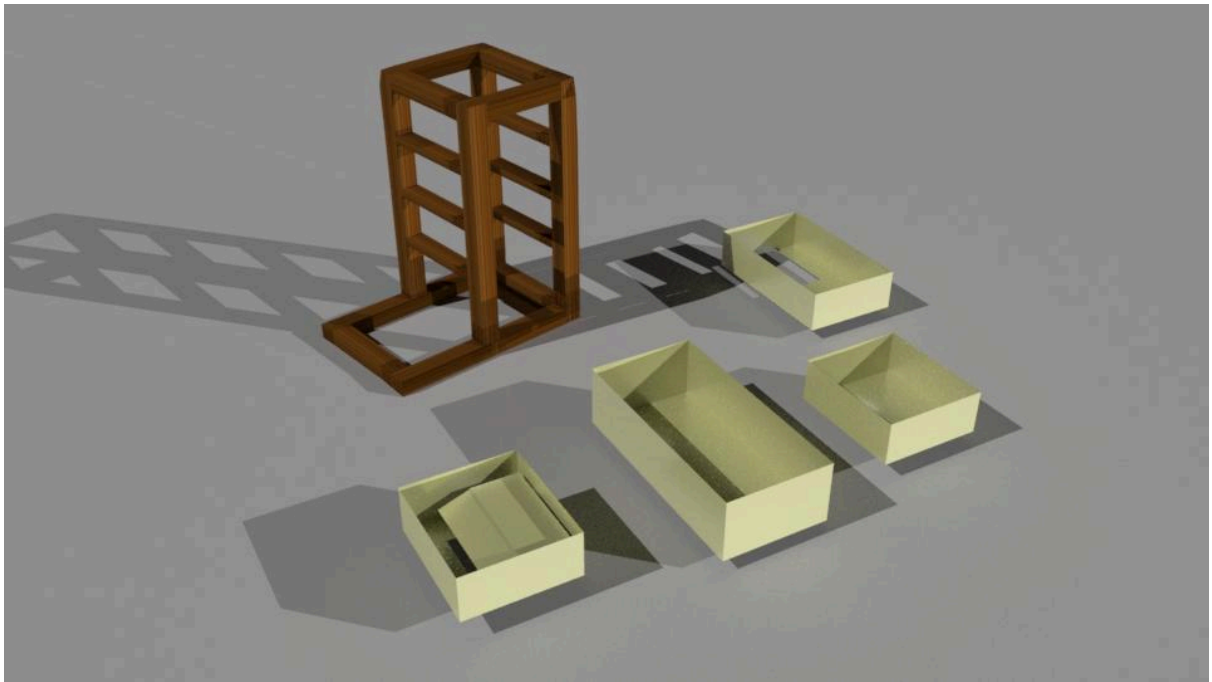
Floor 4

Purpose: repurposing the biodegradable waste into soil for tomato plants.

In this floor there are a few earthworms to make the soil more fertile.

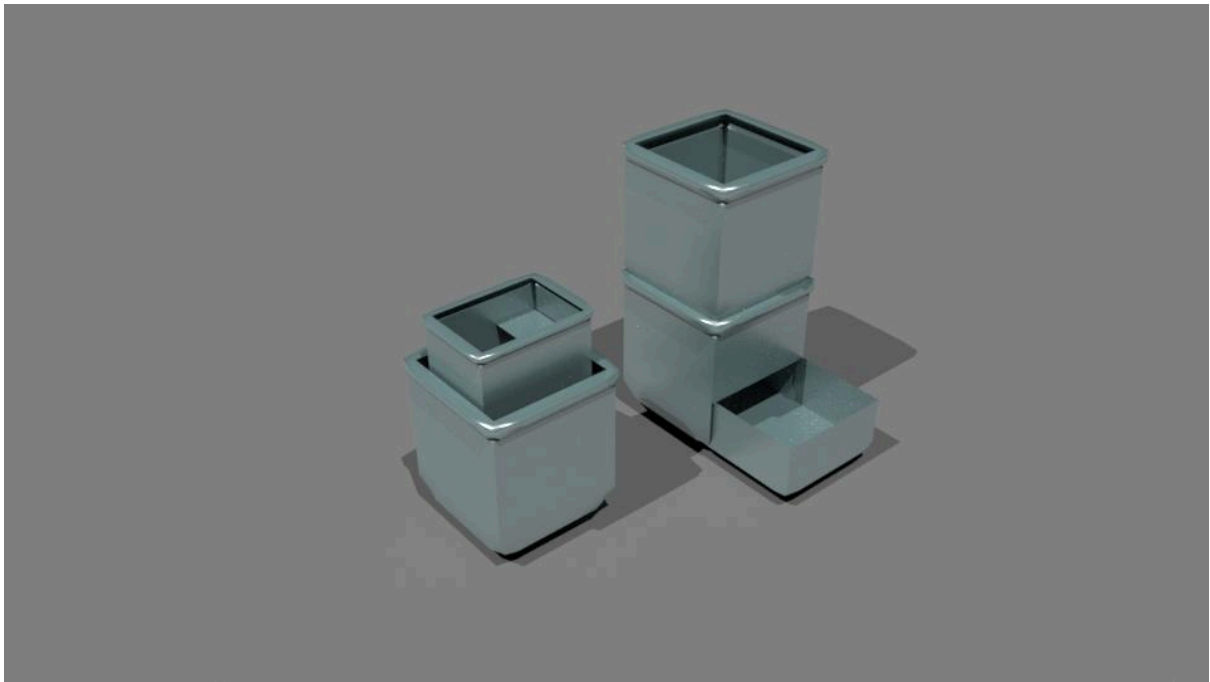
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[view booklet here](#)

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