

Jack Gier and Mitch Nellis

MUSHROOMS

"BRINGING OUR CLASSROOM TO YOU"

Pre-Assessment: go to
joinmyquizizz.com
enter code: 1513 2275

<https://quizizz.com/join?gc=15132275>

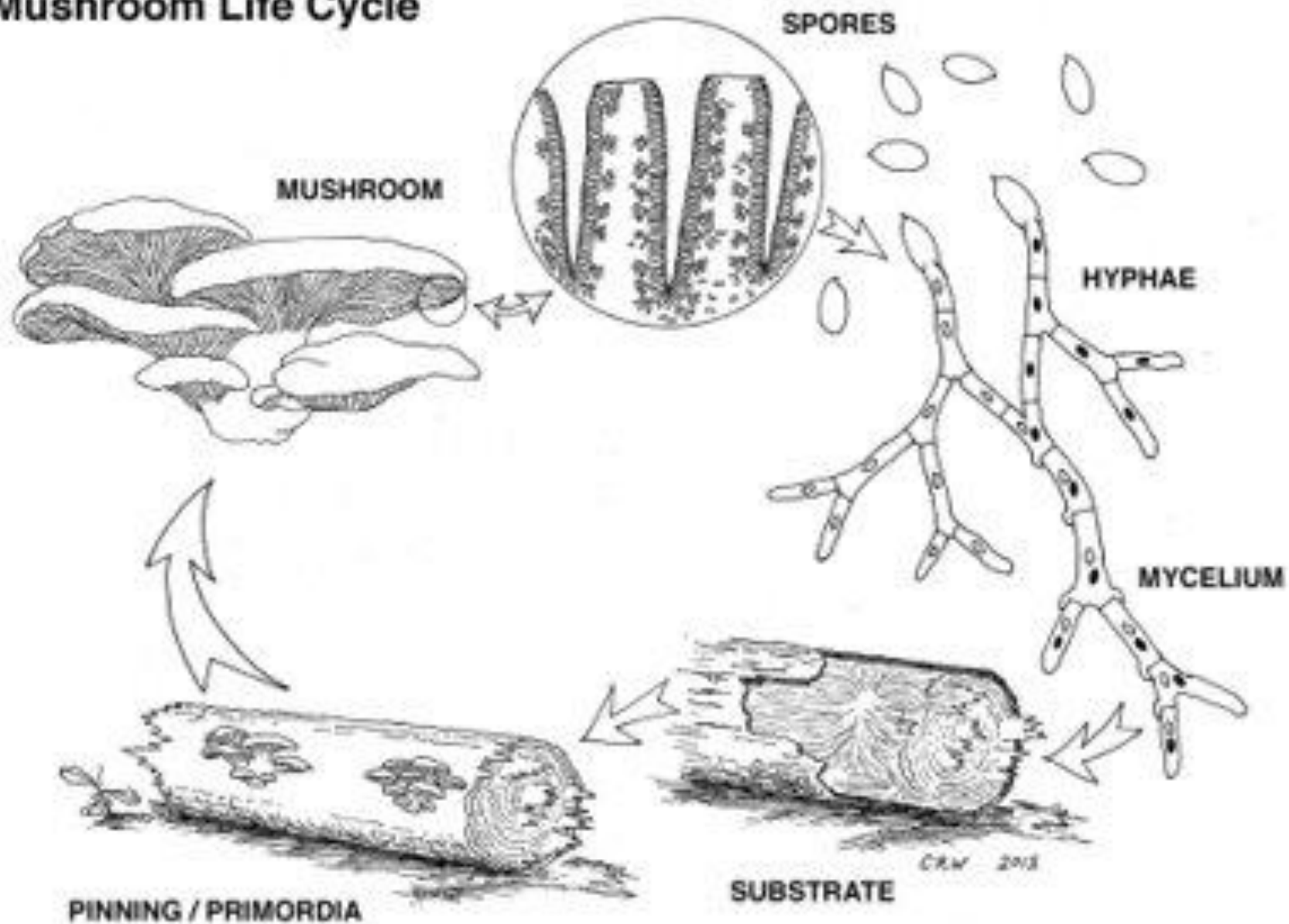


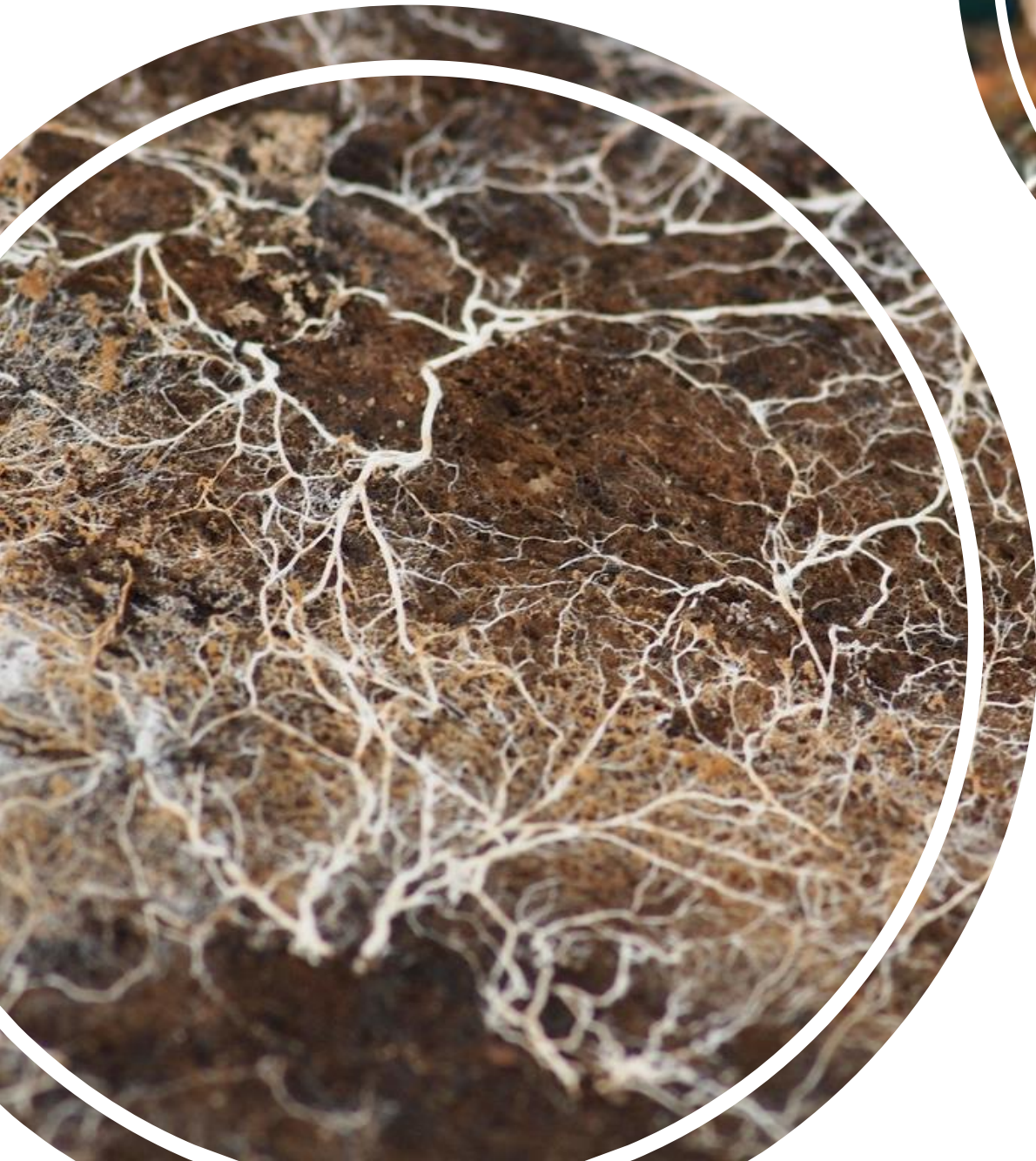
WHAT IS A MUSHROOM/ FUNGUS

- There are at least 5 times more Fungi than Plants
- There are more than 150 types of novel enzymes identified in fungus
- They are the largest organisms on Earth (a single honey mushroom in Oregon is 2,385 acres big and 2,400 years old, some say it is over 8,000 years old)
- The word "Mushroom" only refers to the fruit of the fungus.
- 95% of the fungus lives underground
- 97% agar acid yield **97 percent** of the mushrooms produced in the United States fall under the genus known as Agaricus, which includes the common White Button mushrooms



Mushroom Life Cycle





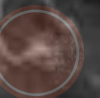
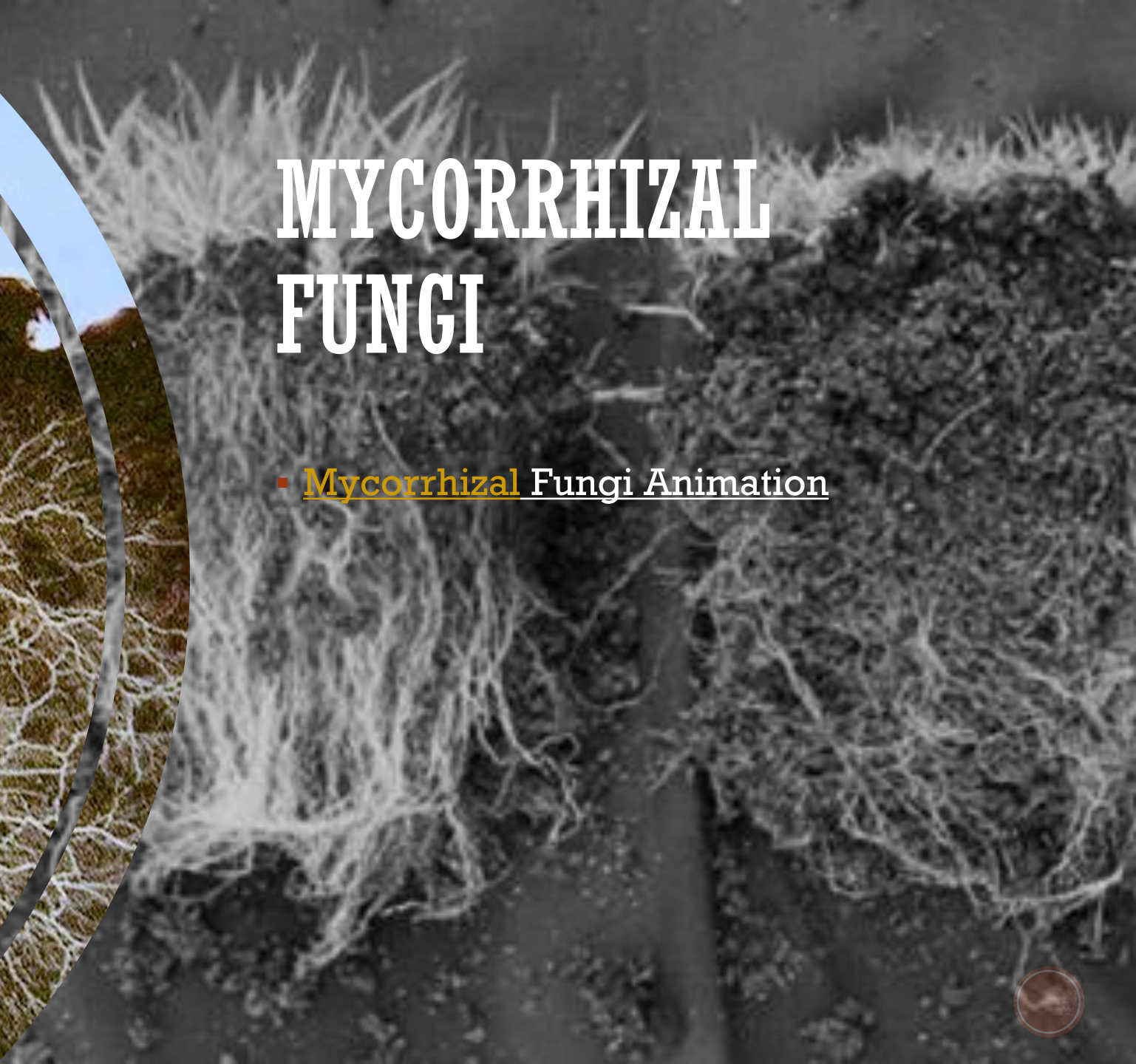
FUNGUS, MUSHROOM, OR MYCELIUM?

The main body of the organism is known as **mycelium**, which grows in multiple directions as it seeks food to digest. All fungi **digest food in their environment with enzymes that are produced by the mycelium.**



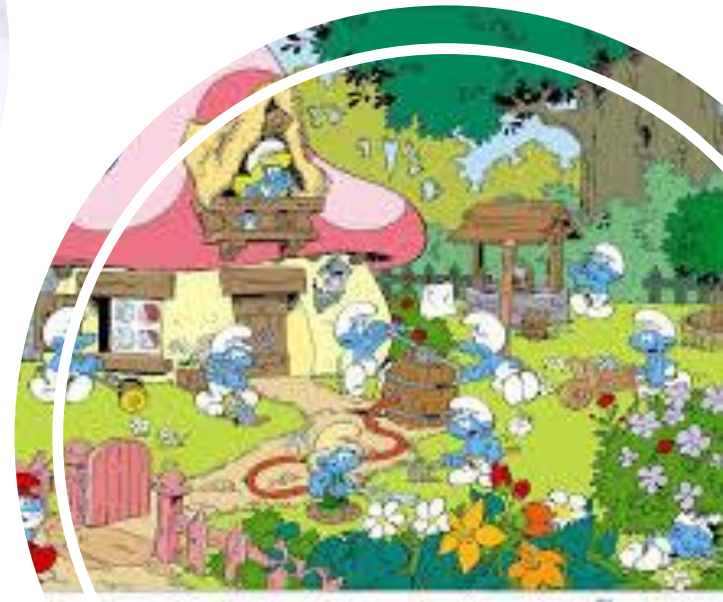
MYCORRHIZAL FUNGI

- [Mycorrhizal Fungi Animation](#)



WHAT ARE MUSHROOMS GOOD FOR

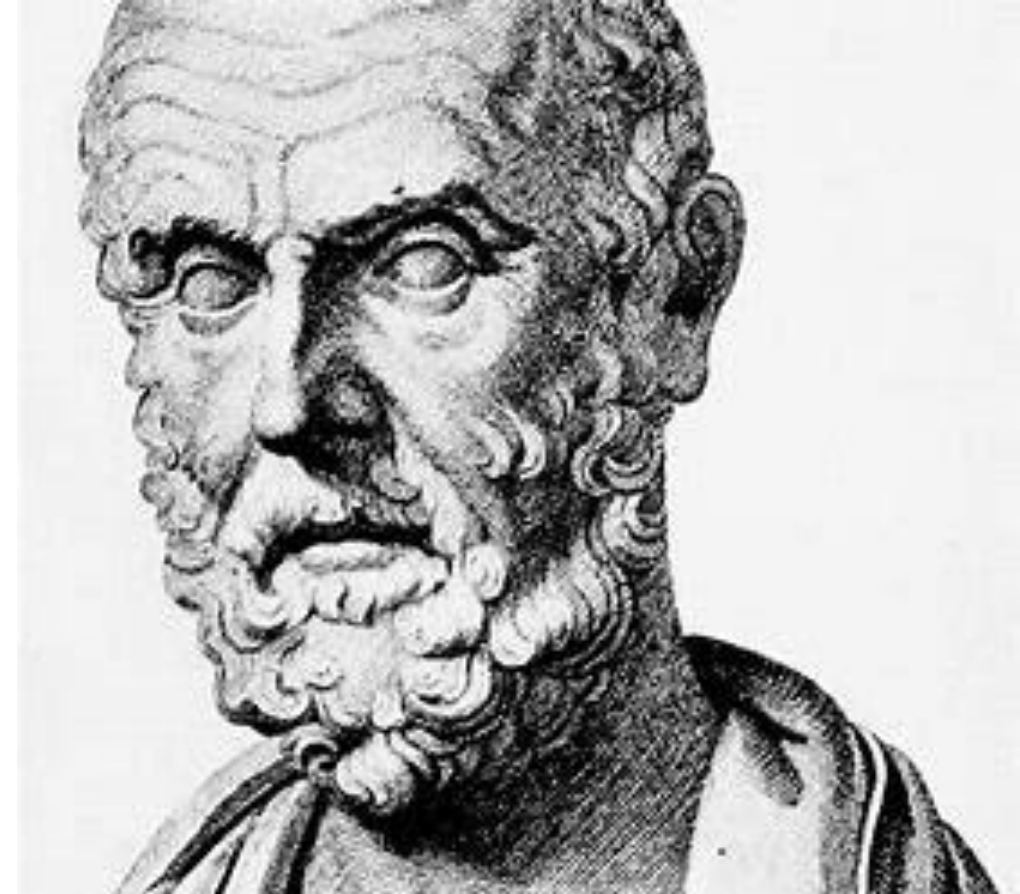
- What does the typical American use mushrooms for?



MUSHROOMS AS THEY WERE

Medicinal
Mushrooms:
Ancient
Remedies Meet
Modern Science
- PMC (nih.gov)





AMADOU MUSHROOM

Hippocrates prescribed it as an anti-inflammatory and to cauterize wounds





AMADOU AND BIRCH POLYPORE

Otzi the Ice Man had mushrooms as one of his few possessions as he climbed the alps.



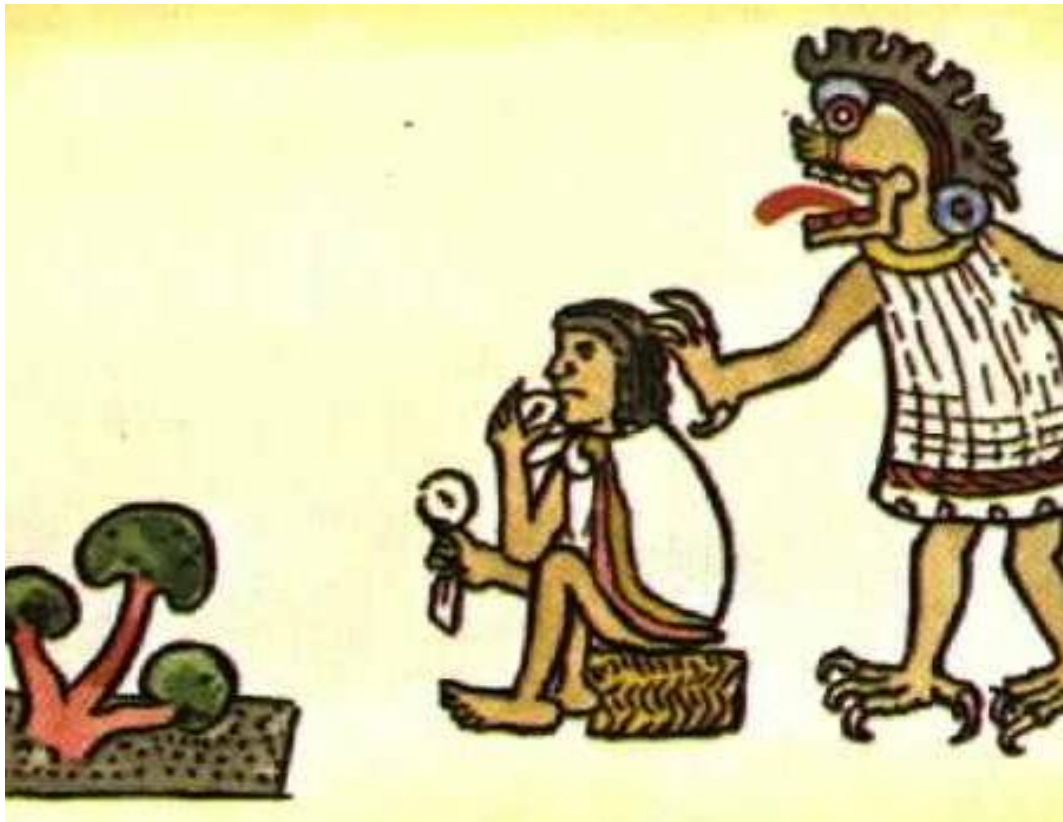


PUFF BALLS

Native Americans used puffballs to heal wounds.



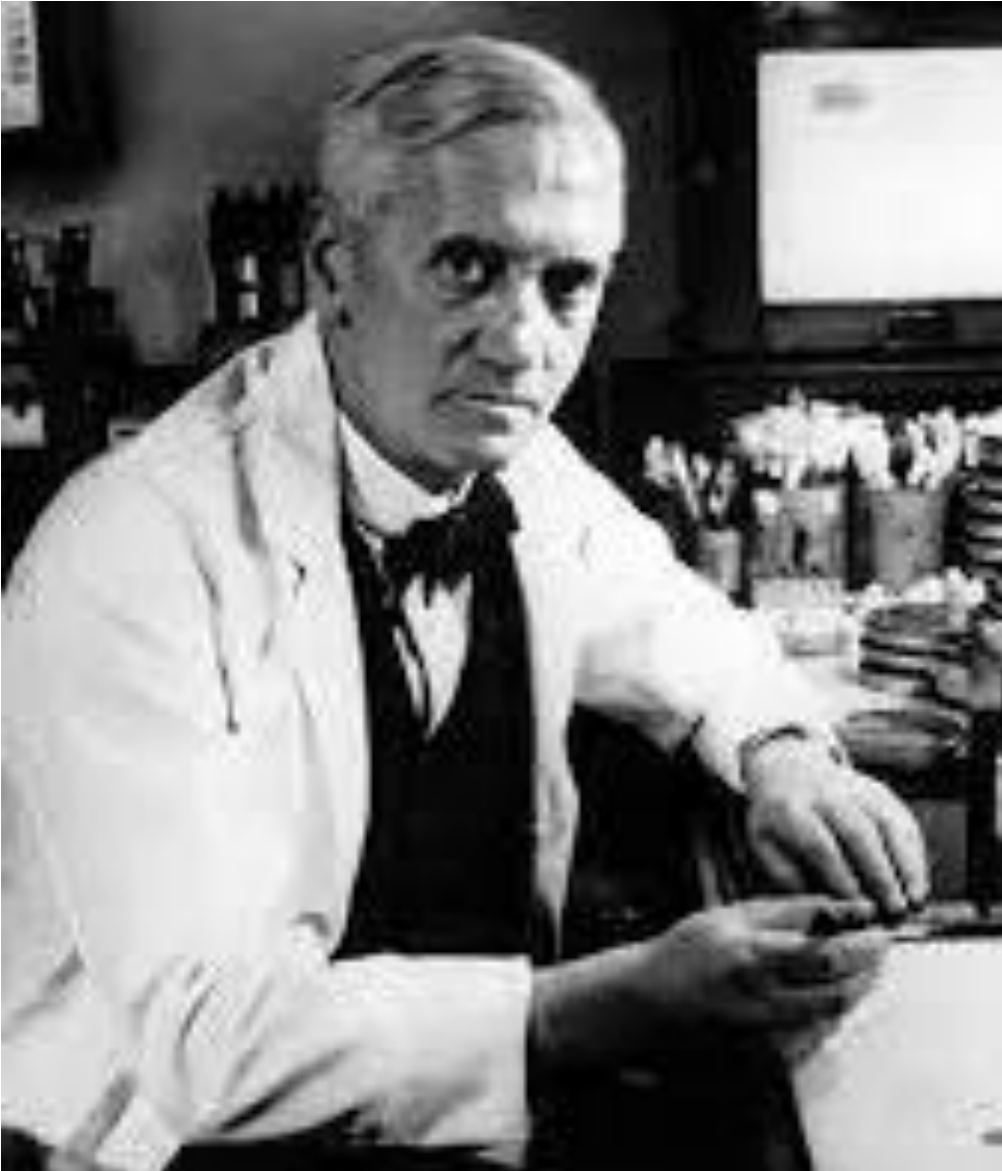
MAGIC MUSHROOMS



Mushrooms have long thought to have been used in ceremonies throughout ancient times

- Psychedelic mushrooms were used as far back as 9,000 BC in Northern Africa.
- Aztec and Mayan ruins have depictions of mushrooms.





PENICILLIN- THE FIRST ANITBIOTIC

- Mold is a member of the fungus kingdom and is the reason we have our first antibiotic- penicillin.
- Estimates have that penicillin has saved 200 million lives



A large, solid orange circle occupies the left side of the slide. Inside the circle, the text "MUSHROOMS AS THEY ARE" is written in a bold, white, serif font, centered horizontally and vertically.

MUSHROOMS AS THEY ARE

Mushrooms meet
Modern Science

Mushroom Markets
and Beyond





MYCOTEXTILES

- **Dried Mycelium Brick**
 - Construction and Building Material
 - Packaging material
 - Styrofoam replacement
- **Myco-Leather**
 - Clothing
 - Furniture
- **Mushroom/Lichen Dye**



HOST DEFENSE <i>Mushrooms</i> ™	MUSHROOM BENEFITS AT A GLANCE						
	AGARIKON	CHAGA	CORDYCEPS	LION'S MANE	MAITAKE	REISHI	TURKEY TAIL
ANTIOXIDANT & DNA SUPPORT*		✓	✓	✓		✓	
BREATHING*		✓	✓			✓	
DIGESTION & MICROBIOME*		✓		✓		✓	✓
ENERGY & STAMINA*		✓	✓			✓	
GLYCEMIC BALANCE*		✓	✓	✓	✓	✓	
HEART SUPPORT*			✓			✓	
IMMUNE RESPONSE*	✓	✓	✓	✓	✓	✓	✓
LIVER & METABOLIC DETOX*		✓	✓			✓	✓
MEMORY, CLARITY & COGNITION*				✓		✓	
MOOD, STRESS & SLEEP SUPPORT*				✓		✓	
NERVE SUPPORT*			✓	✓		✓	
PERFORMANCE & ATHLETIC RECOVERY*		✓	✓			✓	
* THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD & DRUG ADMINISTRATION. THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT ANY DISEASE.							2CPROMO33 V4 • 8/22

MEDICINAL MUSHROOM

Food additives



SCIENCE

Psychedelic mushroom dose can treat stubborn depression, trial suggests

 By [Leo Sands](#)

November 3, 2022 at 10:51 a.m. EDT

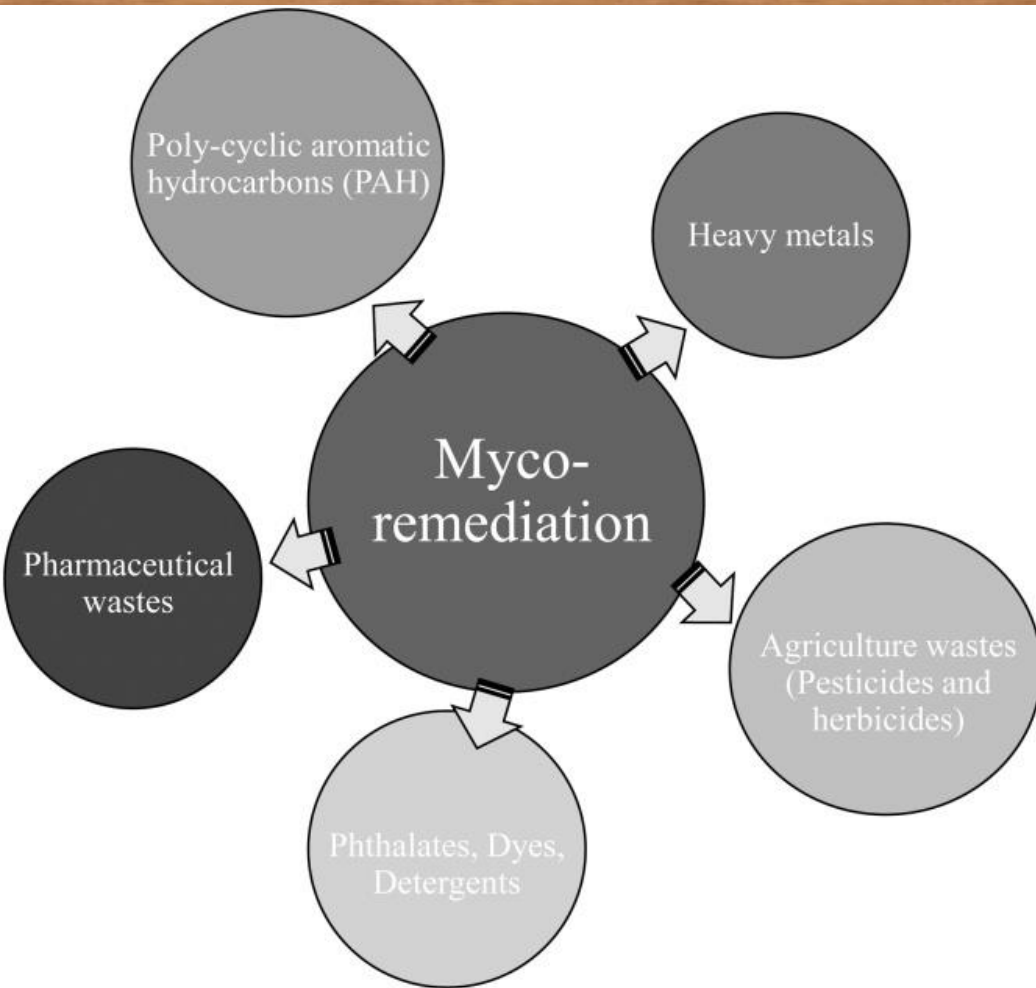


- Anxiety - After a single session with psilocybin mushrooms, eighty percent of participants reported a significant reduction in depression and anxiety six months later.

MOOD ENHANCING

- Depression - Initial evidence suggests that one dose of psychedelic mushroom, psilocybin, alleviated the symptoms of depression within weeks and for months.





AND OUR FAVORITE...

MYCOREMEDIATION



SOIL MYCOREMEDIATION

- Soil contaminated with diesel was inoculated with oyster mushrooms and the levels of oil pollution at 20,000 ppm.
- After 4 weeks the mushrooms had taken over
- After 9 weeks the oil was measured at 200 ppm
- 3 other piles treated with bacteria and chemical fertilizers remained contaminated.

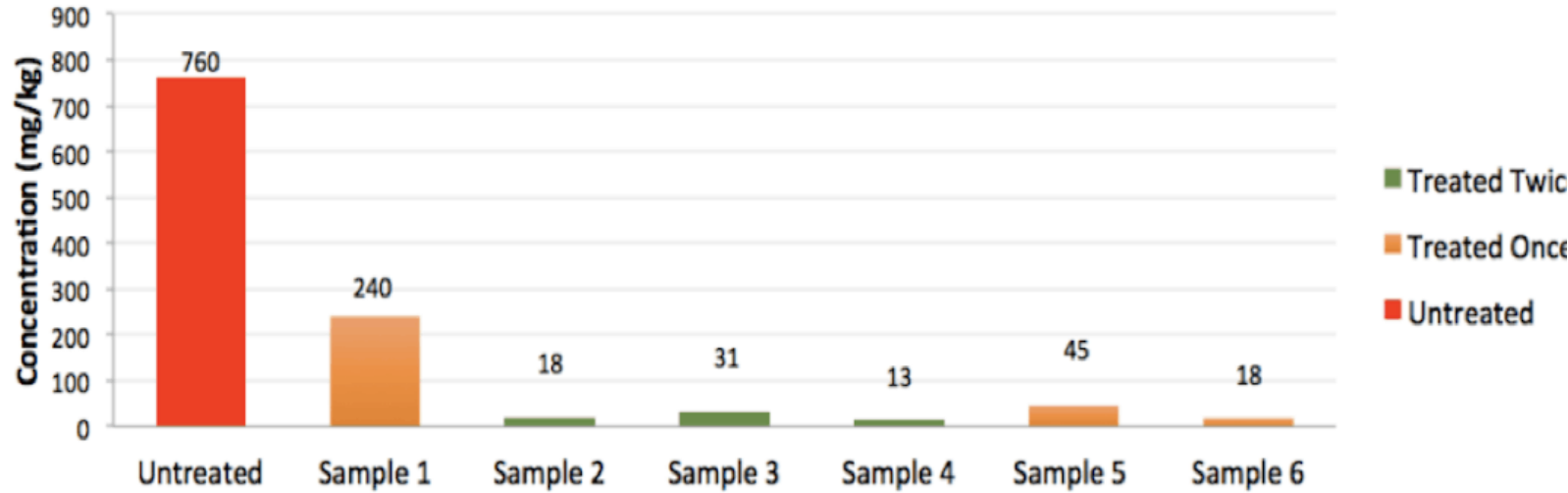


Fig. 14. Diesel concentrations of treated and untreated soil as measured by North Coast Laboratories

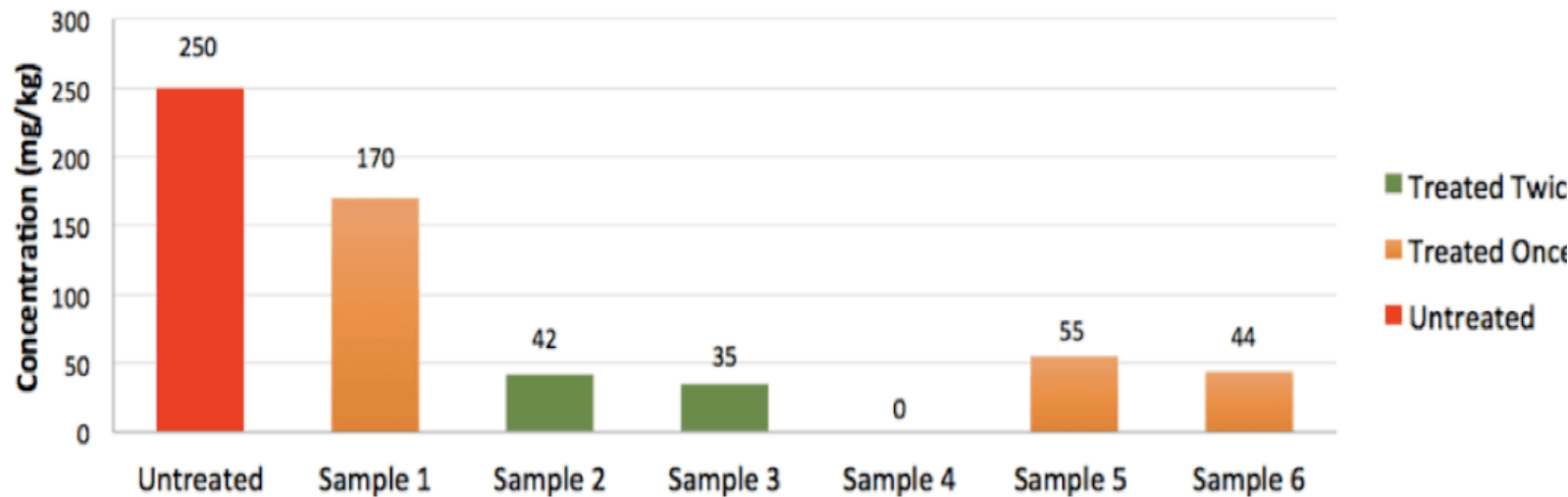
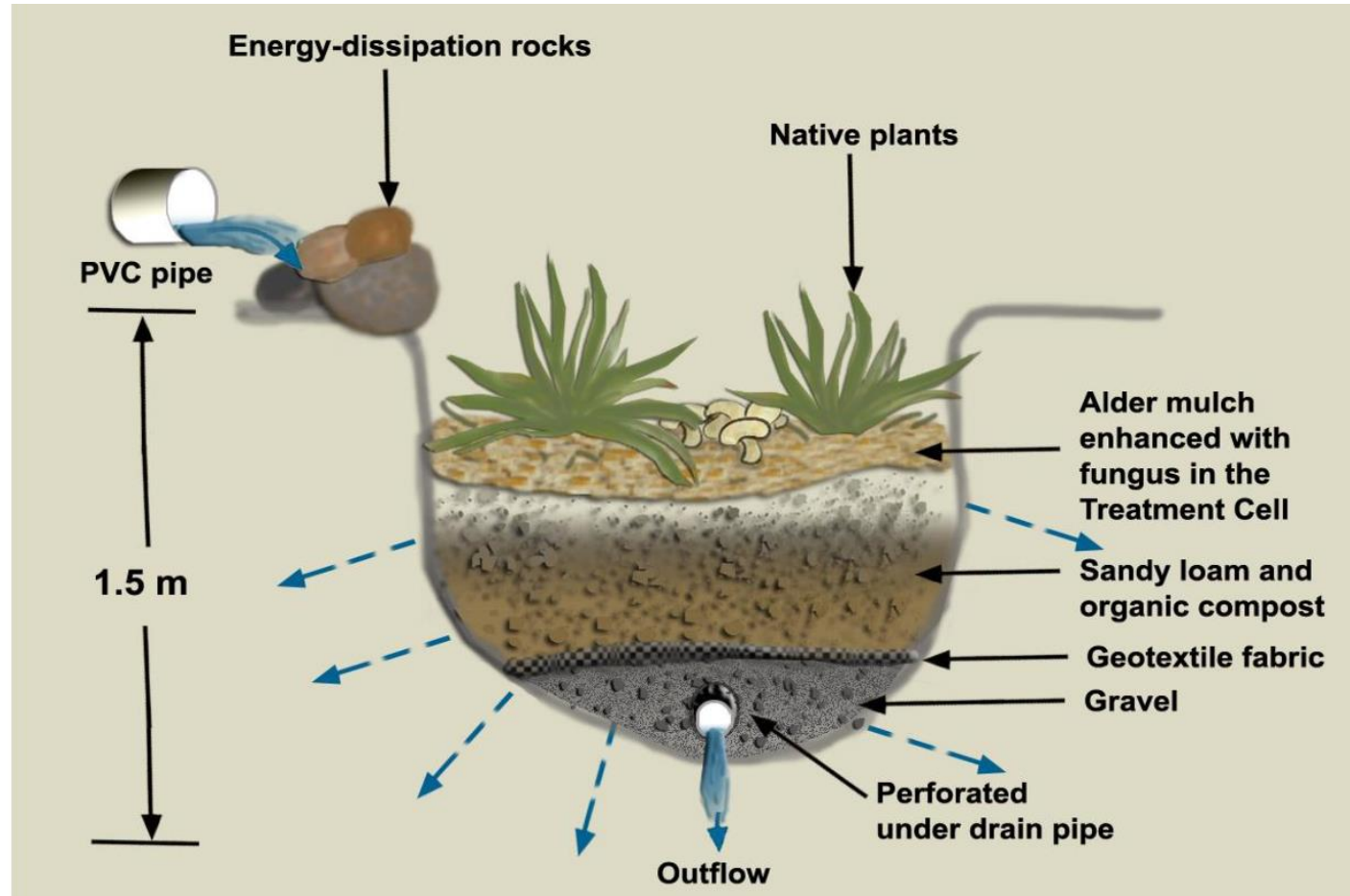


Fig. 15. Motor oil concentrations of treated and untreated soil as measured by North Coast Laboratories



- "The data suggest that bioretention cells can reduce fecal coliform bacteria under a range of concentrations (e.g., lower concentrations during Phase 1 and higher concentrations during Phase 3) and that mycoremediation treatment enhances or increases that reduction."



WATER MYCOREMEDIA TION





ONONDAGA LAKE

Polluted by years of industrial
pollution including:

Mercury

salt processing residue

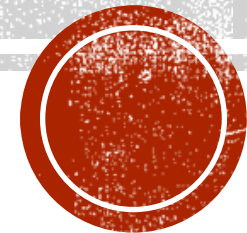
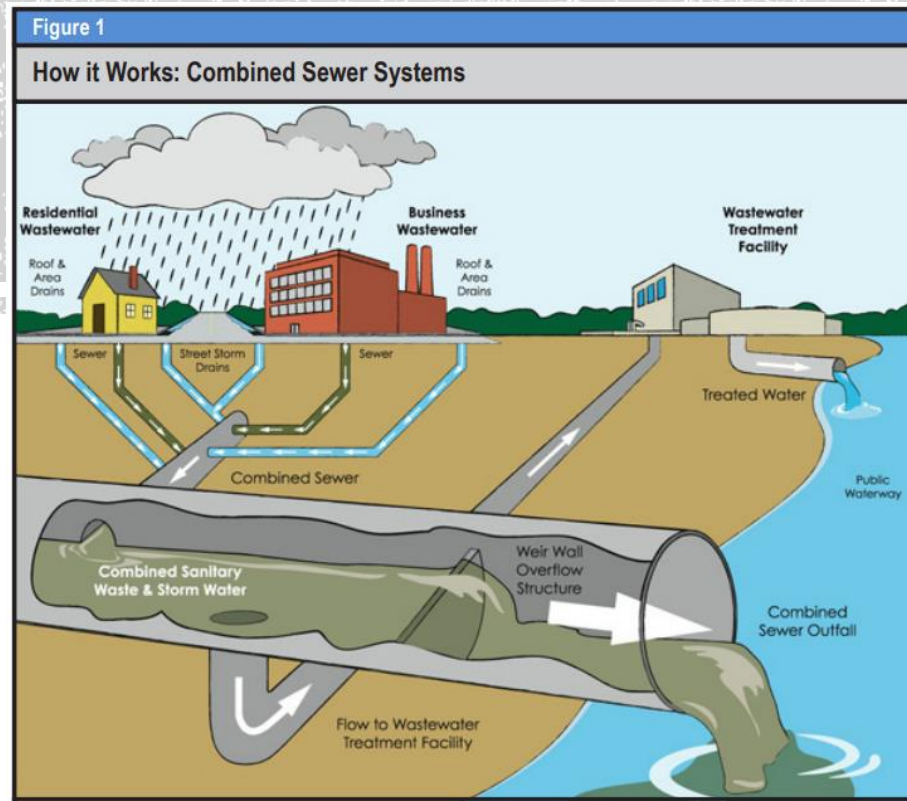
Ammonia

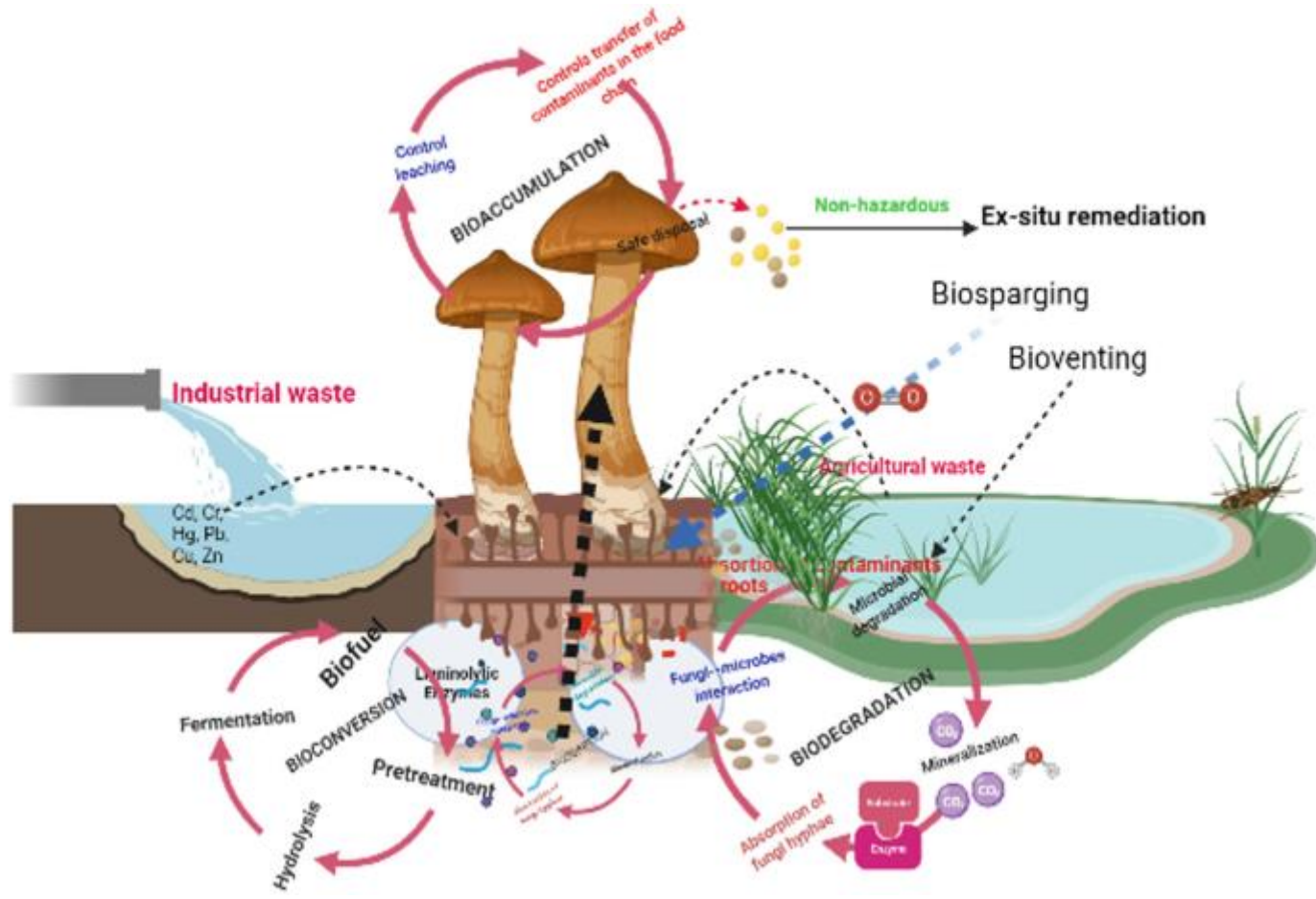
organic compounds

PCB (polychlorinated biphenyl)



COMBINED SEWER SYSTEM





POTENTIAL MYCOREMEDIATION OF WASTE WATER



DEGRADATION OF PLASTIC WASTE

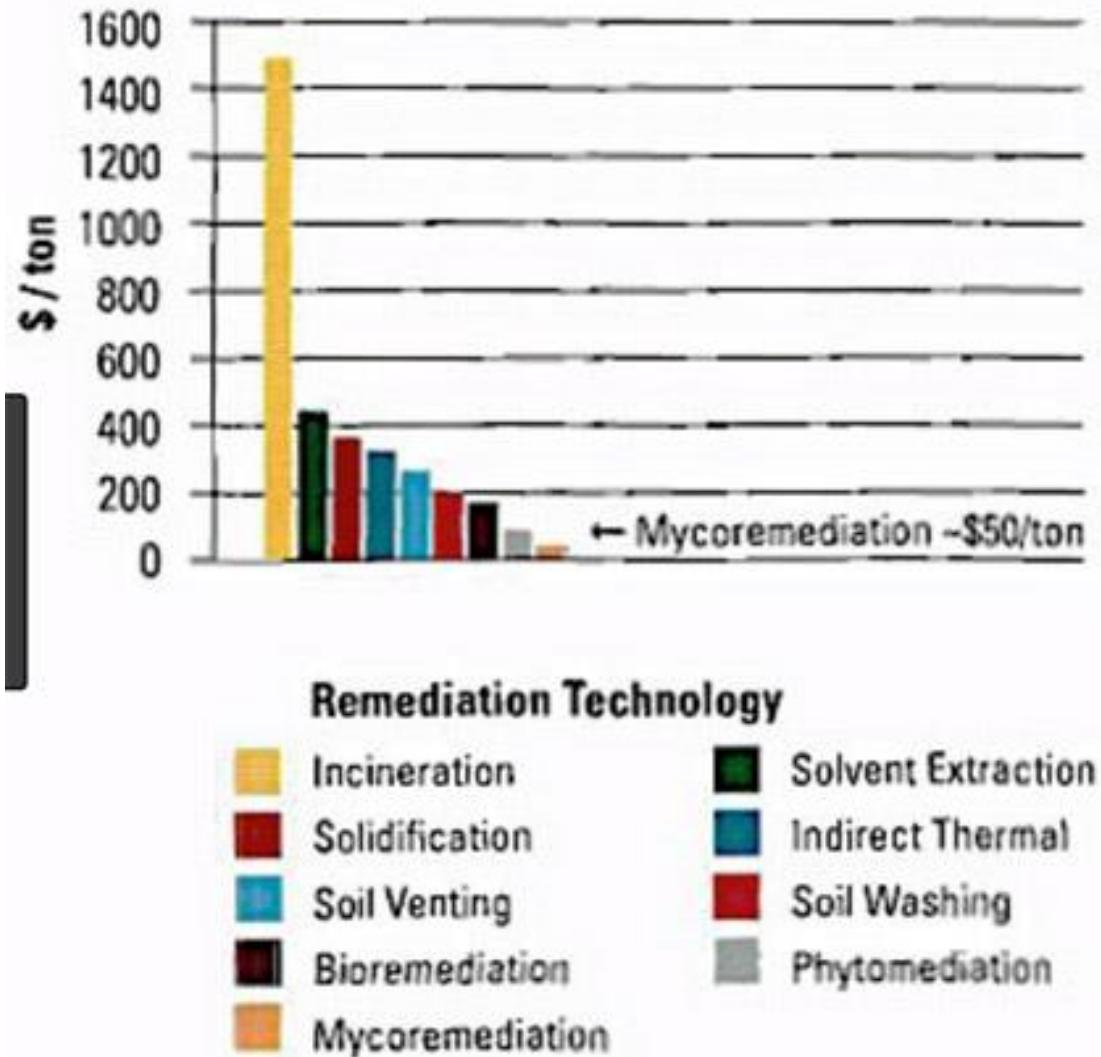
- Oyster Mushroom- one study found that they degrade the plastic found in plastic bags.
- Turkey Tail- can degrade PAH (polycyclic Aromatic Hydrocarbons)



**MUSHROOMS AS
THEY COULD BE**



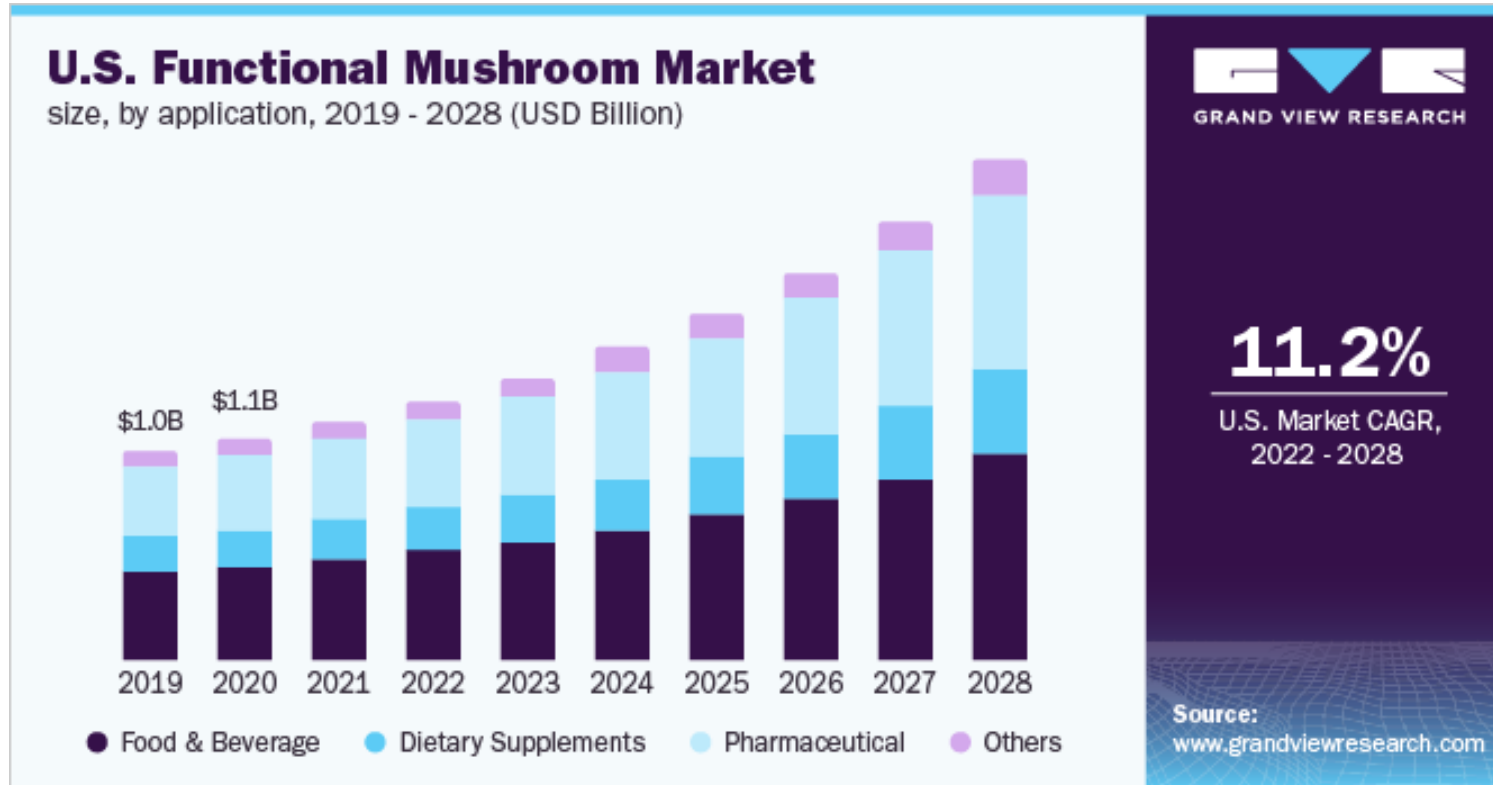
**Soil Remediation Technologies Costs:
Petroleum Hydrocarbons**



MONEY MAKER

[PBS MYCOREMEDIATION](#)





MUSHROOMS AS THEY COULD BE

Projected Growth



PESTICIDES



- Fungal spores repel insects
- Some spores have been found to infect insects and use them to create more spores, killing or repelling more insects
- There has been research on its use to repel termites, carpenter ants and fire ants.
- chemical pesticide sales in the United States amounted to nearly \$14 billion. That's around 1.1 billion pounds (0.5 billion kilograms) of chemicals like chlorine, formaldehyde and arsenic applied on the landscape in a single year.
- <https://www.youtube.com/watch?v=um2Q9aUecy0> (min. 37:00)



LOCAL FUNGI HOTSPOTS



**SMUGTOWN
MUSHROOMS**





PACKAGING

<https://mushroompackaging.com/>



POP QUIZ

Post-Assessment:
go to **quizizz.com**
enter code 3314 4179



HOMEWORK (OPTIONAL)

Take a sample of mycellium add some water, soil, plants, air flow....?

Be a citizen scientist!



Email us a picture of what happens

- mitchellnellis@hotmail.com
- Jacquelynmackie.gier@gmail.com



REFERENCES

- Mood Enhancing (<https://www.washingtonpost.com/health/2022/11/03/magic-mushroom-psilocybin-depression-study/>)
- Soil mycoremediation (<https://www.discovermagazine.com/environment/how-mushrooms-can-save-the-world>)
- Degradation of Plastic Waster (<https://www.realmushrooms.com/mycoremediation-mushrooms-pollution/>)'
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7322808/>

