BACTERIA

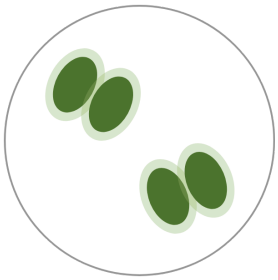


Bacteria

rods and dots (cocci)

Tiny dots and rods: the base of the soil food web.

BACTERIA



Azotobacter

nitrogen fixer

Fat paired cells that turn nitrogen from the air into plant food.

BACTERIA

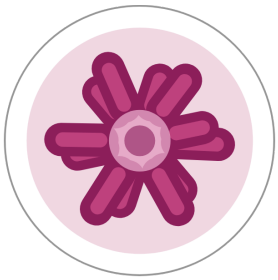


Purple bacteria

PNSB

Purple-red rods that use light and clean up smelly, sour spots.

BACTERIA

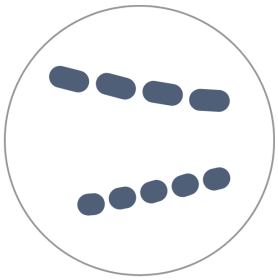


Purple bacteria rosette

PNSB

Purple rods spreading out from a soft centre, like a flower.

BACTERIA



Lactic acid bacteria

LAB

Rods in short chains that ferment, as in bokashi and sauerkraut.

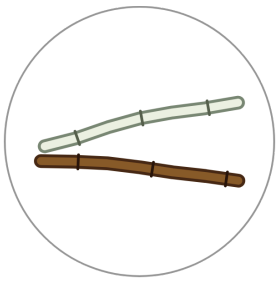
BACTERIA



Actinobacteria

Thin, branching threads that give soil its earthy smell.

FUNGI

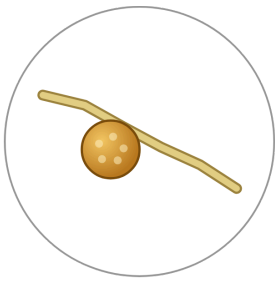


Decomposer fungus

clear or brown threads

Wide, even threads with cross-walls. It breaks down woody stuff.

FUNGI ✦ GLOWS

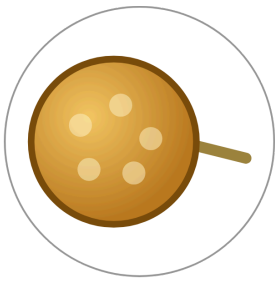


Mycorrhizal fungus

root-partner threads

No cross-walls, round spores. It trades water for root sugar.

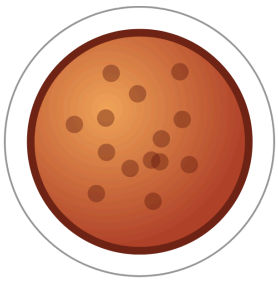
FUNGI ✦ GLOWS



Mycorrhizal spore

A big round spore that grows a new root-partner thread.

FUNGI ✦ GLOWS

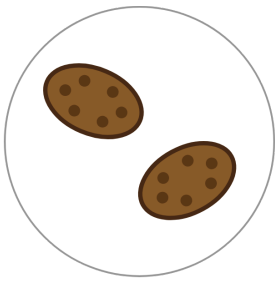


Acaulospora spore

volcanic soils

A pitted orange-red root-partner spore of young volcanic ash soils.

FUNGI ✦ GLOWS

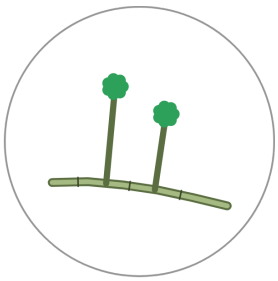


Forest root-partner spores

ectomycorrhizal

Small brown warty spores of fungi that wrap tree roots.

FUNGI



Trichoderma

helper fungus

Right-angle branches and green spore tufts. It guards roots.

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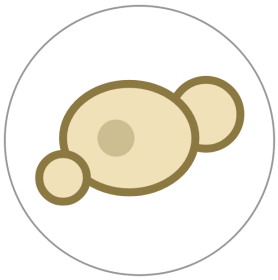
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FUNGI



Yeast

A one-celled fungus that buds off little daughter cells.

FUNGUS LOOKALIKE

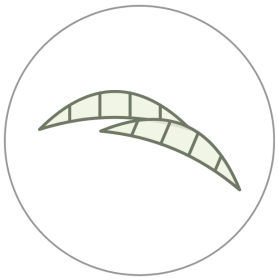


False fungus

lookalike, often a water mold

Thin, wispy, broken threads. Not a true fungus.

DISEASE FUNGUS



Fusarium spores

disease fungus

Clear curved canoes with cross-walls. It can cause root rot.

DISEASE FUNGUS

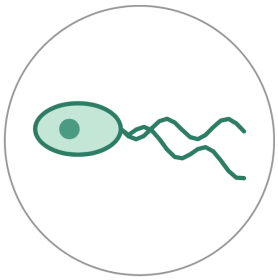


Alternaria spore

disease fungus

A dark brown club with a beak and a brick-wall pattern.

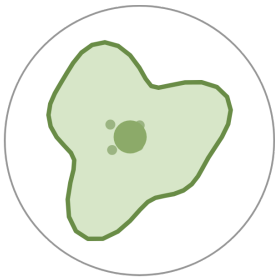
PROTOZOA



Flagellate

A small oval that whips about with its tails and eats bacteria.

PROTOZOA



Naked amoeba

A shape-changing blob that squeezes into tiny pores to eat bacteria.

PROTOZOA

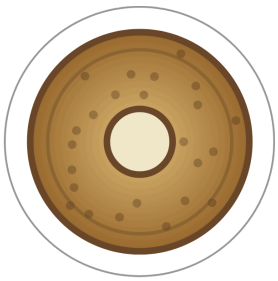


Testate amoeba

amoeba in a shell

It lives in a shell and pokes a soft foot out of the opening.

PROTOZOA

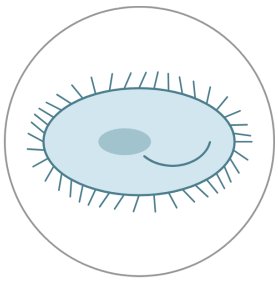


Arcella

testate amoeba, seen from below

A shelled amoeba that looks like a little brown donut.

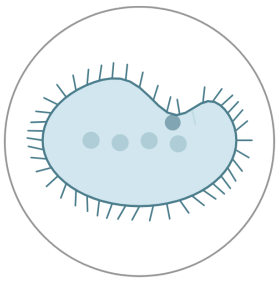
PROTOZOA



Ciliate

Covered in tiny hairs (cilia). A fast swimmer that eats bacteria.

PROTOZOA

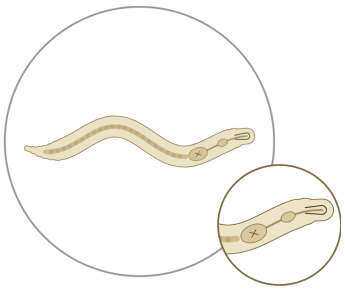


Colpoda

bean-shaped ciliate

The commonest soil ciliate, shaped like a kidney bean.

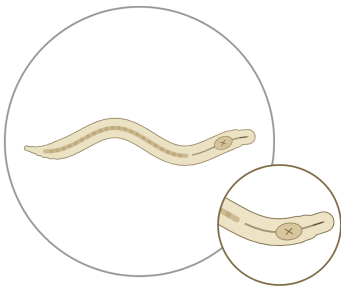
NEMATODES



Bacteria-eating nematode

An open tube mouth. It eats bacteria and releases plant food.

NEMATODES



Fungus-eating nematode

A thin, small spear for piercing fungal threads.

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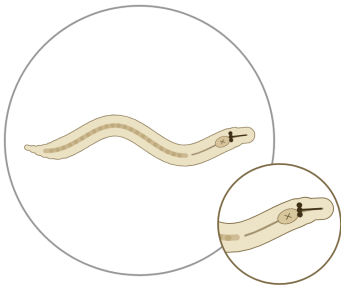
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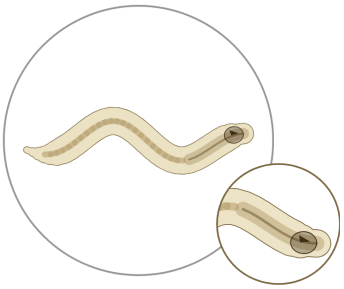
NEMATODE (PEST)



Root-eating nematode

A big spear with knobs that stabs roots. A pest!

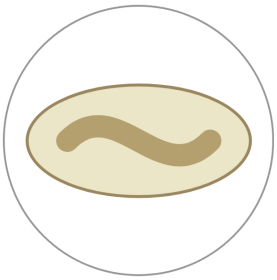
NEMATODES



Predatory nematode

A big mouth with a tooth. It eats other nematodes.

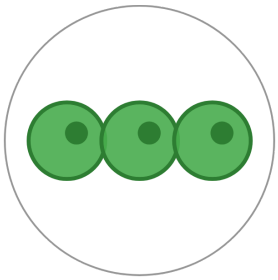
NEMATODES



Nematode egg

A smooth oval egg. Sometimes a little worm is coiled inside.

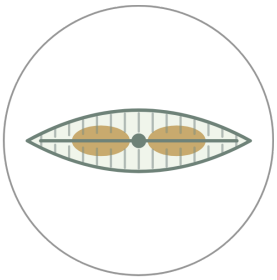
ALGAE · ✦ GLOWS



Algae

Green cells that make their own food from sunlight.

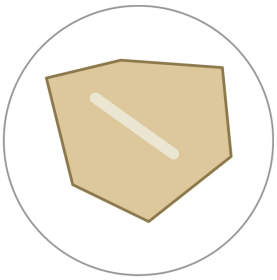
ALGAE · ✦ GLOWS



Diatom

A living alga in a glass shell, shaped like a little boat.

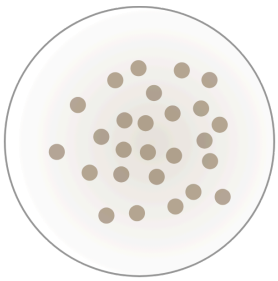
NOT SOIL LIFE



Sand grain

An angular mineral grain. Not alive: the soil's skeleton.

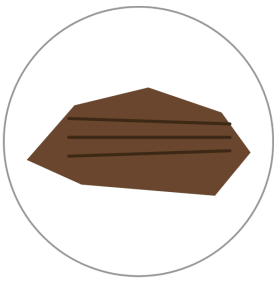
NOT SOIL LIFE



Clay flakes

Too tiny to see one by one: a faint, fuzzy haze and clumps.

NOT SOIL LIFE

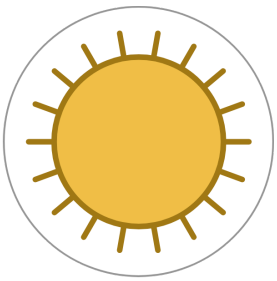


Organic bits

old leaves and roots

Brown bits of old plants: food for the soil life.

NOT SOIL LIFE · ✦ GLOWS



Pollen

A spiky grain from a flower, blown or washed into the soil.

NOT SOIL LIFE · ✦ GLOWS

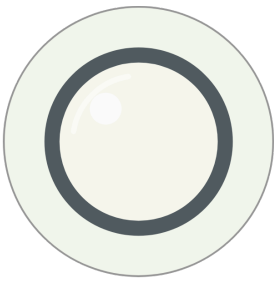


Microfiber

plastic thread

A thread from clothing. Litter, not soil life.

NOT SOIL LIFE



Air bubble

A dark ring with a bright middle, from making the slide.

How to play

DR. DIRT'S GUESS THE MICROBE

Like Guess Who! Ages 6 and up. Each player needs a laminated player sheet and a dry-erase marker.

1. Shuffle the cards into a face-down pile. Each player secretly draws 1 card: that's your microbe.
2. On your turn, ask one yes/no question about the other player's microbe: "Does it have a tail?" Cross off the microbes the answer rules out.
3. **Yes?** Go again. **No?** Your turn ends; the other player asks.
4. Or guess: "Is it Arcella?" Right? They hand you that card and draw a new secret card. Wipe your sheet and keep going. Wrong? Your turn ends.
5. Microbe guessed and the pile is empty? You're out! First to lose all their cards loses; the most guessed cards wins.

Print at Actual size (100%), 2-sided

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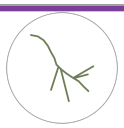
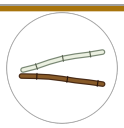
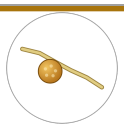
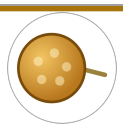
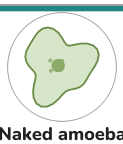
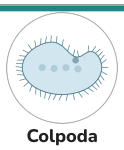
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Dr. Dirt's Guess the Microbe

Player sheet: laminate it, then cross off each microbe your answers rule out (dry-erase marker). Wipe clean for a new secret microbe.

 Bacteria	 Azotobacter	 Purple bacteria	 Purple rosette	 Lactic acid bacteria	 Actinobacteria	 Decomposer fungus	 Mycorrhizal fungus ✦	 Mycorrhizal spore ✦
 Acaulospora ✦	 Forest spores ✦	 Trichoderma	 Yeast	 False fungus	 Fusarium	 Alternaria	 Flagellate	 Naked amoeba
 Testate amoeba	 Arcella	 Ciliate	 Colpoda	 Bacteria-eating nematode	 Fungus-eating nematode	 Root-eating nematode	 Predatory nematode	 Nematode egg
 Algae ✦	 Diatom ✦	 Sand grain	 Clay	 Organic bits	 Pollen ✦	 Microfiber ✦	 Air bubble	✦ glows under the blue light My microbe:

Good yes/no questions

- Is it alive?
- Does it have a tail (flagellum)?
- Does it have hairs (cilia)?
- Does it live in a shell?
- Is it a long thread?
- Is it a worm (nematode)?
- Is there a spear in its mouth?
- Does it eat bacteria?
- Is it round?
- Is it brown? Green? Purple?
- Is it a spore or an egg?
- Is it a troublemaker?
- Is it a bacterium? A fungus?
- Does it glow under the blue light? (✦)

✂ cut here

Dr. Dirt's Guess the Microbe

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Testate amoeba	Arcella	Ciliate	Colpoda	Bacteria-eating nematode	Fungus-eating nematode	Root-eating nematode	Predatory nematode	Nematode egg
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