

# Microbe Neighborhood

Meet a tiny world by drawing, sorting, comparing, and making.



20 activities | Ages 6-9 with support

## GATHER

A pencil, crayons, child-safe scissors, and this pack. An adult helps with cutting. No microscope or living samples needed.

## CHOOSE A VISIT

Meet microbes: 1-6.

Microbe jobs: 7-10.

Investigate: 11-18.

Make a museum: 19-20.

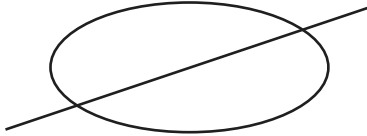
Print single-sided. Try 2-4 activities at a time.

Faces and buildings are imaginary. Scientific drawings are simplified and not to scale. This is a paper-only adventure.

# Follow the zoom

Number these views from 1 (widest view) to 4 (most enlarged).

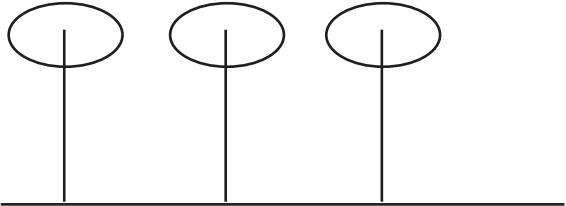
A / ONE LEAF



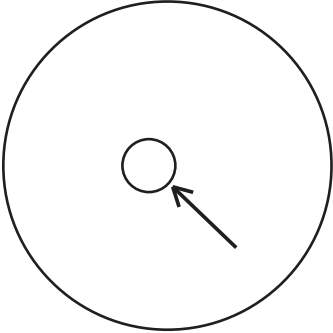
B / MICROBIAL VIEW



C / WHOLE GARDEN



D / ONE SPOT ON A LEAF



Many individual microbes are too small to see with unaided eyes. These are imaginary linked views, not microscope photographs.

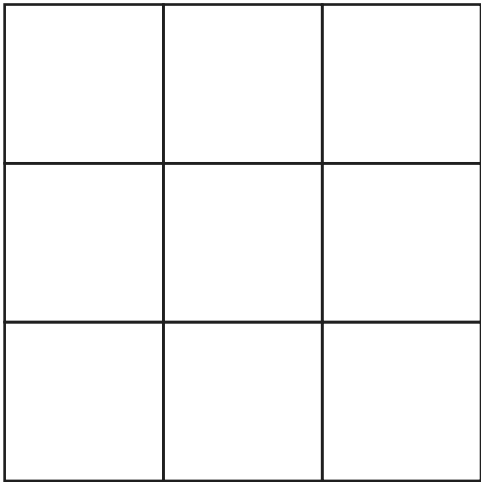
# Enlarge without inventing

Copy the same pattern into the bigger grid. Do not add new marks.

SMALL DRAWING



ENLARGED DRAWING



A larger drawing does not automatically reveal extra detail. Keep every filled square in the same position.

How many squares should be filled in each drawing?

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This copying puzzle models enlargement only. A microscope's ability to show fine detail is a separate idea.

# Bacterial shape detectives

Mark every round shape with R, every rod with D, and every spiral with S.



1. \_\_\_\_\_



2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



5. \_\_\_\_\_



6. \_\_\_\_\_



7. \_\_\_\_\_



8. \_\_\_\_\_



9. \_\_\_\_\_



10. \_\_\_\_\_



11. \_\_\_\_\_



12. \_\_\_\_\_

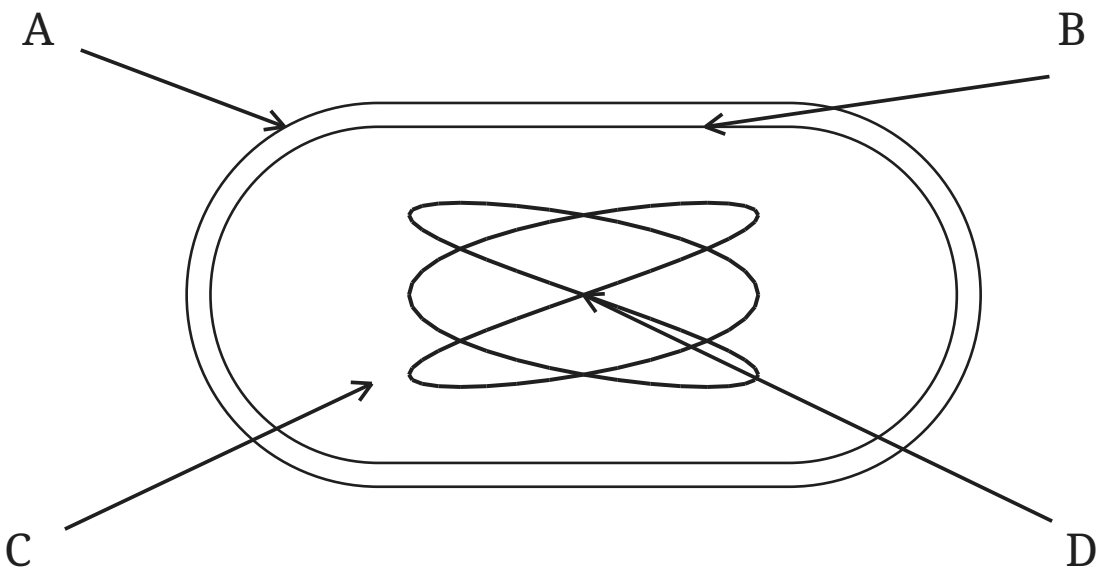
|             |             |             |
|-------------|-------------|-------------|
| Round       | Rod         | Spiral      |
| Total: ____ | Total: ____ | Total: ____ |

Bacteria have many shapes. These are three common shape groups; shape alone cannot identify a species or tell whether it causes disease.

# Inside one bacterium

Use the word bank to name A-D. Follow each arrow to the part it marks.

CELL WALL / CELL MEMBRANE / CYTOPLASM / DNA

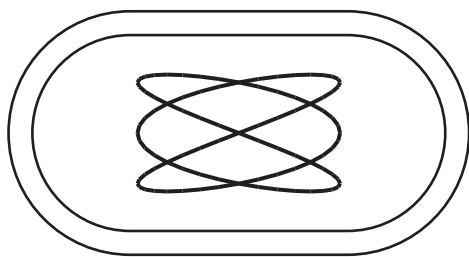


|   |   |
|---|---|
| A | B |
|   |   |
| C | D |
|   |   |

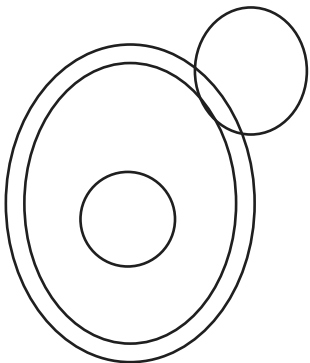
Outer line: cell wall. Inner line: membrane. DNA loop sits in cytoplasm, not a nucleus. This example leaves out many parts; some bacteria lack a wall.

# Two kinds of cell

Place the four fact numbers in the correct boxes. Use each number once.



BACTERIUM



BUDDING YEAST

- 1. Has a cell membrane.
- 2. Contains DNA.
- 3. Has no membrane-bound nucleus.
- 4. Has a nucleus.

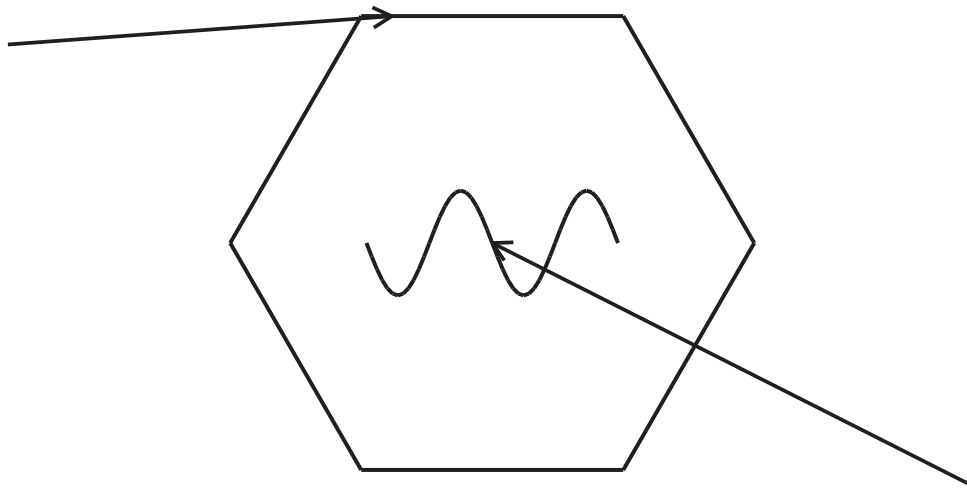
|                |      |            |
|----------------|------|------------|
| BACTERIUM ONLY | BOTH | YEAST ONLY |
|----------------|------|------------|

Yeasts are fungi, not bacteria. The circle inside this yeast model is its nucleus. Both drawings omit many structures and are not to scale.

# A virus is not a cell

Label the two parts of the virus model. Then circle the correct choices.

A: \_\_\_\_\_



B: \_\_\_\_\_

WORD BANK: protein shell / genetic material

Viruses are: CELLS / NOT CELLS

To make new viruses, they need: A HOST CELL / A PENCIL

This is one simple virus model. Viruses have different shapes; some have extra outer layers. A virus is not a tiny bacterium.

# Jobs in the tiny world

Match each group to the job described. Draw lines between the cards.

1

Baker's yeast

2

Selected starter bacteria

3

Soil decomposers

4

Photosynthetic pond algae

A

Use light to make food.

B

Help break down fallen leaves.

C

Release gas that helps bread dough rise.

D

Help turn milk into yogurt.

These are selected examples. A whole group of microbes does not have just one job. Food making uses chosen microbes and controlled methods.

# A job depends on context

Write H for helpful here, P for a problem here, or U for not enough information.

A

Known bread yeast makes dough rise.

☐

B

Mold spoils fruit in a food store.

☐

C

A round microbe appears in a sketch.

☐

D

A selected starter helps make yogurt.

☐

E

A microbe causes an infection.

☐

F

An unknown microbe is in a pond.

☐

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A shape or a habitat does not tell us whether a microbe is helpful or harmful. Classify the situation, not a permanent 'good' or 'bad' identity.

# Yeast at the bakery

Cut the four story cards. Put them in order on the table and explain the story.

A

Gas gets trapped in the dough, helping it rise.



B

A baker mixes bread yeast into dough.

C

The baker bakes the risen dough into bread.

D

Yeast uses sugars and releases carbon dioxide gas.



Correct letter order: \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

What does the yeast contribute? \_\_\_\_\_

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This is a paper story, not a recipe. No food experiment is needed to complete the activity.

# The leaf recycling route

Draw arrows to make a cycle. Begin at A and use all five cards.

## A / LEAF FALLS

A leaf lands on the soil.

## B / ROOTS TAKE UP NUTRIENTS

Roots absorb available nutrients from soil.

## C / DECOMPOSERS WORK

Some bacteria and fungi break down the leaf.

## D / A PLANT GROWS

A plant uses nutrients, water and light as it grows.

## E / NUTRIENTS RETURN

Some of the leaf's nutrients return to the soil.

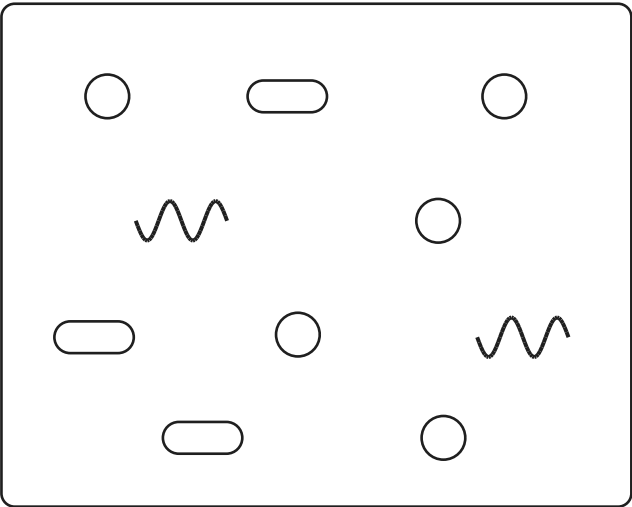
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A useful simplified nutrient cycle: not everything in a leaf becomes plant food. Decomposition includes many organisms and processes.

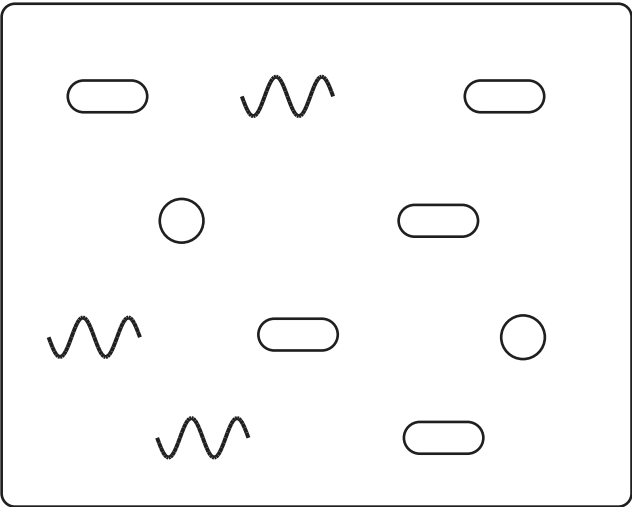
# Count two paper fields

These invented microscope drawings show equal areas. Count each shape once.

FIELD A



FIELD B



| Shape  | A count | B count |
|--------|---------|---------|
| Round  |         |         |
| Rod    |         |         |
| Spiral |         |         |
| TOTAL  |         |         |

Fictional observations, not research data. Same drawn area and magnification. Shapes do not identify species or health effects.

# Build an observation chart

Add the two fields. Fill one chart box for each drawn shape in the combined total.

|        |   |   |       |
|--------|---|---|-------|
| Shape  | A | B | A + B |
| Round  | 5 | 2 |       |
| Rod    | 3 | 5 |       |
| Spiral | 2 | 3 |       |

Round

Rod

Spiral

Which drawn shape was most common overall?

Chart key: one filled box = one shape in these two paper fields. The chart says nothing about all microbes in a whole pond.

# What can evidence tell?

Use the count table to mark each claim S (supported) or N (not supported).

| Shape  | Field A | Field B |
|--------|---------|---------|
| Round  | 5       | 2       |
| Rod    | 3       | 5       |
| Spiral | 2       | 3       |

- ☐ Both fields contain 10 drawn shapes.
- ☐ Field B has more rods than Field A.
- ☐ Every microbe in this pond has been counted.
- ☐ The rods must cause disease.
- ☐ Field A has more spirals than Field B.

Not supported can mean contradicted or simply unknown. Say which one applies to each claim.

# Follow a paper-sample key

Follow the rule path to identify three described models. This key only fits this set.

1 / IS IT A CELL?  
No: virus model. Yes: go to step 2.

2 / DOES IT HAVE A NUCLEUS?  
No: bacterium model. Yes: go to step 3.

3 / IS IT FORMING A BUD?  
Yes: budding yeast model. No: this key cannot name it.

| Record | Cell? | Nucleus? | Bud? |
|--------|-------|----------|------|
| A      | Yes   | No       | No   |
| B      | No    | No       | No   |
| C      | Yes   | Yes      | Yes  |

A: \_\_\_\_\_ B: \_\_\_\_\_ C: \_\_\_\_\_

Real identification needs more evidence. Shape and this small key cannot identify an unknown living sample.

# Plan a pond habitat

Our chosen pond alga needs water AND light. Find the only site that has both.

A / DRY WINDOWSILL

Light: YES

Water: NO

B / LIT POND WATER

Light: YES

Water: YES

C / COVERED WATER

Light: NO

Water: YES

D / DRY DARK DRAWER

Light: NO

Water: NO

My site choice is: \_\_\_\_\_ because ...

This is a paper habitat choice, not a growing experiment. Real organisms also need suitable nutrients and other conditions.

# Who made the gas?

Read this invented experiment record. Use the evidence, without doing the experiment.

The scientist used equal sugar and water, the same temperature, and the same waiting time. Only the addition of bread yeast changed.

|              |                    |               |
|--------------|--------------------|---------------|
| Paper record | Bread yeast added? | Gas detected? |
| Cup A        | Yes                | Yes           |
| Cup B        | No                 | No            |

Circle the claim this record supports:

1 / Adding yeast was linked to gas in these conditions.

2 / Every bubble everywhere must be made by yeast.

These are fictional results for practicing reasoning. Repeat real observations before making broad claims. This pack uses no living samples.

# A division pattern

Paper rule: every drawn cell becomes two in the next step. None are lost.

Some bacteria reproduce by dividing into two. Our paper model makes every cell divide together; real populations do not always do that.

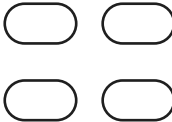
STEP 0



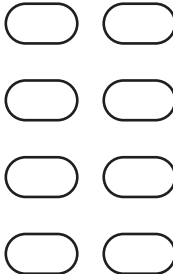
STEP 1



STEP 2



STEP 3



Why might real cells stop following this pattern?

Steps are not minutes. Real growth depends on species, conditions, nutrients, and losses; the model is not a prediction of unlimited growth.

# Mend the museum labels

The museum has three wrong labels. Cross them out and write the correct replacements.

A / YEAST

This is a bacterium.

---

B / VIRUS

This is a cell with a nucleus.

---

C / COLORFUL PORTRAIT

Its painted colors must be its real colors.

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Replacement ideas: yeast is a fungus; viruses are not cells; artists can choose decorative colors.

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An attractive illustration can help us notice an idea, but labels and model notes keep the explanation accurate.

# Fold a pocket museum

Complete the four panels. Cut the outer edge, then fold the three dotted lines like a fan.

|                                                        |                                                                         |                                                                                     |                                                                         |
|--------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <p>MY TINY MUSEUM</p> <p>Draw a cover.</p> <div></div> | <p>BACTERIUM</p> <p>Draw a cell.<br/>It has no nucleus.</p> <div></div> | <p>YEAST</p> <p>Draw a cell<br/>with a nucleus.<br/>It is a fungus.</p> <div></div> | <p>VIRUS</p> <p>Draw a model.<br/>It needs a host cell.</p> <div></div> |
|--------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|

Before cutting, add a tiny model note to your cover: 'Drawings not to scale.' Use activities 4-6 as your drawing references.

Adult help with cutting. Fold only the dotted lines; do not cut between panels. Stand it up as a mini exhibition.

# Be a microbe guide

Make one evidence-based exhibit card. Use the reference choices below, then teach someone.

Choose: BREAD YEAST (a fungus; helps dough rise), SOIL DECOMPOSERS (some bacteria and fungi; break down leaves), or VIRUS (not a cell; needs a host cell to make copies).

MY EXHIBIT IS:

DRAW A LABELED MODEL

ONE SCIENTIFIC FACT:

WHAT MY DRAWING LEAVES OUT:

A visitor's question I would like to investigate:

A useful exhibit distinguishes what we know, what the picture is pretending, and what we still want to find out.

# For the grown-up

Help children separate observation, explanation, and imagination.

## Everything stays on paper

No swabbing, culturing, food tasting, pond collection, or microscope is needed. The counting fields and experiment record are invented practice data.

## Words that matter

Bacteria are cells without a membrane-bound nucleus. Yeasts are fungi with nuclei. Viruses are not cells and depend on host cells to make copies. This is a small selection of microbial diversity.

## Keep the model honest

Faces, neighborhoods and jobs are storytelling devices. Colors can be decorative. Diagrams are not to scale and omit structures. Shape alone cannot identify an organism or its effects.

## Use the supplied evidence

Counts describe the pictured fields only. The three-model key is not a real identification tool. The doubling steps have no fixed duration and assume equal divisions without losses.

## Make it accessible

Read aloud for younger children; accept pointing, dictation and pattern marks instead of color. Divide the pack into short visits. Extension: ask which extra evidence would test a claim.

## Print and try

Print single-sided for activity 9's cards and activity 19's foldout. An adult helps with scissors. Editorial prototype: age fit and session length still need a parent-and-child playtest.

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Sources support the underlying science; they do not validate this new workbook or endorse MomoMango.

# Answers: activities 1-10

Use open-ended responses to discuss evidence, not handwriting or artistic style.

- 1      Widest to most enlarged: C, A, D, B. Card numbers: A=2, B=4, C=1, D=3.
- 2      Six filled squares. Rows are 101 / 111 / 010; 1 means filled. The larger drawing keeps the same pattern.
- 3      R, D, S, R, D, R, S, D, R, S, R, D. Totals: round 5, rod 4, spiral 3.
- 4      A cell wall; B cell membrane; C cytoplasm; D DNA. The inner empty region is cytoplasm, not an empty cell.
- 5      Bacterium only: 3. Both: 1 and 2. Yeast only: 4. A yeast's nucleus contains most of its DNA.
- 6      A protein shell; B genetic material. Viruses are NOT CELLS; making more requires A HOST CELL.
- 7      1-C: bread yeast and gas. 2-D: selected starters and yogurt. 3-B: decomposers and leaves. 4-A: photosynthetic algae and light.
- 8      A H; B P; C U; D H; E P; F U. C and F lack evidence about effects. Do not classify from shape or location alone.
- 9      B, D, A, C. Yeast contributes carbon dioxide gas; gas trapped in the dough helps it rise.
- 10     A -> C -> E -> B -> D -> A. Accept arrows that clearly show this sequence and acknowledge the simplified cycle.

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For explanations, ask: 'Which detail helped you decide?' and 'What else would you need to know?'

# More answers and sources

Activities 11-20. Original activities; references support the science.

- 11-12     A: 5 round, 3 rods, 2 spirals. B: 2 round, 5 rods, 3 spirals. Each total is 10. Combined: 7, 8, 5; rods are most common.
- 13        S, S, N, N, N. Claim 5 is contradicted. Claims 3 and 4 are unknown from the counts.
- 14-15     14: A bacterium, B virus, C budding yeast. 15: B has both water and light; these alone do not describe all real growth needs.
- 16-17     16: claim 1 fits; claim 2 goes beyond the record. 17: 1, 2, 4, 8, 16. Real nutrients, conditions and cell losses can change growth.
- 18        Yeast is a fungus. Viruses are not cells. An artist's colors do not establish a microbe's natural appearance.
- 19-20     Look for correct type distinctions, a labeled drawing, a supported fact, and an honest model limitation. A question need not have an answer yet.

## SCIENCE REFERENCES

AMNH, Microbiology for Kids: [amnh.org/explore/ology/microbiology](https://amnh.org/explore/ology/microbiology)

OpenStax Microbiology, prokaryotic cells:

[openstax.org/books/microbiology/pages/3-3-unique-characteristics-of-prokaryotic-cells](https://openstax.org/books/microbiology/pages/3-3-unique-characteristics-of-prokaryotic-cells)

Microbiology Society, Microbes and the food supply:

[microbiologysociety.org/resource-report/microbes-and-the-food-supply.html](https://microbiologysociety.org/resource-report/microbes-and-the-food-supply.html)

Microbiology Society, Understanding viruses and challenges in microbiology:

[microbiologysociety.org/resource/understanding-viruses-and-challenges-in-microbiology.html](https://microbiologysociety.org/resource/understanding-viruses-and-challenges-in-microbiology.html)

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Reference check: October 2026. Drawings and fictional data are educational models, not clinical or research observations.