

# SCIENCE SPAZA

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## THE HUMAN MICROBIOME: MEET YOUR MICROBES!

IT'S SO INTERESTING TO SEE WHAT WE LOOK LIKE ON THE INSIDE.

AND TO IMAGINE, OUR BODIES ARE HOME TO MICROBES, LIVING ORGANISMS TOO SMALL TO SEE WITH THE NAKED EYE.

THERE ARE TRILLIONS OF MICROBES THAT LIVE ON AND INSIDE OUR BODIES.

WOULDN'T ALL THESE MICROBES MAKE US SICK?

NOPE, NOT ALL MICROBES ARE BAD LIKE PATHOGENS THAT MAKE US SICK.

MANY MICROBES HELP TO KEEP US HEALTHY.

THERE ARE ALSO MICROBES IN THE AIR, SOIL, WATER, AND ANIMALS AROUND US.

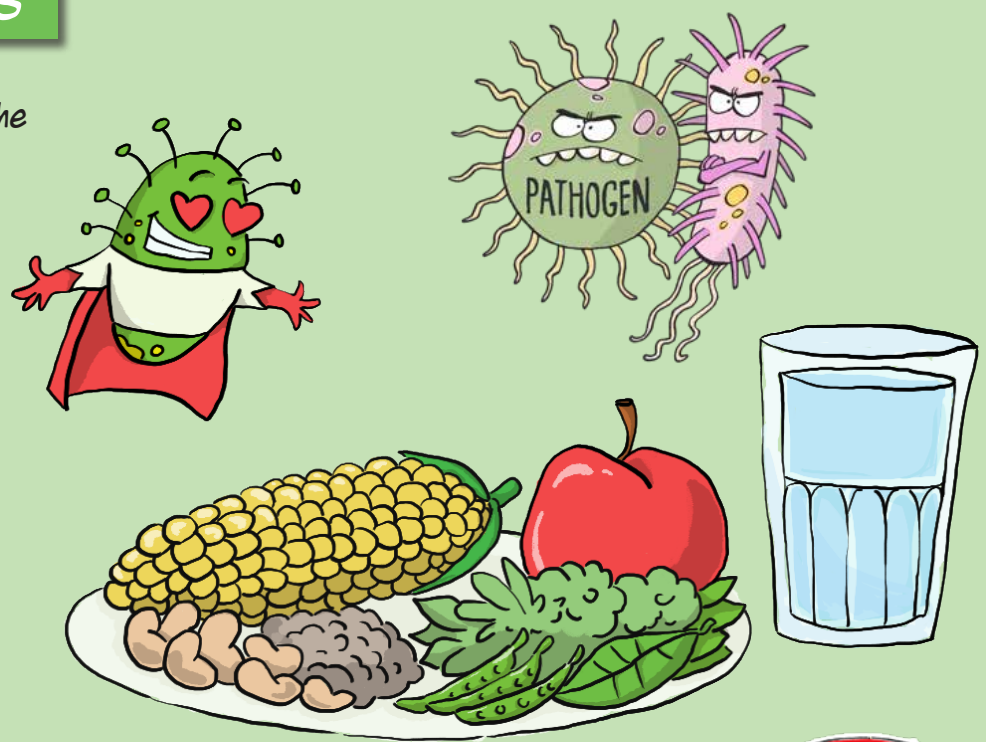
WELL THEN, NICE TO MEET YOU, MY MICROBIAL MATES!

### AMAZING MICROBES

Your microbiome consists of all the microbes found in and on you.

The places we live, our food, and our activities influence the amount and types of microbes in and on us.

For example, the good bacteria that absorb nutrients, prevent disease, keep skin healthy, and improves brain function thrive when you eat a balanced, high-fibre diet.



Knowledge is NCAW!



# MAKE A WINOGRADSKY COLUMN

MICROBIOLOGIST **SERGEI WINOGRADSKY** INVENTED A TOOL TO SEE HOW DIFFERENT SOIL MICROBES HAVE DIFFERENT NEEDS. HERE'S HOW YOU CAN MAKE ONE TOO!

**1** CAREFULLY CUT AWAY THE TOP PART OF THE BOTTLES WITH SCISSORS.

**2** LABEL THE BOTTLES:  
1 - MUD ONLY  
2 - MUD + NEWSPAPER  
3 - MUD + NEWSPAPER + YOLK\*

**3** USING YOUR BUCKET AND SCOOP, COLLECT MUD FROM YOUR COMMUNITY. IF YOU CAN'T FIND MUD, MAKE A MIXTURE OF SOIL AND WATER IN THE BUCKET. TAKE CARE WHEN GOING NEAR MUD OR OPEN WATER.

**4** FILL BOTTLE 1 WITH MUD ONLY. DON'T FILL TO THE TOP.

**5** MIX BITS OF NEWSPAPER INTO THE MUD IN THE BUCKET (THIS ACTS AS A SOURCE OF CARBON). FILL BOTTLE 2 WITH THIS MIXTURE.

**6** \*ADD AN EGG YOLK TO THE MUD AND NEWSPAPER MIXTURE (THIS ACTS AS A SOURCE OF SULPHUR). FILL BOTTLE 3 WITH THIS MIXTURE.

**7** ALLOW THE MUD MIXTURES TO SETTLE IN THE BOTTLES, THEN ADD SOME WATER, BUT LEAVE SOME SPACE FOR AIR.

**8** SEAL THE BOTTLES WITH PLASTIC AND ELASTIC OR TAPE.

**9** LEAVE THE COLUMN IN A BRIGHT PLACE (NO DIRECT SUNLIGHT) UNDISTURBED FOR 8 TO 10 WEEKS AND OBSERVE REGULARLY.



## YOU WILL NEED:

- CLEAR PLASTIC BOTTLES (2 OR 3\*)
- MARKER PEN OR LABELS
- SCISSORS
- BUCKET & SCOOP
- SOIL OR MUD
- WATER
- NEWSPAPER
- EGG YOLK\*
- PLASTIC AND ELASTIC TO SEAL THE BOTTLES

\*OPTIONAL

## WHAT TO EXPECT:

DIFFERENT BACTERIA GROW IN DIFFERENT PLACES DEPENDING ON THEIR NEEDS.

OVER TIME, DIFFERENT MICROBIAL SPECIES SEPARATE INTO VISIBLE LAYERS DEPENDING ON THEIR USE OF OXYGEN, LIGHT, AND NUTRIENTS SUCH AS CARBON AND SULPHUR.

THOSE THAT NEED AIR, GROW AT THE TOP; THOSE THAT DON'T, GROW AT THE BOTTOM. DO YOU EXPECT TO SEE MORE LAYERS IN THE BOTTLE WHERE YOU ADDED EXTRA NUTRIENTS?

**NOTE: AFTER THE EXPERIMENT, THROW THE SEALED BOTTLES IN THE RUBBISH BIN. DO NOT OPEN OR PLAY WITH IT.**

TO WATCH A DEMONSTRATION OF THIS EXPERIMENT AND TO LEARN MORE, SCAN HERE:



## WHAT'S HAPPENING HERE?

Just like in the column, different places in your body are home to different microbes.

There is a skin microbiome, a gut microbiome, a lung microbiome, and more. Together, these microbes are called the human microbiome.

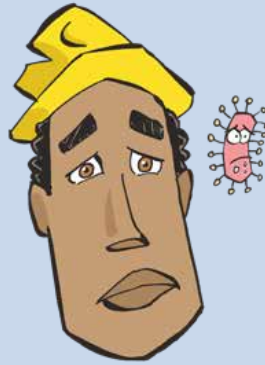
What you put in the bottle influenced what kind of microbes grew. Similarly, the foods you eat and your environment will influence your microbiome.



## FINDING BALANCE

A balanced diet includes many different types of food. Since different microbes prefer different foods, eating a balanced diet will make sure there are different types of microbes to keep you healthy.

Eating too much of only one or a few types of food is called an unbalanced diet and causes poor gut health.



Scientists found that gut health is linked to your emotions or how you feel.

## TINY ORGANISMS – HUGE OPPORTUNITIES

Microbiome research is used in:



**CURRICULUM LINKS**

*Life Orientation FET Gr 10-12*

- Healthy and balanced lifestyle choices

*Life Sciences FET Gr 10-12*

- Biodiversity of microorganisms

*Natural Sciences SP Gr 7-9*

- Biodiversity
- Useful microorganisms

Each of these areas focus on the many different roles that these microbial mates play in our lives. Microbiome research combines expertise from many different subjects including:

- Microbiology – the study of microorganisms.
- Dietetics – the study of nutrition and health.
- Bioinformatics – studying large datasets in life sciences.

And others like:

- Genetics
- Psychiatry
- Immunology

To hear from researchers in this field, check out their feature in this edition of Spaza Space or scan here.



Knowledge is NCAH!



# FOOD GROUPS WORD SEARCH

**PROBIOTIC FOODS** CONTAIN GOOD BACTERIA THAT CAN BENEFIT OUR HEALTH.

A BALANCED DIET, WATER, AND PROBIOTIC FOODS WILL KEEP YOUR GOOD **GUT BACTERIA** THRIVING.

**CAN YOU FIND ALL THE EXAMPLES OF EACH OF THE FOOD GROUPS?**

**FATS AND SUGARS** - EAT IN SMALL AMOUNTS:  
SWEETS, OIL

**PROTEINS** - BUILD OUR BODIES AND MUSCLES:  
MEAT, BEANS, EGGS

**CARBOHYDRATES** - PROVIDE ENERGY AND NUTRITION:  
BREAD, POTATOES, RICE

**FRUIT AND VEGETABLES** - PROVIDE VITAMINS AND FIBRE:  
BANANAS, CARROTS, SPINACH

**DAIRY** - BUILDS STRONG BONES AND TEETH:  
YOGHURT, CHEESE, MAAS



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We are talking to future leaders. Are you?



WE WANT YOUR FEEDBACK!

WE WOULD LOVE TO SEE PHOTOS OF YOUR EXPERIMENT! WHATSAPP YOUR PHOTOS TO 076 173 7130



The Societal Impact Task Team (SITT) leads the science engagement activities of the Divisions of Molecular Biology and Human Genetics, and Immunology at Stellenbosch University's Department of Biomedical Research, Faculty of Medicine and Health Sciences, as well as the South African Medical Research Council (SAMRC) Centre for Tuberculosis Research.



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