

# ARTIS MICROPIA

## Winogradsky column

### Make your own micro-zoo

Microbes are an indispensable link in the circle of life. Microbes are responsible for producing and breaking down materials that other life within the ecosystem needs. Microbes are the beginning and end of the food chains on Earth. It is possible to study how microbes do this from the comfort of your own home.

In this experiment you will study the various microbes from your local environment by building a Winogradsky column - a miniature ecosystem. This experiment is named after Sergei Winogradsky (1856 - 1953), a Russian microbiologist who researched the coexistence of soil microbes.



### Part 2: questions.

Try to answer the following questions during this experiment.

**Question 1:** What changes do you see in the column after three weeks? And after eight weeks?

**Question 2:** Are there also parts of the column that remain exactly the same after eight weeks?

*Each Winogradsky column looks different, sometimes completely different. In general, after three weeks you will see different horizontal layers form, which will have become a lot more pronounced after eight weeks. These zones contain different types of microbe groups.*

**Question 3:** In a Winogradsky column, oxygen plays an important role. Predict the concentration of oxygen in the entire column. (Think about all parts of the column: mud, water and air.) Try to find out if you are right.

*When the column is built, there will be approximately the same amount of oxygen in the entire column. After a few weeks, the oxygen in the lower mud layers will be used up. Only in the top layers, and in the water, oxygen is also produced by the microbes. So the concentration of oxygen will be high in the air layer, in the water layer and in the top layers of the mud, and will gradually decrease the further you go to the bottom mud layers.*

**Question 4:** Note which colours the layers of the Winogradsky column have over time, and look up which microorganisms could be in each layer or colour.

*In general, you may encounter the following types of organisms from top to bottom:*

<i>Layer</i>	<i>Which microbes</i>	<i>Colour</i>
<i>In the water layer:</i>	<i>green algae, diatoms, cyanobacteria (blue green algae) sulphur-oxidizing bacteria</i>	<i>Green to blue green  Colourless</i>
<i>In the mud layer:</i>	<i>purple phototrophic bacteria green phototrophic bacteria sulphate-reducing bacteria</i>	<i>Purple Green Grey</i>