

Didactic Scenario

1. Title

Who are there in the realm i can't see?

2. Keywords

microscopic organisms, microscope, bacterial culture, coding

3. Basic Information

STEAM Subject: Science, Technology, Arts, Maths

Typical interaction time with the instructional scenario in teaching hours for in-school work:
40'+40'

General description of the scenario:

<u>Phases</u>	<u>Stage</u>	<u>Time</u>
I explore the environment in which microscopic organisms live	preparation stage	40'+40'
Exploring microscopic organisms	preparation stage	40'+40'
I observe microscopic organisms under a microscope	implementation stage	40'+40'

Age group: 10-12 years

Estimated difficulty level:

Very Easy	Easy	Moderate	Challenging	Very Challenging
		X		

Teaching resources

Ortaokul Fen Bilimleri Dersi Kitabı – Bilsem Ders Müfredat Planı- Tubitak Bilim Genç, EBA (Eğitim Bilimleri Ağı)

Material: microscope, slide, coverslip, culture (medium) created for the reproduction of microscopic organisms, etamin, needle thread, pulley, microscopic organism learning pictures, bacterial cultivation culture, cultivation rod, petri dishes with ready-made medium, oven, stretch film

School infrastructure: smart board, computer, microscope, oven

Additional material from external sources/online tools:

<https://bilimgenc.tubitak.gov.tr/makale/konveksiyon-yontemiyle-isi-akisini-gozlemleyelim>

https://ders.eba.gov.tr/ders/proxy/VCollabPlayer_v0.0.992/index.html#/main/curriculumResource?resourceID=8d8daa7242f8d6d53c54778e5c341aa3&resourceTypeID=3&loc=0&locID=31830af6996f96dacbf4b628e5d88b9c&showCurriculumPath=false

https://ders.eba.gov.tr/ders/proxy/VCollabPlayer_v0.0.993/index.html

<https://www.morpakampus.com/anasayfa>

Differentiated Instruction for students of differing abilities and learning styles in the same class: N/A

Developed by: ?

4. Educational Problem

In the existing education plan, it was determined that the existence of mould fungi, yeast fungi and parasite fungi were not known and their shapes could not be observed under a microscope. It is understood that microscopic organisms are not known to be everywhere and in large numbers, and it is not realised that there are fungi settled in our bodies. It has been realised that students and many people are not sufficiently aware of the scientific studies carried out today.

It has been realised that while microorganisms are thought to cause harm, they cannot think that they also have benefits. In addition, it is known that direct learning takes place in activities carried out by doing and experiencing, and it is not easily forgotten. (Sözer, 1998)

Since children in the concrete operational period can only reason about things that they have direct personal experience, our activities will provide skills such as designing experiments, critical thinking and reflective thinking. (Özdemir, O. Özdemir, P, Kadak, M. Nasıroğlu, S. (2012).

5. Learning Objective (-s)

1. It is aimed to help them realise how the knowledge in one field can be used in other fields and to help them associate the information they learn in the classroom with daily life.
2. With the idea that it would be appropriate to use the method of learning by doing and experiencing in order to realise permanent learning, the activity of coding microscopic creatures in etamine is aimed to discover microscopic living creatures.
3. In order to discover microscopic organisms in the environments we live in, it is among our goals to cultivate bacteria with samples taken from the usage areas in the school environment.
4. It is aimed to observe living things under microscope with samples taken from microscopic living culture.

6. Phases of the Scenario

Phase 1

Title: I explore the environment in which microscopic organisms live

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 40'+40'

Detailed description of the scenario phase:

The students are shown the living creature images in Appendix-1 and asked the question "What do you think the species of the creatures you see in the photographs could be?". If the answer is "microscopic creature", do you mean a creature that is small enough to be examined with a microscope?" Where might they live? "So what kind of microscopic creatures do you know?" Brainstorming is done with the question.

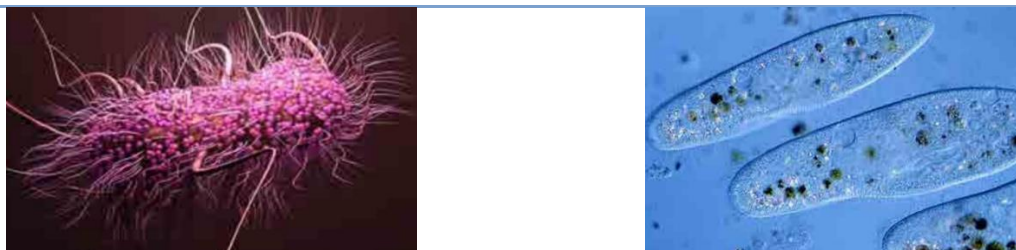


Image 1. Microscopic Live Specimen Pictures



Microchip

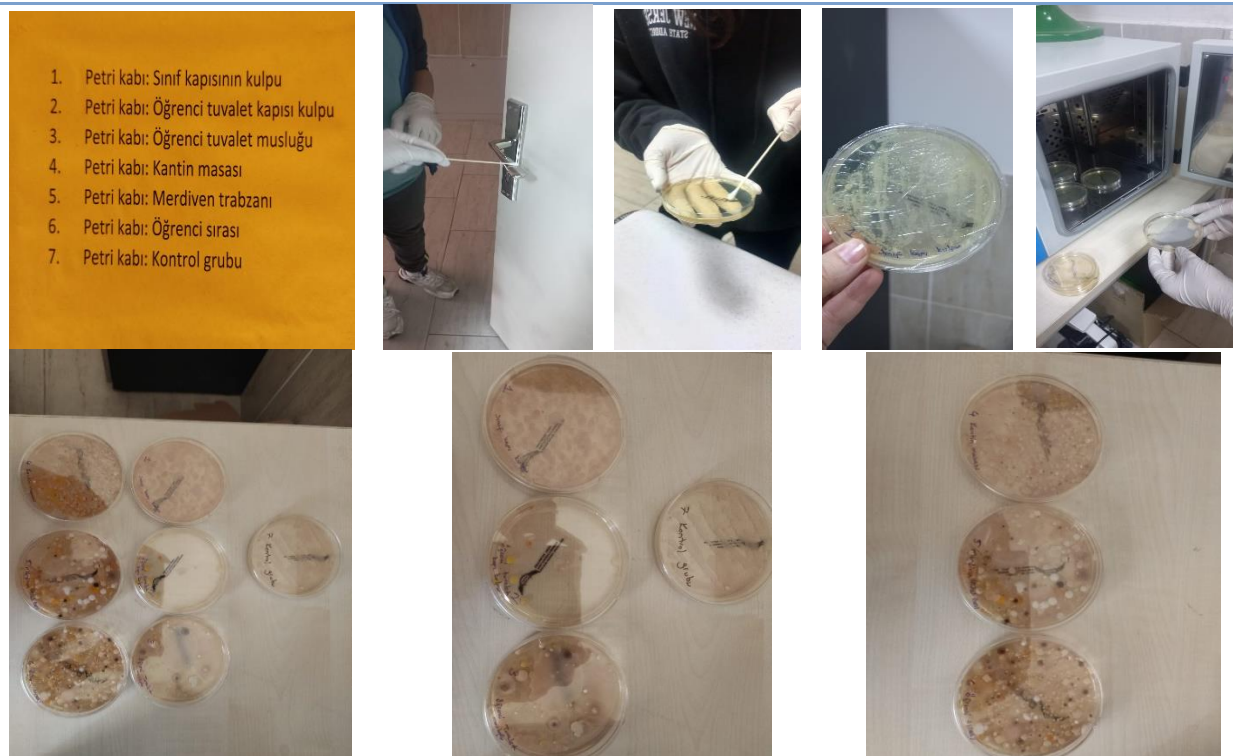
Turkish scientist Dr Enver Gürhan KILINÇ, who works on bacteria resistant to antibiotics at the University of Toronto, has produced a microchip that detects bacteria quickly. Can we catch bacteria in our school?

Activity sheets:

Activity 1:

The aim of this activity is to determine the existence of microscopic organisms invisible to the eye and to raise awareness about the importance of complying with hygiene rules for microbes that will adversely affect human health.

Swab samples are taken from frequently used areas of our school with swabs. The samples are inoculated into petri dishes containing prepared medium. The petri dishes, which are tightly covered with cling film, are placed in the oven in our laboratory at the appropriate temperature.



Phase 2

Title: Exploring microscopic organisms

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 40'+40'

Detailed description of the scenario phase:



Etamine fabric and sample motifs embroidered on them are shown. Have you seen them before? Would you like to embroider one of the microscopic creatures by choosing the one you want using this type of embroidery by showing etamine fabric, needle and thread?

Activity sheets:

Activity 1:

What is etamin?

Where is it used?

How to embroider on it?

Etamin is the name given to linen, silk and mostly cotton fabrics that are sparsely woven and have tiny holes on it due to its weaving. It is generally used mainly in home textile products such as prayer rugs, cushions, tables.



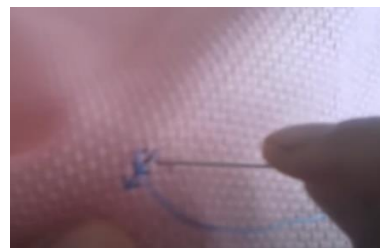
Towel



Necklace

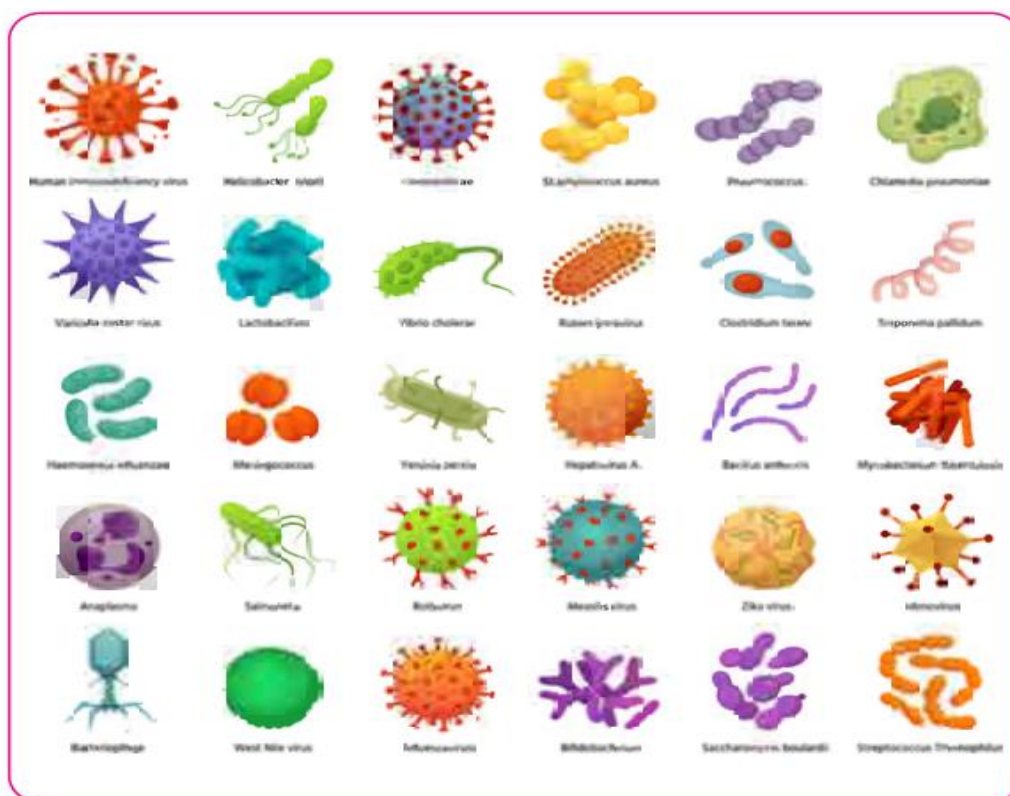


Prayer rug



<https://www.youtube.com/watch?v=-rDZ2sj0TuE>

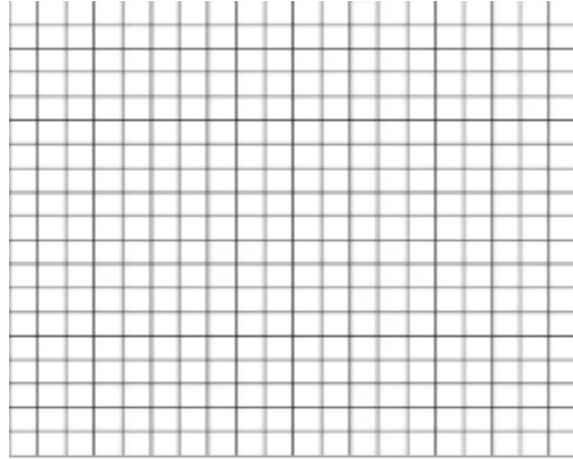
How to make embroidery in etamine? Explained by watching video footage



Types of microscopic organisms

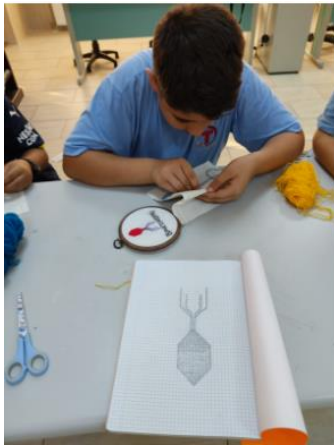
The board of microscopic living organisms is left on the students' desks and they are asked to examine it.

They are asked to choose a microscopic creature they would like to embroider in etamine.



Checked paper

They are asked to encode the microscopic creature model they have chosen on squared paper. Then they are asked to embroider the microscopic creature they coded on etamin fabric with needle and thread as described in the video.







The works were transferred to the hoops and a panel was created in our classroom.



https://www.youtube.com/watch?v=7hR_DiOrCF8

Phase 3

Title: I observe microscopic organisms under a microscope

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 40'+40'

Detailed description of the scenario phase:

How to Prepare Microscopic Live Culture?

- A 0.5 l water bottle is filled with water from a stagnant pond (lake, water filled with animal footprints etc.)
- Add some dried herbs into the bottle (dried leaves, fruit peels, etc.).
- Add 3 teaspoons of granulated sugar to the bottle.
- Keep at room temperature, uncovered, for 1 week

Not: The mixture should be prepared 1 week before the lesson



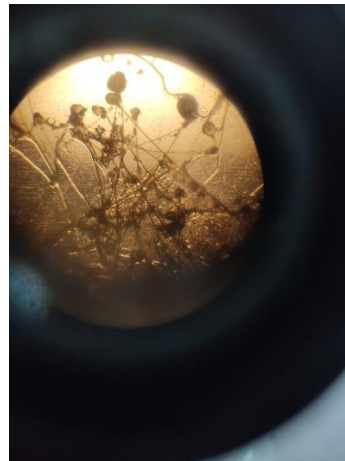
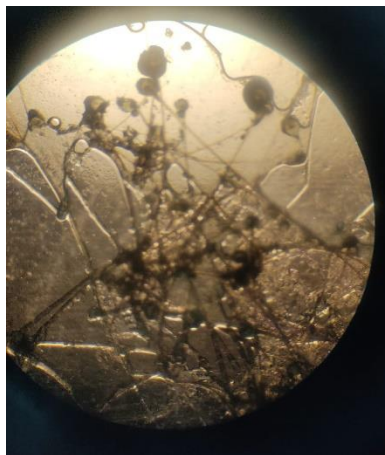
Rules to be considered when using a microscope:

1. The microscope should always be carried with two hands, holding it firmly with one hand underneath and the other hand on the handle.
2. The table on which the microscope is placed is sturdy, unshakeable, the stool or chair to sit on height-adjustable to ensure comfortable and fatigue-free viewing of the microscope must be of good quality.
3. The microscope should not be placed too close to the edge of the table and unnecessary things on the table must be removed in advance.
4. Care should be taken to ensure that the cables of the microscope are not crushed underneath.
5. When not in use, the microscope should be kept in its special case or box.
6. The microscope should be cleaned after each use with a soft-touch, residue-free, clean cloth.
7. At the end of the work, the microscope should be left adjusted to the small objective. Objective and eyepieces should never be removed unnecessarily.

The use of microscope is reminded again by making explanations. Our students have learnt how to use a microscope in our previous lessons and received their badges.



I know how to use a microscope badge



Microscopic image of a mould fungus

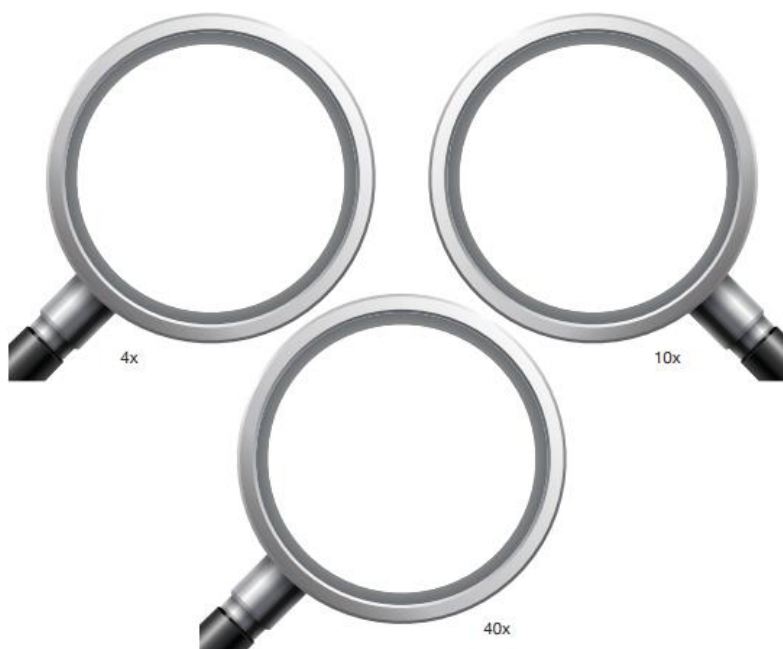
Activity sheets:

Microscope Observation

In this study, you are expected to see the pictures that your teacher shows you and the creature that your teacher asks the question "What do you think the species of the creatures you see in the photographs could be?". For this purpose, you will prepare a preparation with your teacher and examine the preparation under a microscope.

Follow the instructions below carefully.

1. Take the water from the jar containing the bacterial culture prepared by your teacher without getting the water on your hands (you can use gloves) with the help of a dropper.
2. Drop 1-2 drops of turbid water from the dropper onto the slide.
3. Carefully place the slide on the slide with the drop.
4. Place the prepared preparation carefully on the microscope table.
5. Try to find images with micro and macro screws by alternately changing the objective lens of the microscope.
6. If you cannot find an image, you can reduce the light of the microscope.
7. If you cannot find an image, you can try to find an image with a digital microscope or digital zoom by holding the phone camera to the ocular lens.
8. Draw the image you obtained in the appropriate places below





https://drive.google.com/file/d/1tDatzrC2oARb1dazY7KV_gWVpZTCmJeH/view

Microscopic organisms video taken from Morpa Kampüs Education portal is watched.

7. Evaluation Methodology

TASK: Design your own bacterium in the space provided below. State the most important feature you want to give to your design. What feature would you give to the bacteria in your design so that it cannot be caught by the microchip produced by Dr Enver Gürhan KILINÇ.

Instruction:

This measurement tool was prepared to evaluate the performance of the students in the activity "Who are there in the world I cannot see?". Please indicate your opinions (observations) according to the following criteria (by putting an X in the relevant section).

Name and Surname:

Criteria	0 (Not observed) or (Very poor)	1 (Weak) or (Inadequate)	2 (Middle)	3 (Good) Or (Adequ ate)	4 (Very Good) or (Very Adequate)
Knows what he/she is researching					
Performs bacterial cultivation in petri dishes					
Knows the types of microorganisms					
Has the ability to use a microscope.					
Can prepare preparations and make observations					

8. Additional Resources for the teacher

<https://www.youtube.com/watch?v=-rDZ2sj0TuE>

https://www.google.com/search?q=etamin+nerelerde+kullan%C4%B1%C4%B1r&sca_esv=591911936&bih=607&biw=1366&rlz=1C1GCEA_enTR1088TR1088&hl=tr&ei=2ImAZbujE571xc8Pxp-csA8&oq=Etamin+nerelerde+&gs_lp=Egxnd3Mtd2l6LXNlcnAiEUV0YW1pbjBuZXJlbGVyZGUgKgIIADIFEAAyGARllhQygZYxRdwAXgBkAEAmAHmAaABgQ-qAQUwLjYuNLgBAcgBAPgBAcICChAAGEcY1gQYsAPCAg0QABiABBiKBRhDGLADwgII EAAYFhgeGACagYQABgWGB7iAwQYACBBiAYBkAYK&sclient=gws-wiz-serp

Sözer, E. (1998). Sosyal bilgiler öğretiminde ilke, strateji, yöntem ve teknikler. Eskişehir: Eskişehir Anadolu Üniversitesi Yayını.

Özdemir, O, Özdemir, P, Kadak, M, Nasıroğlu, S. (2012). Kişilik Gelişimi. Psikiyatride Güncel Yaklaşımlar, 4 (4), 566-589. DOI: 10.5455/cap.20120433