Staining of living organisms

Biology | Microscopy / Cell Biology | Basics of Microscopy & Work Technology

Nature & technology | From the very small & the very big

Nature & technology | Plants & animals

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	30 minutes

This content can also be found online at:

http://localhost:1337/c/5f508b9337ffe20003f101c1

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Teacher information

Application

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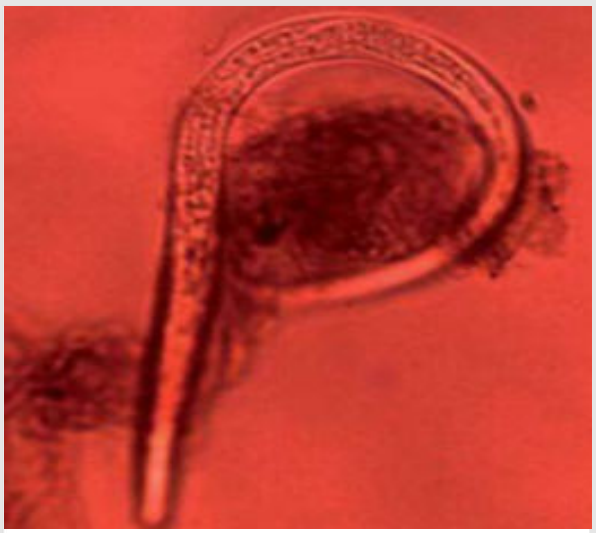

Direct staining nematode (400x)

It is often helpful to introduce a clear contrast into the microscope image. In this way, the questions as to what part of the organism is being examined and what the exact dimensions of these components are can be answered. For the staining of living organisms, therefore, highly diluted and only weakly or not at all toxic dyes are used.

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Other teacher information (1/3)

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Prior knowledge

Ciliates, rotifers, nematodes and various small crustaceans are the main objects of investigation. Ciliates, nematodes and rotifers are found in pond or aquarium water. They multiply in large numbers if you leave a water sample with some site substrate on the windowsill two weeks before the examinations. Small crustaceans (e.g. stream flea crabs) are more likely to be found in fresh flowing waters.

Scientific principle

The living stains can always be used if you want to examine quite transparent microorganisms better. However, they are also a possibility of differentiation for the more capable students. Only non-toxic colours should be experimented with.

Other teacher information (2/3)

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Learning objective

The students learn to stain smaller organisms on the slide and larger organ organisms in a beaker. Neutral red is used as the dye.

Tasks

1. Staining of the small objects on the slide
2. Colouring of the larger organisms in a beaker

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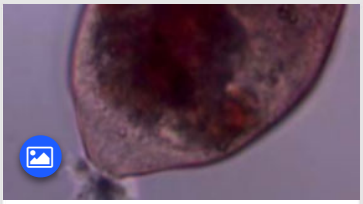
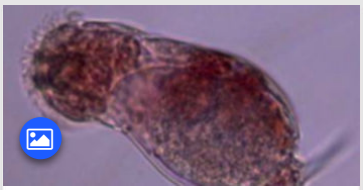
Other teacher information (3/3)



Direct dyeing bell valve (400x)



staining in beaker, rotifers (400x)

Direct staining on the slide

This experiment is very easy for the students to carry out, because instead of the usual drop of water only a little colour solution is applied. The concentration of the colour solution should not be too strong. It can be diluted with water afterwards if necessary.

Colouring in beaker

In this experiment, only a small portion of the organisms should be filled into a separate container and stained.

Safety instructions

- If the dye gets into the eyes, they should be rinsed out with water.
- Only non-toxic dyes should be used.
- If too much dye has been used, the object can be diluted with water.
- The general instructions for safe experimentation in science lessons apply to this experiment.

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Student Information

Motivation

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A strong contrast helps to be able to view different components

In this experiment you will learn how to introduce a contrast into living organisms in order to be able to view them better. The contrast helps you to clearly distinguish different parts of the organisms. You will have a closer look at two different possibilities: the direct staining on the slide and the staining in a beaker.

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Tasks

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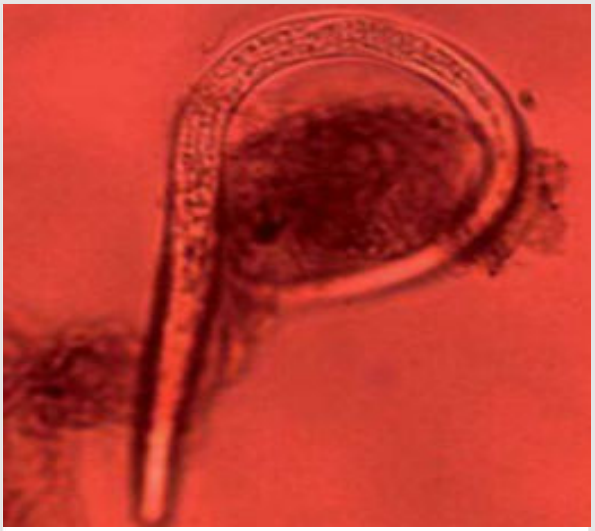

Direct staining nematode (400x)

1. The objects are stained directly on the slide.
2. Slightly larger organisms are dyed before the examination.

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Equipment

Position	Material	Item No.	Quantity
1	PHYWE Binocular student microscope, 1000x, mechanical stage	MIC-129A	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs	64685-00	1
4	Dropping pipette with bulb, 10pcs	47131-01	1
5	Beaker, 250 ml, plastic (PP)	36013-01	1
6	Beaker, 100 ml, plastic (PP)	36011-01	1
7	Chemicals set for TESS advanced Microscopy	13290-10	1

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Procedure (1/2)

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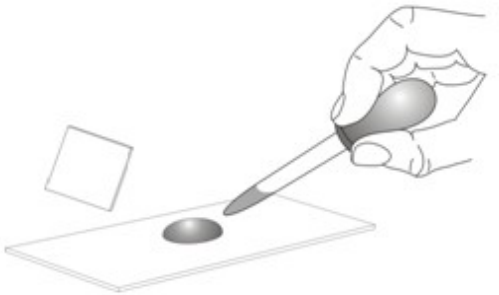


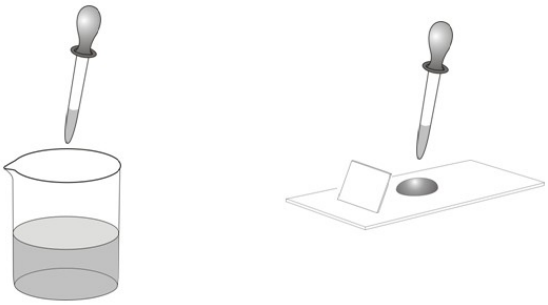
(1) The objects are stained directly on the slide

- A drop of neutral red color solution is placed directly on the slide.
- Add a drop of the water sample with ciliates.
- Microscopy with different magnifications.

Procedure (2/2)

(2) Slightly larger organisms are dyed before the test

- Put 3-5 drops of neutral red into a beaker with some small crabs (50 ml liquid).
- After 10 minutes, the microscope is used with the smallest magnification (40x).



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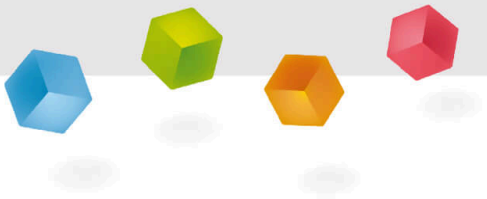

Report

Task 1

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How can you save an object that has been stained too much?

- ○ Dilution with water
- ○ Immersion in an alcoholic solution
- ○ Not at all
- ○ Application of a discolouring dilution

Check

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Task 2

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Assign the terms to the text

The direct staining takes place on the _____. A drop of _____ is placed on the _____. An object (e.g. a drop with ciliates) is then added to this slide.
Larger organisms are stained in a _____ before the examination. After about 10 minutes the microscope can be used with the _____ magnification.

object slide
color solution
beaker
smallest
slide

Check

Task 3

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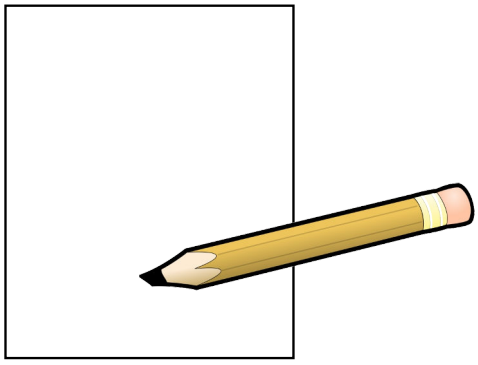
Write down your observations. Pay particular attention to whether you can see differences between the direct staining and the staining in the beaker under the microscope.



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Slide	Score / Total
Slide 14: Object colouring	0/1
Slide 15: Direct coloring of an object	0/5

Total amount 0 / 6

Solutions Repeat

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