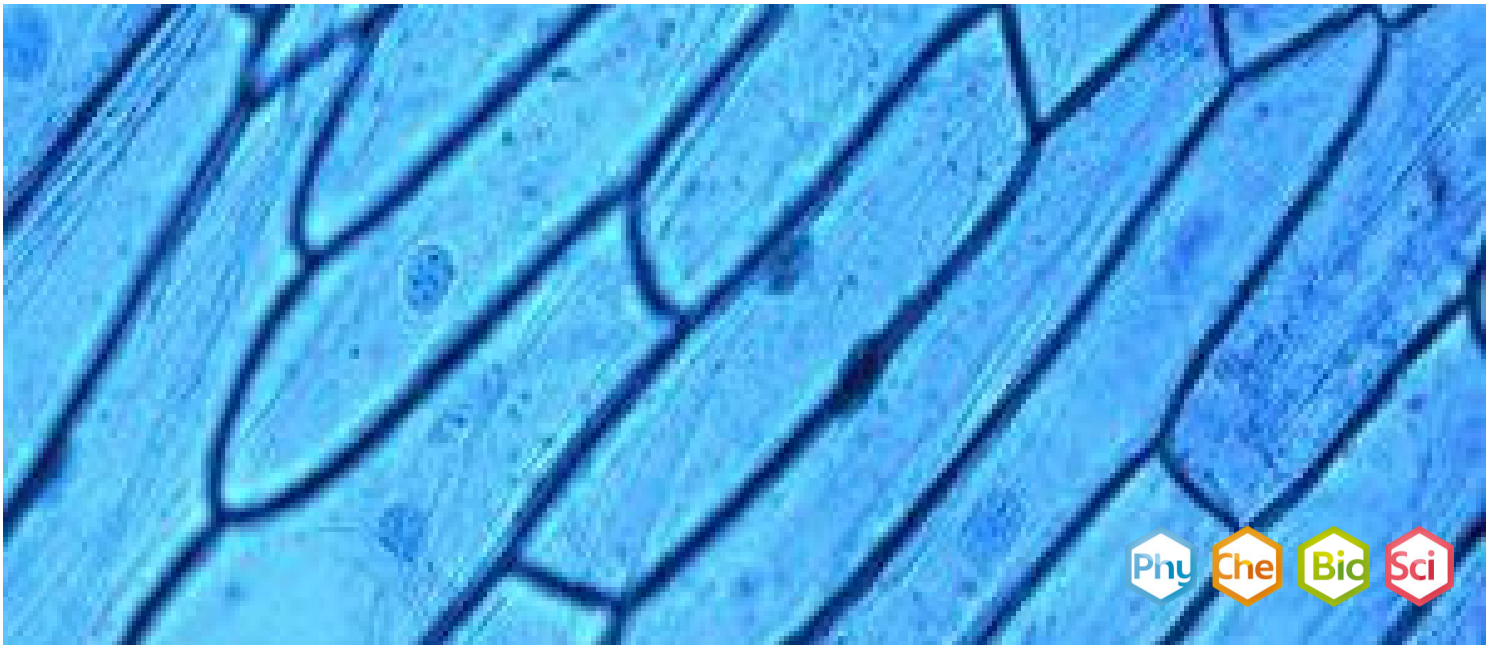
Rapid staining technique



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/6004986527aa1c00038a12f5

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Teacher information

Application

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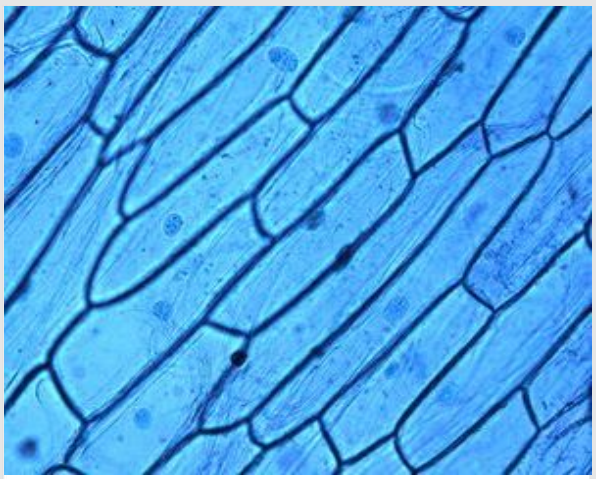

Allium cepa (100x)

The structures of individual components of organisms are often difficult to see clearly. To achieve greater contrast, the biologist uses dyes. Simple procedures for the rapid visualisation of cell nuclei in fresh preparations are staining with methyl green or with carmine acetic acid.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Other teacher information (1/4)

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Prior knowledge

Students should be familiar with the structure of animal and plant cells and the preparation of microscope slides.

Scientific principle

Have students stain plant material (e.g., from bulbs or flower pots) and animal tissue with methyl green or carmine acetic acid.

Other teacher information (2/4)

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Learning objective

Students should understand that staining techniques make it easier to see different structures of cells under the microscope.

Tasks

Have students stain delicate, botanical objects with methyl green and resistant, botanical or zoological objects with carmine acetic acid.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

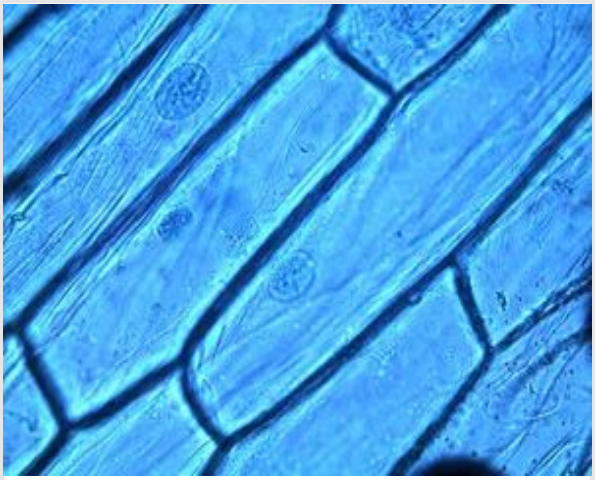
Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Other teacher information (3/4)

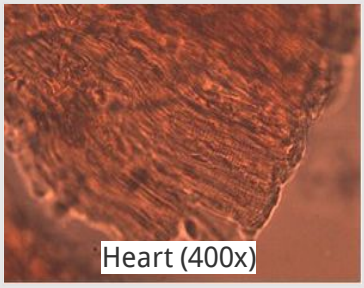
Notes on material procurement

For the first exercises, you can choose almost any plant material that is easily accessible (bulb, plants from flower pots). As zoological material, any animal tissue from the meat department of a supermarket is possible.

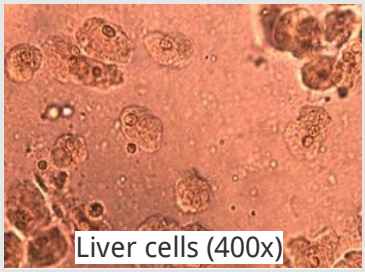


Allium cepa (400x)

Other teacher information (4/4)



Heart (400x)



Liver cells (400x)

Notes on implementation

The experimental instructions are briefly formulated, since only basic staining techniques are presented here. These staining methods can then be used as supplementary differentiation in later experiments. How to prepare an onion is described in experiment 4.1 and how to prepare a plucking preparation in experiment 6.4.

PHYWE
Robert-Bosch-Breite 10
37079 Göttingen
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www.phywe.de

Safety instructions (1/2)

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- **Methyl green is corrosive.**
- **Put on protective goggles!**

H and P phrases for methyl green

H314: Causes severe skin burns and eye damage.
H411: Toxic to aquatic life with long lasting effects.
P273: Avoid release to the environment.
P280: Wear protective gloves / protective clothing / eye protection / face protection.
P301 + P330 + P331: If swallowed: Rinse out mouth. Do not induce vomiting.
P305 + P351 + P338: In case of contact with eyes: Rinse cautiously with water for several minutes. Remove contact lenses if possible. Continue rinsing.
P309 + P310: In case of exposure or if you feel unwell: Call the Poisons Information Centre or a doctor immediately.

Safety instructions (2/2)

PHYWE

- **Carminessetic acid is corrosive.**
- **Put on protective goggles!**

H- and P-phrases for carmine acetic acid

H314: Causes severe skin burns and eye damage.
P260: Do not inhale dust / smoke / gas / mist / vapour / aerosol.
P280: Wear protective gloves / protective clothing / eye protection / face protection.
P301 + P330 + P331: If swallowed: Rinse out mouth. Do not induce vomiting.
P305 + P351 + P338: In case of contact with eyes: Rinse cautiously with water for several minutes. Remove contact lenses if possible. Continue rinsing.
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Robert-Bosch-Breite 10
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info@phywe.de
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Student Information

Motivation

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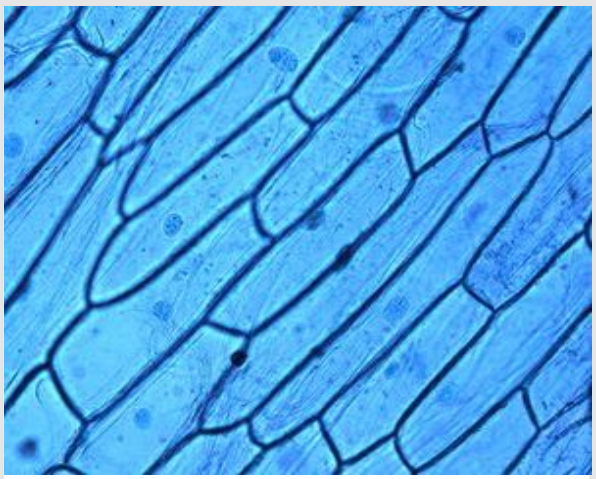

Allium cepa (100x)

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37079 Göttingen

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info@phywe.de
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Tasks

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1. Rapid staining of delicate botanical objects with methyl green
2. Rapid staining of zoological or resistant botanical objects with carmine acetic acid

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Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
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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, 100 ml, plastic (PP)	36011-01	1
6	Tweezers,straight,pointed,120mm	64607-00	1
7	Dissecting needle, pointed	64620-00	1
8	Chemicals set for TESS advanced Microscopy	13290-10	1

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Robert-Bosch-Breite 10
37079 Göttingen
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Procedure (1/2)

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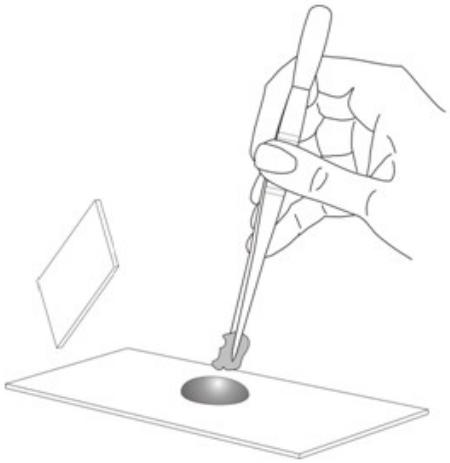
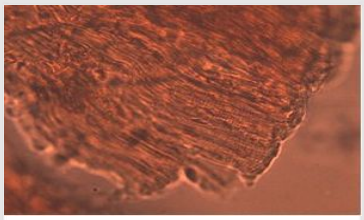
Rapid staining of delicate botanical objects with methyl green

- Place two drops of methyl green on the slide.
- Place the thin botanical object (e.g. onion skin) directly into the drop.

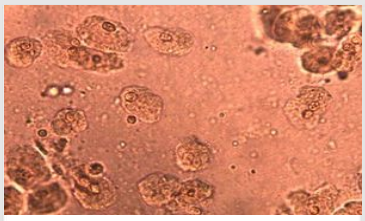


Place the object directly in the drop

Procedure (2/2)



Heart (400x)



Liver cells (400x)

Rapid staining of zoological or resistant botanical objects with carmine acetic acid

- Make a very thin plucking preparation with some animal tissue. Microscope without colour at first.
- Drop some carmine acetic acid next to the cover glass.
- Suck up liquid with some absorbent paper (cellulose) on the opposite side.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
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info@phywe.de
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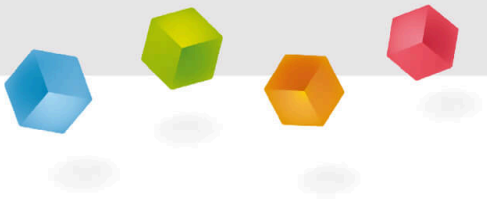

Report

Task 1

PHYWE

Which of the following statements are true?

- ○ Methyl green and carmine acetic acid are soaps and hand lotions that should be used after working with dyes to safely remove dye residue.
- ○ Methyl green and carmine acetic acid are cell components that are made visible during staining.
- ○ Methyl green and carmine acetic acid are dyes with which, for example, the cell nucleus can be well represented.

Check

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

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info@phywe.de
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Task 2

PHYWE

Which of the following statements are true?

- [ ] Methyl green and carmine acetic acid are corrosive. Safety glasses and gloves should be worn.
- [ ] In case of contact of the skin with methyl green or carmine acetic acid, the affected area should be washed off with a lot of water.
- [ ] Methyl green and carmine acetic acid are harmless. Further protection is not necessary.

Check

Task 3

PHYWE

Move the words into their correct places.

With rapid staining the biologist achieves a stronger _____ of the _____. Besides methyl green, which is mainly used for _____ botanical objects, _____ can be used for zoological or resistant botanical objects.

tender
preparation
contrast
carmine acetic acid

Check

PHYWE
Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
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info@phywe.de
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Task 4

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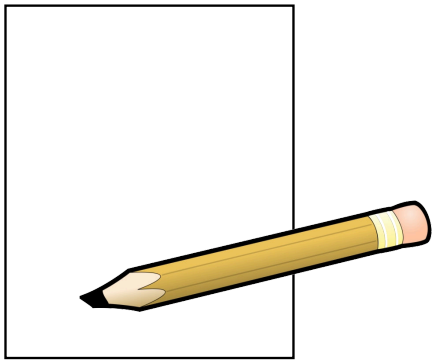
Discuss with your classmates what difficulties you had in making the preparations. Try to solve them by exchanging information.



Slide	Score / Total
Slide 16: Methyl green and carmine acetic acid	0/1
Slide 17: Rapid dyeing Dangers	0/2
Slide 18: Application quick dyeing	0/4

Total 0 / 7

Solutions Repeat

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Robert-Bosch-Breite 10
37079 Göttingen

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