How to motivate students to sciences

Meeting in Portugal,
11/05/2015 – 16/05/2015

Three methods of modern laboratories

1/ CHROMATOGRAPHY

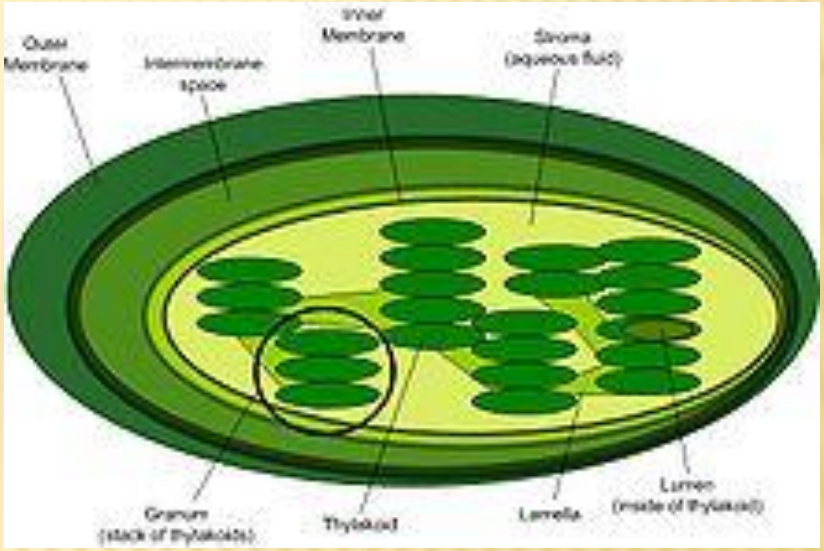
WHY ARE LEAVES GREEN ?

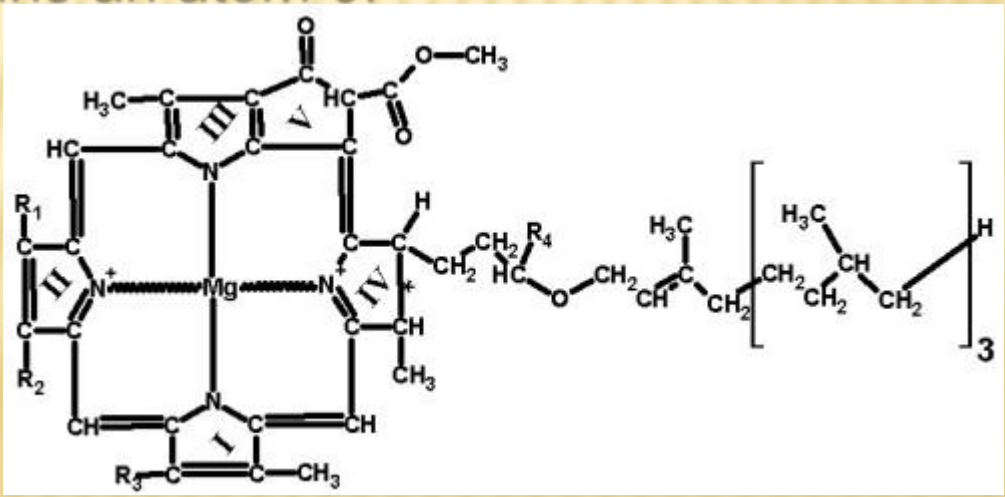
WHY DO LEAVES GET YELLOW OR GREEN IN AUTUMN?

1/ PLANT DYES

Chlorophyl -

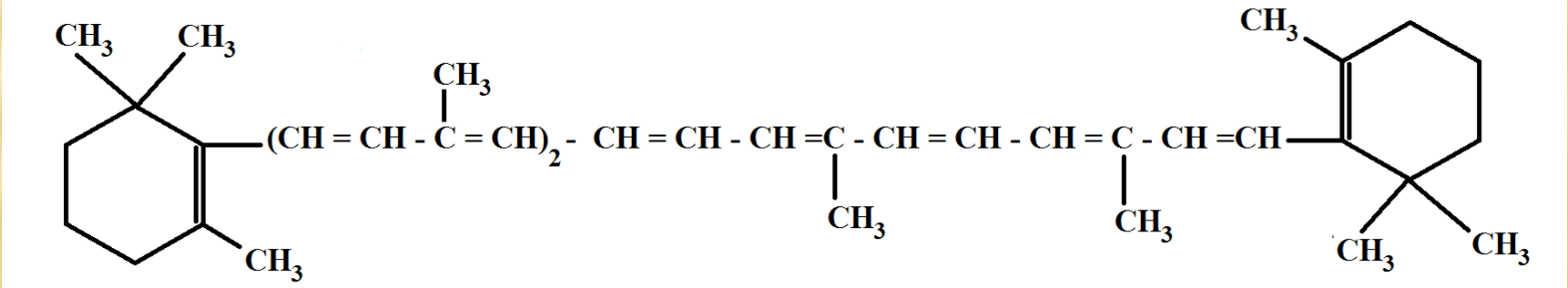
- A green dye, which is found in chloroplasts
- A complex compound which contains an atom of magnesium





PLANT DYES

- **Karotenes** – yellow and orange dyes



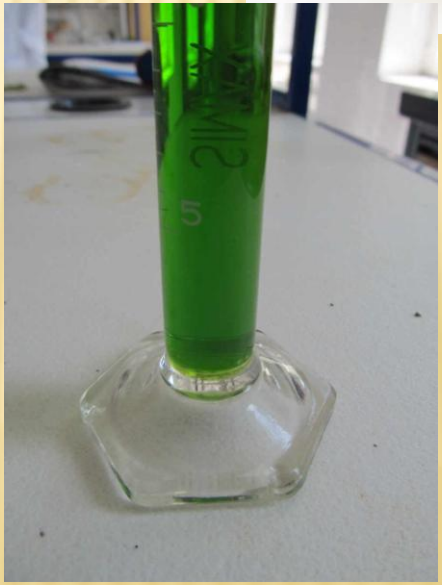
PLANT DYES

- **Xanthophylls** - yellow dyes look like karotenes but they are more polar
- There exists about 600 kinds of xanthophyls, well known is lutein

HOW TO MAKE AN EXPERIMENT?

- We tear up the leaves and mash them with sand to get plant dyes

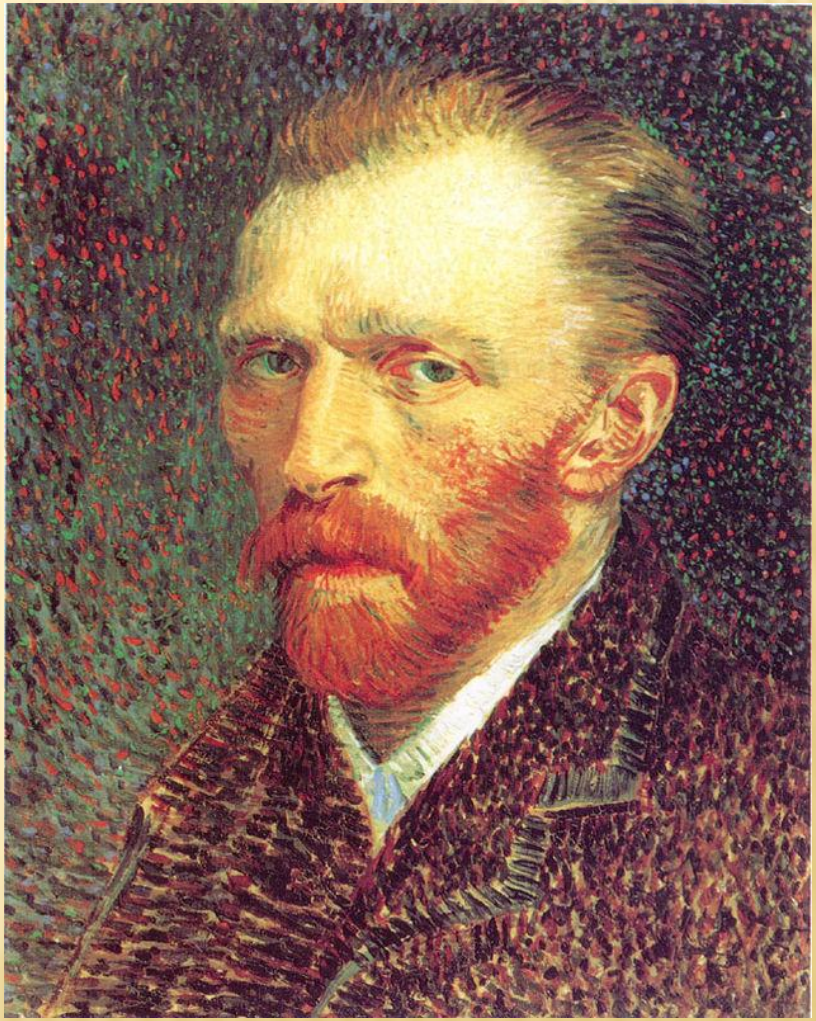
- The solution of plant dyes we filter out



2/ VINCENT VAN GOGH AND PLANT DYES

Who he was:

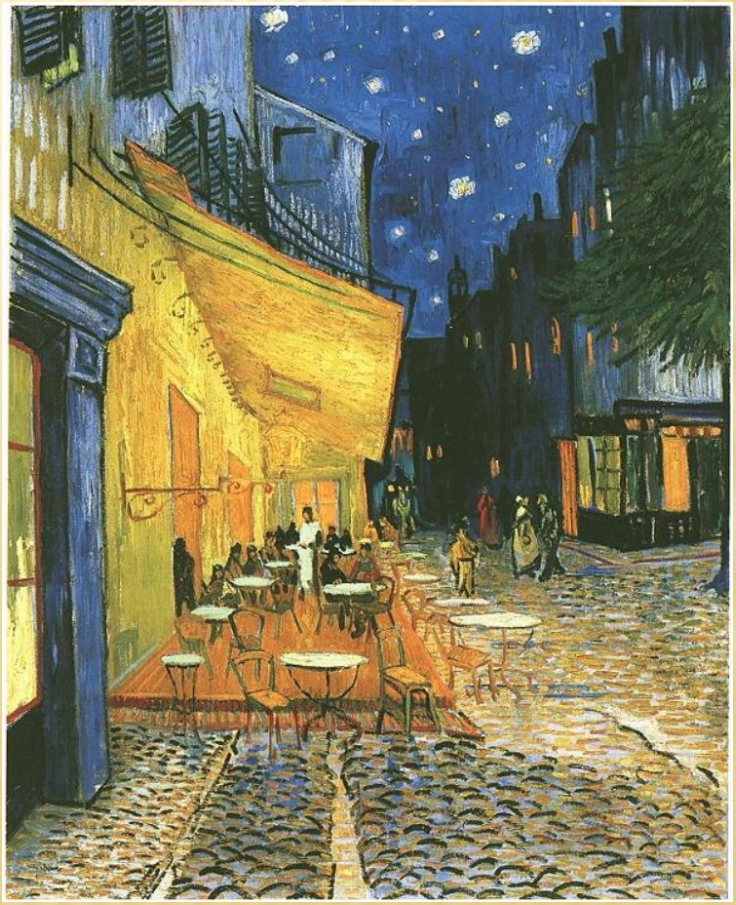
- A Dutch painter
- 1853 -1890
- A representative of impresionism
- An author of the pictures Sunflowers, Starry Night, and landscapes from south France…



VINCENT VAN GOGH'S PAINTINGS

Paintings and crystals

HOW CRYSTAL ARISES



YELLOW PIGMENT

Painters often prepared paints on their own.

An oil paint comprises pigment – yellow powder and oil which after a certain time gets dry – it stiffens up.

By melding different paints on the pallete they pripared different shades

OUR TASK:

- To prepare yellow pigment which Vincent van Gogh could use to paint his paintings

3/ ISOLATION AND QUALITY DESCRIPTION OF NATURAL DYES

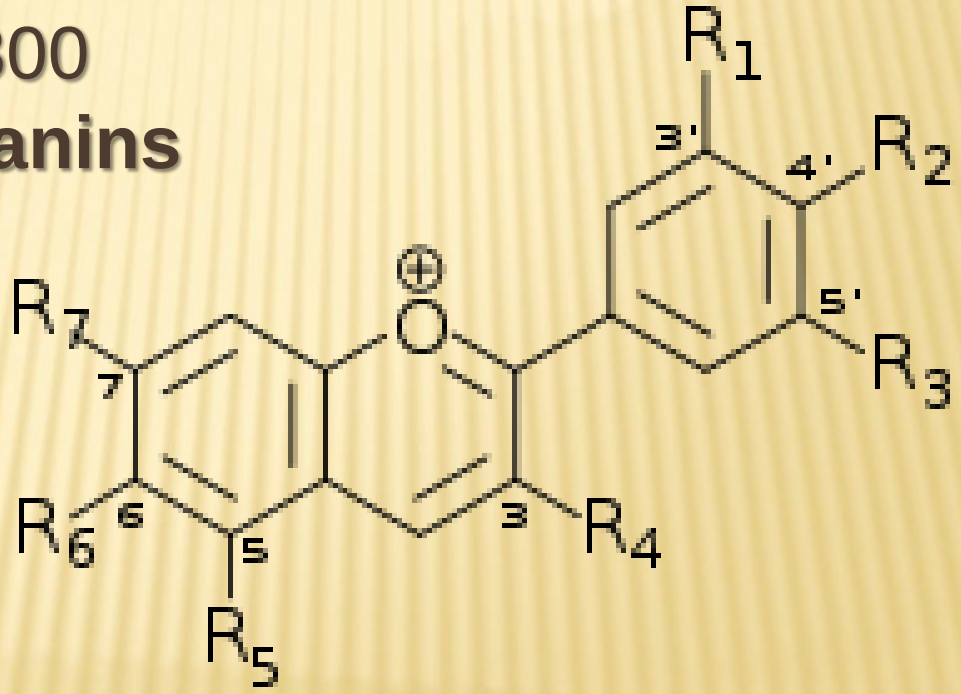
WHAT DO THE FLOWERS IN THE PICTURES HAVE IN COMMON?

ANTHOCYANINS

- Red dyes
- Present in flowers, leaves and fruits

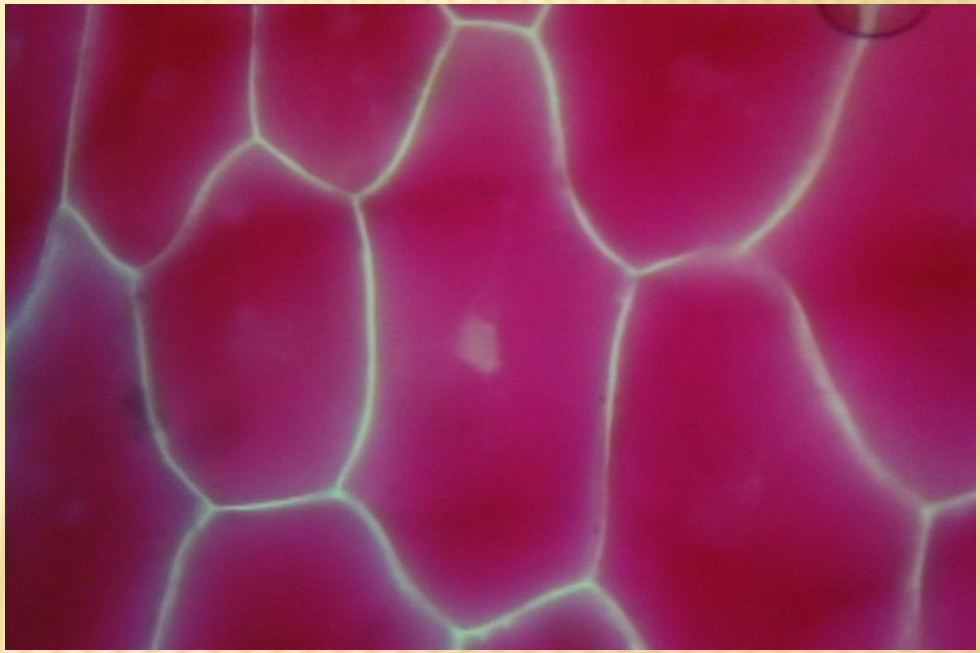
ANTHOCYANINS

- They have a complex structure
- There are about 300 different **anthocyanins**



QUALITIES OF ANTHOCYANINS

- They are dissolvable in water
- They fill in vacuoles plant cells
- They change their colouration according to the character of the solution



QUALITIES OF ANTHOCYANINS

- They are able to oxidate itselves – that‘s why they function as antioxidants in plants
- They protect plants from free radicals which arise as a result of UV radiation.
- This effect is also observed towards human health.

GOALS OF WORK

- To observe anthocyanins under the microscope
- To isolate anthocyaninsfrom plants
- To describe their qualities
- To find out the dependance of anthocyanins coloration from solution acidity

Thank you for your attention

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