



Subject: Biology

Worksheet : chlorophyll

Name:

Date:

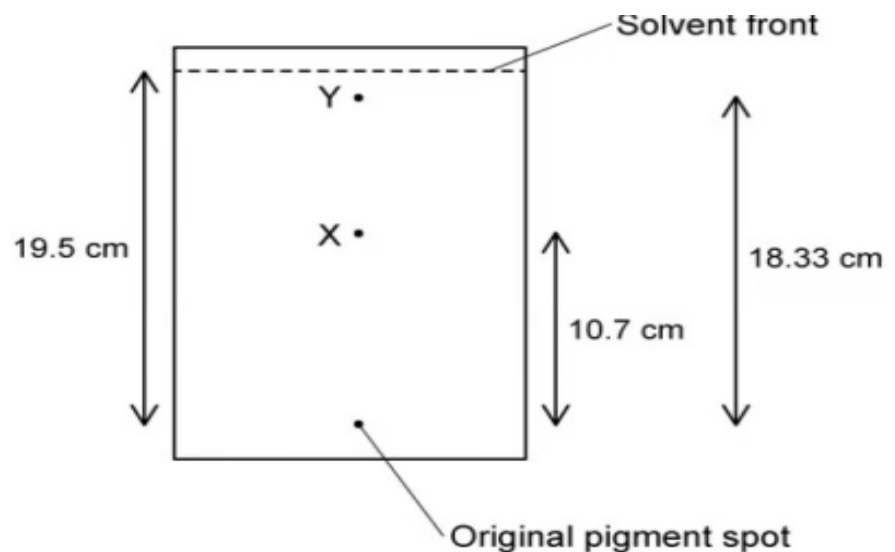
Grade 9 IB

Question 1

- a. Chloroplasts contain various photosynthetic pigments. State the role of a photosynthetic pigment.

Absorb some green light that can be used in photosynthesis.

- b. b) The pigments in a chloroplast can be separated and identified using a technique called thin layer chromatography. After extracting pigments from a spinach leaf a student carried out thin layer chromatography Some of their results can be seen below.



Use the equation provided to calculate the R_f values for pigments X and Y.

$$R_f = \frac{\text{Distance moved by pigment}}{\text{Distance moved by solvent}}$$

Rf value for pigment X = $10.7 / 19.5 = 0.56$

Rf value for pigment Y = $18.33 / 19.5 = 0.94$

Question 2

c)
The table below contains value ranges for the R_f values of common photosynthetic pigments.

Pigment	R _f value range
Carotene	0.89 - 0.95
Neoxanthin	0.05 - 0.11
Chlorophyll a	0.64 - 0.69
Chlorophyll b	0.53 - 0.62
Pheophytin a	0.78 - 0.86

Use your answers to part b) to identify pigments X and Y from part b).

X is chlorophyll b

Y is carotene

a. State why the majority of plants look green to human eyes.

green light is reflected and makes the leaf appear green

b)
The effect of different colours of light on the growth of *Arabidopsis thaliana* (thale cress) seedlings was studied. Three different colours of light were tested and measurements of seedling height, shoot length, and biomass were taken. The results of the study are shown in the table below.

Colour of light	Wavelength of light / nm	Height of seedlings / cm	Shoot length / cm	Total biomass / g
Blue	450	2.3	2.0	2.4
Orange	600	3.5	2.8	2.8
Red	630	7.4	6.1	3.7

State what can be concluded about the effect of different colours of light on the growth of *Arabidopsis thaliana* from the data shown.

Red light had the most growth and blue light having the slowest growth rate.