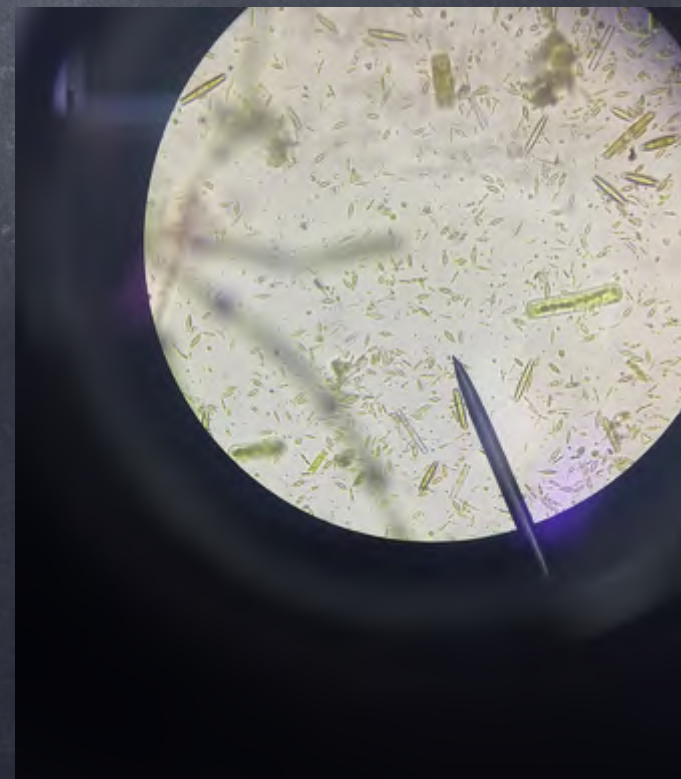


Investigating the relationship between light intensity and the density of alge

SD Group 1



General Characteristics of Algae.

- Eukaryotic organisms
- No roots, stems or leaves
- Do have chlorophyll for carry photosynthesis
- Can be multicellular or unicellular

Principle

- Light intensity is a measurement of light
- Algae's growth rate depends on the light intensity
- Higher light intensity
- Higher rate of photosynthesis
- Produces more food

Introduction

Independent variable: light intensity

Dependent variables: density of algae

Controlled variables: temperature, humidity, wind speed, carbon dioxide and oxygen concentration

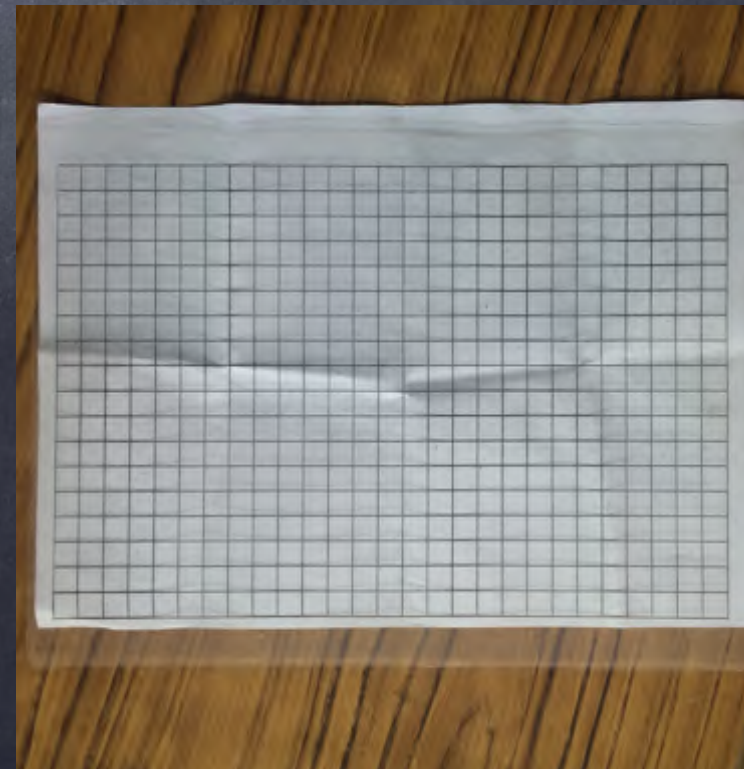
Tools and methods to measure light intensity (independent variable)

- Use light meter to measure the light intensity (unit: Lux) at random points along the water stream



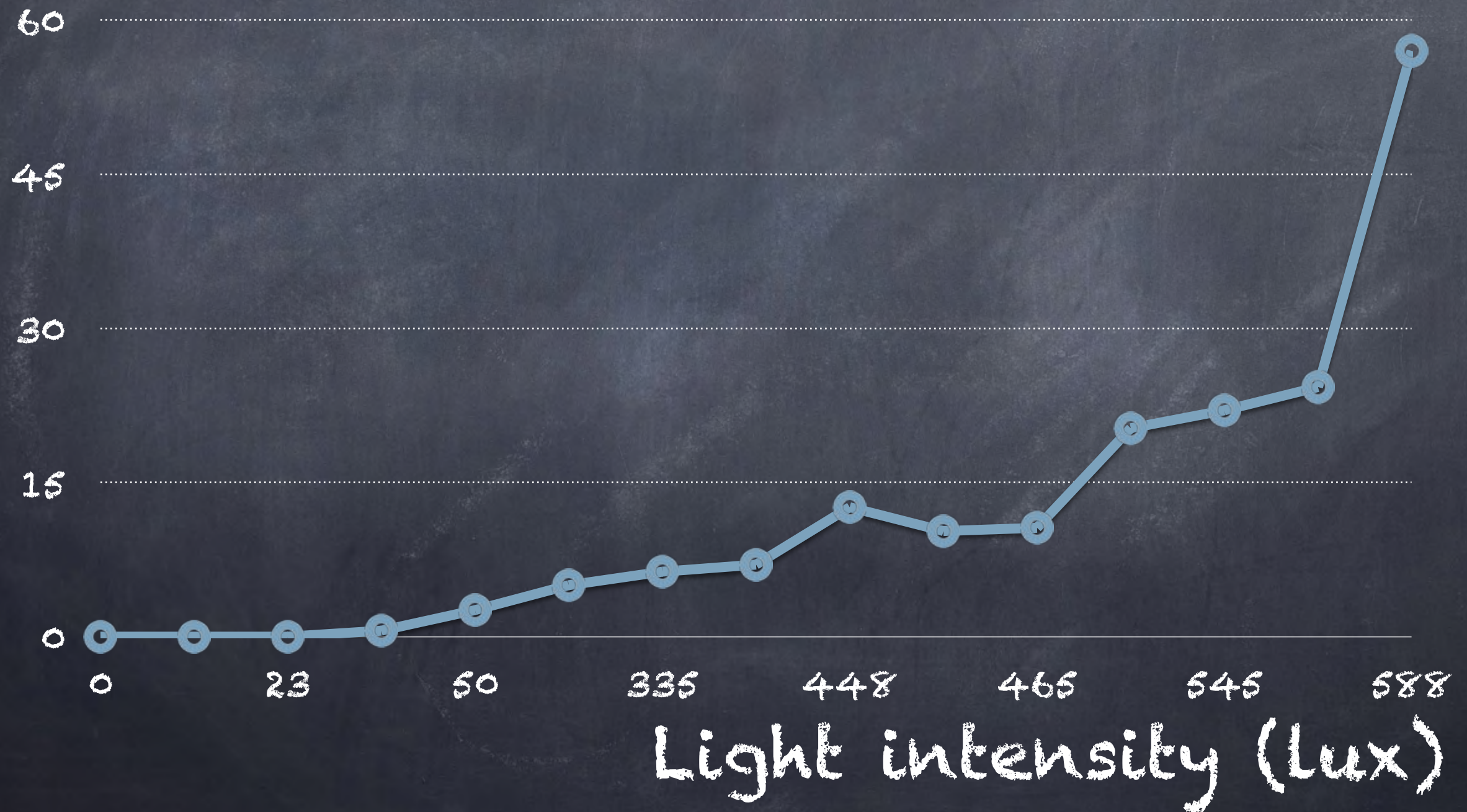
Methods to record the density of algae (dependent variable)

- Take photos of the random points in the investigatory area of about $1\text{m} \times 1.5\text{m}$
- Use a piece of graph paper (300 $1\text{cm} \times 1\text{cm}$ squares) to cover the iPad and count the algae-covered area
- Calculate the percentage the algae occupied in the $1\text{m} \times 1.5\text{m}$ area



light intensity (unit: Lux)	no. of squares covered by algae	%
19	0	0
23	0	0
24	0	0
33	2	0.6
50	8	2.6
259	15	5
335	19	6.3
379	21	7
448	38	12.6
453	31	10.3
465	32	10.6
514	61	20.3
545	66	22
555	73	24.3
588	171	57

Relationship between the Light intensity and the density of algae (occupied percentage)



Errors

- For light intensity 448, the percentage of squares covered by algae on the graph paper is 12.6.
- This may be affected by other limitations like water current or carbon dioxide concentration.

Explanation

- The graph has a straight upward sloping curve
- It shows that there is a positive relation between the light intensity and the growth of algae
- It is because more energy is provided for light-dependent reaction of the algae so the rate of photosynthesis is increased.
- Since the rate of photosynthesis is increased, more food can be produced and provided for its growth.
- When the growth rate of algae increases, the density of algae also increases

