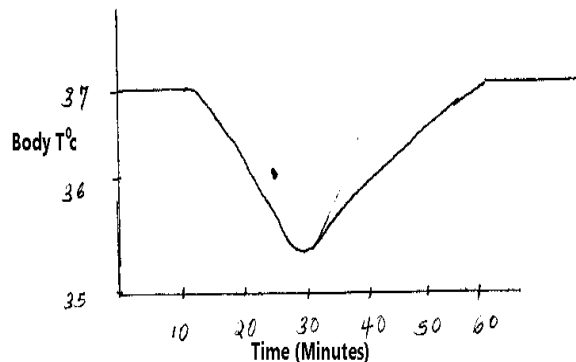


## Discussion questions

- In an experiment to investigate the effect of light intensity on the rate of photosynthesis, a shoot of elodea (water weed) was used. The shoot was immersed in 2% sodium hydrogen carbonate solution maintained at 15<sup>0</sup>C in an apparatus which allowed for collection of a gas evolved from the shoot. The gas given off was collected for five minutes at each light intensity and its volume recorded as shown in the table below.

Light intensity (arbitrary units)	Gas evolved (cm <sup>3</sup> per 5 mins)
1	0.45
2	0.70
4	0.95
7	1.40
12	1.75
18	1.82
26	1.90
37	1.90
46	1.90

- Using the data given in the table, plot a suitable graph of gas evolved against light intensity
  - Describe the shape of the graph
  - Account for the rate of gas evolved between;
    - 1 and 18 arbitrary units
    - 26 – 46 arbitrary units
  - Explain why a green leaf is normally tested for presence of starch instead of glucose.
  - How is the dry mass of a leaf determined
  - Describe how the chloroplast is adapted to its functions.
- Haemophilia is a sex – linked trait caused by a recessive gene carried on the X – chromosome. A carrier woman marries a normal man.
    - Work out the genotypes of the F<sub>1</sub> offspring. Use H to represent the dominant gene and h to represent the recessive gene.
    - What is the probability of the parents getting a haemophiliac child?
    - Name three other sex-linked traits in humans.
  - Describe how the mammalian small intestine are adapted to their function.
  - The figure below shows the body temperature of a person before, during and after taking a cold bath. (The temperature of the bath water was 22<sup>0</sup>C).



- For **how long** was the person in the bath?
- Explain** why the person's body temperature decreased

- (c) **Explain** the role played by the following in helping to return the body temperature to normal.
- (i) The liver
  - (ii) The blood vessels in the skin
  - (iii) The body muscles

**5. How** are the xerophytes adapted to live in their habitats? (20 marks)

In an experiment to investigate the effect of heat on germination of seeds, 12 bags each containing 60 pea seeds were placed in a water bath maintained at 85°C.

After every two minutes a bag was removed and seeds contained in it planted. The number that germinated was recorded. The procedure used for pea seeds was repeated for wattle seeds. The results were as shown in the table below.

Number of seeds that germinated		
Time(min)	Pea seeds	Wattle seeds
0	60	0
2	60	0
4	48	0
6	42	2
8	34	28
10	10	36
12	2	40
14	0	44
16	0	46
18	0	48
20	0	49
22	0	47

- a) Using a suitable scale and on same axes, draw graphs of number of seeds that germinated against time in hot water for each plant.
- b) (i) At what time would number of seeds that germinated for each plant be same.  
(ii) How many wattle seeds would have germinated if the 13<sup>th</sup> bag was available and was removed and seeds contained in it planted at 24 minutes.
- c) Explain why the ability of pea seeds to germinate declined with time of exposure to heat.
- d) Explain why the ability of the wattle seeds to germinate improved with time of exposure to heat
- e) Account for the shape of the graph for the wattle seeds which germinated between 20 – 24 m
- f) Some of the pea seeds were allowed to germinate and placed in a large airtight flask and left for four days.
- (i) Suggest the expected changes in the composition of gases in the flask on the fifth day
  - (ii) Give reasons for your answer in (f) (i) above.
- g) Name three factors other than those investigated in a) above which would affect dormancy