**WORKSHEET 1**

**Aim: To prove that chlorophyll is essential for photosynthesis**

**Apparatus:**

1. Glass beaker
2. Test tube
3. Bunsen burner
4. Test tube holder
5. Watch glass / petri dish
6. Medicine dropper
7. Forceps
8. Water
9. Iodine solution
10. Alcohol / ethanol/methylated spirits

11. Dark cupboard

12. Geranium plant with variegated leaves

**Method:**

1. Place the variegated plant in a dark cupboard for two days and ensure that the plant is watered.

|  |  |
| --- | --- |
|  | Variegated leafGreen areaWhite boarderPot with soil |

(a) What is a variegated leaf?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b) Why is the plant placed in a dark cupboard?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(c) Why should the plant be watered?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Remove the plant from the cupboard and test for starch. (Do the starch test)

 Why is this done at this stage?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Place the plant in bright sunlight for two days.

 What process will take place in the leaves of the plant, due to the presence of

 sunlight?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Remove one of the leaves and test for starch.

**Observations**

Draw and label the leaf before the starch test.

Indicate which part of the leaf is the control and which part is the experiment.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Make a drawing of the leaf after the starch test (after it was exposed to sunlight)

**Discussion**

Briefly explain your observations.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Conclusion**

 What can be concluded from this experiment?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Possible answers**

**WORKSHEET 1**

**Method**

1. (a) A leaf with two colours: one part is green and the other part is white.
2. To ensure that there is no starch. (To de-starch the plant).
3. To keep the plant healthy/ to ensure the plant do not wilt/die
4. To prove that there is no starch in the leaf.
5. Photosynthesis

**Observations**

|  |  |
| --- | --- |
| Variegated leaf before starch test  | White border (no chlorophyll) Green area (chlorophyll)  |

White border is control and green is experiment

|  |  |
| --- | --- |
| Variegated leaf after starch test | Brown boarder stays brown no photosynthesis, thus no starchGreen area turns blue-black photosynthesis occurred 🡪 starch |

**Discussion**

The green part of the leaf plant contains chlorophyll thus it will photosynthesise and produce starch hence, the colour change from brown to blue black. The white boarder of the leaf does not have chlorophyll, thus no photosynthesis took place hence iodine remained brown as no starch was produced.

**Conclusion**

That chlorophyll is needed for a plant to make starch/ chlorophyll necessary for photosynthesis