

Zealand flax; willow, oak, white-pine, red-beech (commonly called "birch"); apple, plum, orange, gooseberry, strawberry; cabbage, radish, mustard; tomato; common trees and other plants found in the neighbourhood of the school. Appendix.

In S4 this work will be continued and still further systematized, and the children may begin, if they have not done so already, to keep nature-calendars and weather-calendars.

In their geography lessons the children will also learn from actual observation the simplest and most striking facts about rivers and the work of water on the earth's surface; clouds, rain, dew; cardinal points; the direction of winds; drawing of plans; height of the sun at different times of the day and year.

The drawing of plans may extend to the mensuration of squares and rectangles as set forth in the elementary course of physics suggested above.

Some such experiments and observations as the following may also be made. [The actual experiments and the work of caring for the plants, &c., should be done by the children individually.]

Raise seedlings of beans and peas in small pots or shallow dishes in sand and in garden-soil, planting seeds every two or three days; also raise other seedlings between two sheets of blotting-paper on a glass plate or in a saucer. Soak a few seeds also in water, and put a few into dry sand. Compare the seedlings raised. Observe the method of germination and growth. Note the parts of the seedlings—rootlets, root-hairs, stem, leaves, plant-hairs, &c. Raise in like manner seedlings of vegetable-marrow, mustard or radish, cabbage, sunflower, oat or wheat, and ryegrass. Observe the seeds after some days' growth. Moisten some fine wheaten flour. Knead it, and then wash out all the white powder (nearly all starch), and show the gluten. By crushing seeds of flax, sunflower, rape, between dry blotting-paper show that some seeds contain oily matter. What has become of these things in the seedlings? Suspend seedlings of various kinds so that only the root-hairs just dip into water. Note what happens after a few days.

Make solutions of salt, sugar, aniline, &c., in water; filter. Distil the solution of salt, and condense water again. What is left behind? What is found in the condenser?

Put some small growing plant through a split cork in a wide-mouthed bottle so that the roots dip into a solution of aniline. After an interval observe the leaves. Take six or eight large, healthy leaves; pass the petioles through three or four holes in each of two cards, and put the cards over two tumblers nearly full of water. After a short interval invert two dry empty tumblers over the cards; place one set of leaves in the sunshine, and one in a shady place. After ten minutes observe what has taken place. From which set of leaves has there been most evaporation?

Take a leaf from a young plant whose roots have been placed in water; put it back downwards on a polished metal surface, and leave it for a few minutes. What do you notice? Repeat the same experiment with a similar leaf, placed face downwards. Observe again. From which side of the leaf does evaporation take place?

[To show the existence of air.] Invert wide-mouthed bottle or tumbler full of water in water; invert another bottle or tumbler, apparently empty, below mouth of first. What passes from second to first bottle? Burn a candle in a lamp-glass with narrow top (i) with lower end open; (ii) with lower end closed. What happens in each case? Test the gas left in tube with lime-water. Also blow or breathe into lime-water.

Put two healthy young growing plants through split corks into bottles so that the roots dip into water; in one case allow free access of air, in the other shut off the air by sealing the cork with melted candle-grease. Observe the difference after a few days. Repeat the experiment, using garden-soil instead of water, and pouring the melted grease over the surface of the soil in one of the pots or bottles. Observe again. What do the roots require besides water?

Grow young seedlings of corn on damp paper. Mark the longest rootlet very carefully with a fine camel's-hair brush with India ink or purple ink by lines, say, $\frac{1}{4}$ in. apart, beginning at the tip. Keep the plants moist and warm, and notice which of the $\frac{1}{4}$ in. intervals increase in length, and which remain the same. Where is the growing point of the root?

Keep some of the growing seedlings or young plants without water; water others very occasionally; others, regularly; and to others again give large quantities of water, keeping the soil always completely saturated. Note the difference in growth after the lapse of, say, a fortnight. [The pots in which the seedlings are grown should be numbered, and a diary of all that is done should be kept.]