SECTION VII.

1. Draw up an outline syllabus of subjects suitable for object-lessons for a class preparing for Standard II.

2. Write a short essay on one of the following subjects:—
   (*a.*) The value of regular drill in a school, *or*
   (*b.*) The necessity of supervision in the playground, *or*
   (*c.*) Short and varied lessons, *or*
   (*d.*) The benefits of good teaching-notes.

Elementary Experimental Science.—For Class D. Time allowed: 3 hours.

1. Explain the meaning of the term "energy of motion." How would you exhibit the transformation of energy of motion into some other form of energy?

2. You are required to prove, by means of Attwood's machine, that the velocity of a falling body increases with the time of fall. How would you do it?

3. Describe the method that you would employ in order to find the specific gravity of a solid body that is lighter than water.

4. In talking to a class about the refraction of light, to what facts which must have come within the children's experience would you refer? What experiments would you make, and how would you explain them?

5. Make a sketch illustrative of the passage of the rays of light through an ordinary magic lantern.

6. Explain in detail how you would fit up an apparatus for the distillation of water. How could you measure approximately the latent heat of steam by means of the apparatus when fitted up?

7. Describe the construction of any form of bichromate battery. What substances are used to make up the solution, and in what proportions?

8. What magnetic effects are produced by a coil of wire carrying an electric current? Describe exactly how you would show the magnetic properties of such a coil to a class.

9. You are given three jars of oxygen gas: explain in detail how you would proceed in order to exhibit the combustion in oxygen (*a*) of sulphur, (*b*) of hydrogen, (*c*) of iron.

10. Give a short account of the element chlorine, and of any of its compounds which you have seen. Describe in particular the method you would adopt for the preparation and collection of chlorine gas.

11. A lesson on ventilation is to be given: indicate briefly what you would say, and what experiments you would make.

Elementary Science.—For Class E. Time allowed: 3 hours.

1. Define and give illustrations of momentum, energy, and mass.

2. Describe the principle of the hydraulic ram, and make a sketch to illustrate your answer.

3. Make sketches illustrating the wheel and axle and the screw.

A screw with a pitch of 1 in. is turned by a bar at right angles to its axis, and having an effective length of 3 ft.: what is the gain of power, disregarding friction?

4. Upon what conditions do the pitch and the loudness of a musical note depend?

How is the apparent pitch of a steam whistle affected by rapidly receding motion of the whistle?

5. Describe the eye, show how an image is formed in it, and explain the use of convex spectacles.

6. State the various means by which heat is generated, conserved, and distributed. Give illustrations of the practical use of each of the means you mention.

7. How would you make a compass and a dipping-needle? What do you understand by magneto-electricity and electro-magnetism? Give examples of each kind of action.

8. How would you make CO_2 from chalk? What experiments would you make with CO_2?

9. Describe the process of digestion. What organs are concerned in digestion, and what is the function of each organ?

Domestic Economy and Laws of Health.—For Class E. Time allowed: 3 hours.

1. What conditions make the proximity of trees to a house favourable or unfavourable to health?

2. Discuss the advantages of open and of closed drains. Show how to connect a house with a closed drain.

3. Describe a hen's egg. State the composition of its parts, and give a general idea of the uses of eggs in cookery.

4. What are the advantages and what the disadvantages of a strictly vegetable diet?

5. Discuss the effects of the use of stimulants and of narcotics.

6. Name the chief antiseptics and disinfectants, and say to what purpose each is particularly adapted.

7. What do you consider the best methods of ventilating a schoolroom and a bedroom respectively?

8. State what you know of the micro-organisms of disease. What is meant by the aseptic method of surgery?

9. Describe the circulatory system and the mechanism of breathing.

10. Describe the way to grill a chop, to boil a leg of mutton, and to make beef-tea.