



## WHAT TO DO AND HOW TO DO IT

fully explained in this book for Teachers in junior grades. It contains directions for lessons in

### STICK-LAYING, CUTTING, MODELING, SEWING and WEAVING

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#### REVIEW'S QUESTION BOX.

M. O. M.—Please give what Prof. Waddell would call a perfectly correct answer to the questions on physics and chemistry in the provincial examination papers of July 1912?

If a locomotive weighing 100,000 lbs, starting from a station gains a velocity of twenty feet per second in ten seconds, what force is being exerted by the engine, assuming that the force is all employed in moving the locomotive? Name the unit in which your answer is given. Which of the following are units of force; foot, pound mass, pound weight, poundal, erg, gram, dyne, dyne-centimeter?

A velocity of 20 ft. per second gained in ten seconds is 2 ft. per second in one second. The force required to give one pound a velocity of one ft. per second in one second is called a poundal and the force required to give 100,000 lbs. a velocity of two ft. per second in one second is therefore  $100,000 \times 2 = 200,000$  poundals. The unit is poundals. Pound weight, poundal and dyne are the units of force in the list given

What is produced if a mixture of ammonia gas and oxygen is exploded?

Nitrogen and water as shown by the equation,  
 $4\text{NH}_3 + 3\text{O}_2 = 2\text{N}_2 + 6\text{H}_2\text{O}$ .

It is seen from the equation since the coefficient of  $\text{NH}_3$  is 4 and the coefficient of  $\text{O}_2$  is 3 (and the formulas of gases always represent the same volume) that the volume of oxygen required is only  $\frac{3}{4}$  that of the ammonia. Therefore for 40cc of ammonia 30cc of oxygen would be required;

$\therefore$  10cc of oxygen would be left over. The volume of nitrogen produced is  $\frac{2}{4}$  that of the ammonia,  $\therefore$  20cc.

$10\text{cc oxygen} + 20\text{cc nitrogen} = 30\text{cc}$ .

At the ordinary temperature water would be liquid and its volume would be negligible. If the temperature were above  $100^\circ \text{C}$  its volume would be three times that of the nitrogen because it would be a gas. The answer to both of these questions is a little more full than I should think really necessary from a candidate, because I hope the statement will be plain even to one who did not understand the question before, whereas I am satisfied if a candidate shows me that he understands it. If, however, a candidate gave the answers in this form I should be glad. —J. W.

#### GRADUAL SPRING.

Dream footsteps wandering past us in our sleep;  
A restless presence stirring with the light;  
The cry of waters where the snow was white;  
A violet's whisper where dead leaves lie deep;  
The dim wood's music makes a sudden leap;  
Broken notes blending in a wild delight,  
And lo! the whole world changes to our sight;  
Promise is ended, we must turn and reap  
Fulfilment, for the spring with all her wealth  
Is with us, and compels us to her will.  
Yet if the sun-dawn we should shun by stealth  
Yearning for shadow and the darkened hours,  
Sweet Lord, be pitiful, remembering still,  
One lieth low beneath the budding flowers.

—CAROLINE NORTH, in Sunday Magazine.