Appendix.

Draw scale of yards and chains. Find area of square chain. Draw to scale plan of acre. Find area in square chains.

Draw square mile to suitable scale. Find area in acres.

Draw playground, or rectangle in playground, to scale. Find area.

Construct table of square measure.

Find surface of a cube or other rectangular solid, of outside of a box, of walls of room, &c.

Wrap paper round cylinder; unroll and find surface.

Find the scale of a map, as of New Zealand, England, or India, taking one degree of latitude as equal to 70 miles; estimate the area of the country, or of some part of it. The estimate may be confirmed by each pupil making a tracing of the map, cutting it out, and also cutting out a square piece of paper representing, say, 10,000 square miles. All the tracings should be weighed, then all the squares, and the area calculated.

Draw circle on cardboard; draw two diameters at right angles. Bisect right angles. Divide circumference into 6, 12, 24 parts. Prove angles and sectors equal (by cutting out and superposition). Define degrees.

Construct table of angular measure. Find angles between hands of clock at 1 o'clock, 2 o'clock, &c.

Construct a cardboard protractor; with it construct various angles.

Build up cubes and other rectangular solids with wooden or cardboard cubes, blocks, and slabs. Find volume in cubic inches. Construct table of cubic measure.

Find volume of box, class-room (measuring the height to wall-plate if there is not a horizontal ceiling).

Make a simple lever with a rule or lath in which the fulcrum is between the power and the weight. Show that power $\times$ its arm = weight $\times$ its arm.

Make and mount a simple balance; make weights of lead and copper sheeting, or of shot in canvas bags. Weigh various substances, using generally method of double weighings.

Make cubic inch of cardboard, caulking it with wax or candle-grease. Find weight of cubic inch of water in grains. Check by weighing $\frac{1}{4}$ pint or 5 fluid ounces of water (which contains about 8·66, or $8\frac{2}{3}$, cubic inches).

Find weight of cubic inch of wood. Find relative density or weight of wood compared with water—*i.e.*, weight of cubic inch of wood divided by weight of cubic inch of water.

Graduate a glass jar or bottle, with neck removed, into cubic inches, with paper scale gummed outside. Find volume of block of wood by pushing it below surface of water in jar, and noting rise of water; hence find relative density; in like manner, that of a pebble, glass, iron, lead, candle, &c. Find by same graduated jar, the water being removed, relative density of milk, olive-oil, alcohol, turpentine, milk-and-water, salt water, mercury (which may be put into a small bottle and held below surface of water, the volume of the small bottle being first found).

Find volume and relative density of various coins—penny, florin, &c. (Take several pennies, &c., at a time; shake them about so that no air is enclosed.)

Take a flask or bottle, apparently empty; immerse below water, and let water fill it. What escapes from jar?

Put a little water into a large flask, fit with stopper and glass and rubber tubes; boil water and drive off air, closing rubber tube with clip. Let flask cool; weigh; admit air and weigh again. (Put clip into scale with flask.) Weigh flask full of air. Fill it with gas from gas-jet and weigh again. (Keep it away from a flame.) Warm flask with air; close with clip. Let flask cool; weigh. Admit air; weigh again.

Take a U tube (two straight tubes joined by rubber tube will do). Pour in water. Hold at different angles; note level of water. For one branch of U tube substitute tube of a glass filter; pour in water; note level in funnel of filter and in tube.

Construct model to illustrate artesian well; also model with branches to illustrate a high-pressure water-supply system.

Very slightly oil wooden cube; float it in water. Measure depth immersed, and total depth of cube. Find the fraction, depth immersed, total depth, and compare with relative density of wood.

Float oil on water; warm water (coloured) on cold water, &c.

Take U tube as before. Pour in mercury. Pour alcohol into one branch, and water into the other until mercury is at same level in both branches. Measure heights of alcohol and water above mercury; find the fraction $\frac{\text{height of water}}{\text{height of alcohol}}$; compare this fraction with relative density of alcohol. Repeat for other liquids (including mercury).

Take a U tube, one end closed; hold it with closed end down, and nearly fill with mercury; raise closed end. What happens?