

progress of England in the eighteenth century, mentioning the chief inventions. What is the main principle underlying the "Wealth of Nations"? Describe Pitt's financial policy, and point out its political results.

GEOGRAPHY.

1. Sketch an outline map of the Mediterranean Sea, marking the countries and chief cities upon its shores, and the principal rivers which flow into it.

2. Write explanatory notes on the following points connected with the Mediterranean Sea:—

(a) Its temperature and saltness as compared with the Atlantic.

(b) The continuous flow of water into it from the Atlantic.

(c) Its influence on civilization.

3. Name and describe the physical features of the Spanish Peninsula.

4. Enumerate the British Possessions in India and Australasia; state the form of government, chief cities and productions of each.

5. Trace the Mississippi, Rhine and Elbe, from source to mouth, naming the chief towns on their banks.

6. Describe the position of Avignon, Varna, Belgrade, Lutzen, Sadowa, Granada, Antwerp, Leipsic, Rhodes; and mention any historical events connected with them.

7. Name the principal rivers of Ontario, and the counties and towns through which they pass.

ELEMENTARY MECHANICS.

1. Define a Couple, and shew that the forces composing one do not admit of a single resultant.

State the various transformations that may be made on a couple without alteration of effect. Establish the truth of one of them.

The sides of a quadrilateral are acted on by forces perpendicular to them, and proportional to them in magnitude, the forces being turned inwards. Shew that if the points of application divide the sides in a constant ratio they reduce to a couple.

2. Find the centre of gravity (1) of a triangular area; (2) of three uniform rods forming a triangle.

In the latter case, if the system be suspended by a string attached to a point in one of the sides, find the position of the point that the triangle may rest with one side vertical.

3. State Newton's Laws of Motion, and explain the nature of the reasoning by which they are arrived at.

Shew how the second and third enable us to exhibit dynamic phenomena by means of equations.

4. (1) A gun (wt. 3 tons) rests on a plane of inclination 30° to the horizon, being pointed downwards parallel to the plane; a shot of 60 lbs. is discharged from it with a velocity of 1500 feet per second. Find how far up the plane the gun will recoil.

(2) Two weights of 5 and 10 lbs. are attached by a string, the heavier hanging vertically from the edge of a smooth horizontal table on which the lighter rests. Determine the motion.

5. The normal pressure on a surface exposed to the action of a fluid is equal to the pressure on a plane horizontal surface of equal area at the same depth below the surface that the centre of gravity of the first surface is, gravity being the only force acting.

A tetrahedron whose faces are equilateral triangles, is just filled with fluid and has three of its corners in a horizontal plane; shew that when the fourth is above this plane the total pressure on all the sides is three times the total pressure when this corner is below the plane.

6. When a body is immersed in a fluid it loses a portion of its weight equal to the weight of the displaced fluid.

A sphere of radius a is composed of a substance n times heavier than water; find the radius of a spherical portion that must be hollowed from its inside that it may float in water with $\frac{1}{n}$ th of its volume above the surface.