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Physics 2

tentative program

1. Electricity.

1. Static electricity
    1. Charges and ways to charge objects (contact and inductive). Static cling. Conservation of charge. 2 Hours
    2. Electric force. Coulomb's law. 2 Hours
    3. Electric field. 1 Hour
    4. Electric potential energy (point charges). Potential. (special attention to signs, examples). 2 Hours
2. Electric current
    1. Insulators, conductors and semiconductors. 1 Hour
    2. Why does the electric current flow? Voltage. 1 Hour
    3. Resistivity, resistance and resistors. 1 Hour
    4. Ohm's law. 1 Hour
    5. Parallel and series connection of resistors. 1 Hour
    6. Ideal and real voltage sources. Internal resistance. 1 Hour
    7. Basic circuits. Kirchhoff rules. Nodal analysis. 3 Hours
    8. Electrical capacitance and capacitors. 1 Hour
    9. Parallel and series connection of capacitors. 1 Hour
    10. Direct and alternating current. Why can capacitors pass alternating current? 1 Hour
3. `Introduction to Magnetism
    1. Magnets. 1 Hour
    2. Magnetic field. 1 Hour
    3. Magnetic (Lorentz) force. 1 Hour

2. Atomic structure of matter

1. Discovery of electron. J.J.Thomson's "plum pudding" model. 1 Hour
2. Ernest Rutherford and Geiger-Marsden experiment. Planetary model of atom. 1 Hour
3. Why don't the electrons fall to the nuclei? 1 Hour
4. Protons and neutrons. What holds the protons together in an atomic nucleus? 1 Hour

5. Mendeleev's periodic table of elements. Why it is "periodic"?2 Hours
6. What is chemical reaction? 1 Hour
7. Radioactivity. 1 Hour