

Matter and Energy

MATTER

ATOMS

Planetary model of the atom	1
Cloud model of the atom	2
Argon atom	3
Carbon atom	4
Chart, Elements and their atomic numbers	5

MOLECULES

Oxygen molecule	6
Water molecule	7
Glucose molecule	8

CHEMICAL ELEMENTS

Chart, Chemical symbols for some common elements	9
The Periodic Table of the Elements	10

THE STATES OF MATTER

Chart, The basic physical properties of solids, liquids and gases	11
The three common states of matter: solid, liquid, gas	12
Normal gas and plasma	13

WATER PRESSURE AND AIR PRESSURE

Water pressure is greater in deep water than in shallow water	14
---	----

COMBINATIONS OF MATTER

Chart, Chemical formulas for some common compounds	15
Molecules of some common compounds	16

DENSITY

Chart, Densities of some familiar substances compared to water	17
--	----

ENERGY

ENERGY SOURCES

Chart, Some common energy transformations	18
A fossil fuel power plant	19
A hydroelectric power plant	20
Fission of a uranium atom	21
A nuclear power plant	22

SOUND

Vibrations traveling away from a source are called sound waves	23
An echo	24

LIGHT

Light travels in a straight line	25
Looking along a sight line at an object	26
How light reflects off a mirror	27
Water reflects like a mirror	28
A simple face is a good way to learn about reflection	29
Words are reversed in a mirror	30

ELECTRICITY AND MAGNETISM

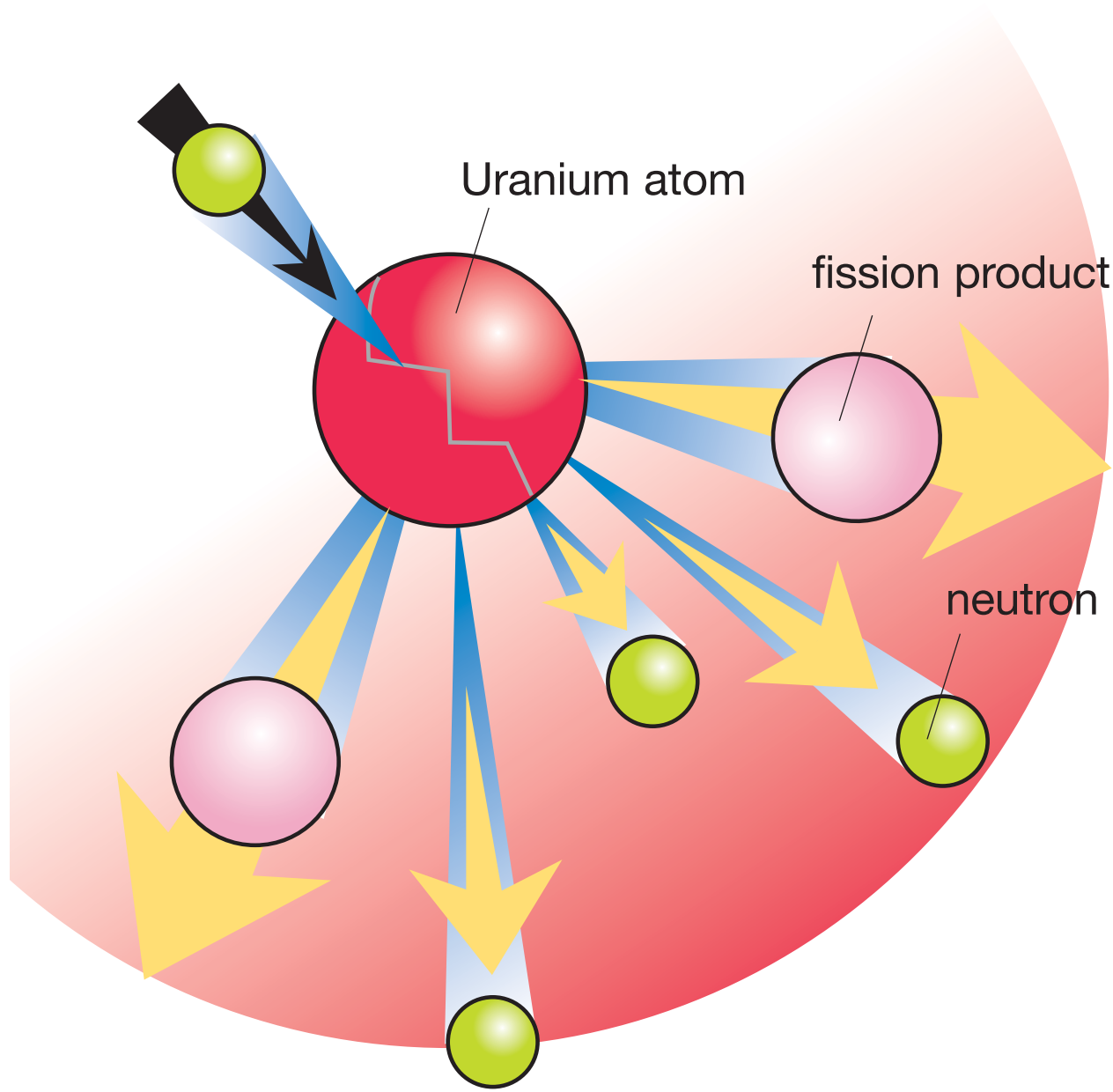
Electrons inside a magnet	31
Electric current in a wire	32
Electromagnetic fields for a magnet and a wire	33
Electric current passes through a filament	34
A battery in a simple electric circuit	35
A homemade electromagnet	36
Electrical power transmission and distribution	37
Electromagnetic waves	38
Chart, The seven groups of electromagnetic waves and their characteristics	39
The electromagnetic spectrum	40

GRAVITY, FRICTION AND INERTIA

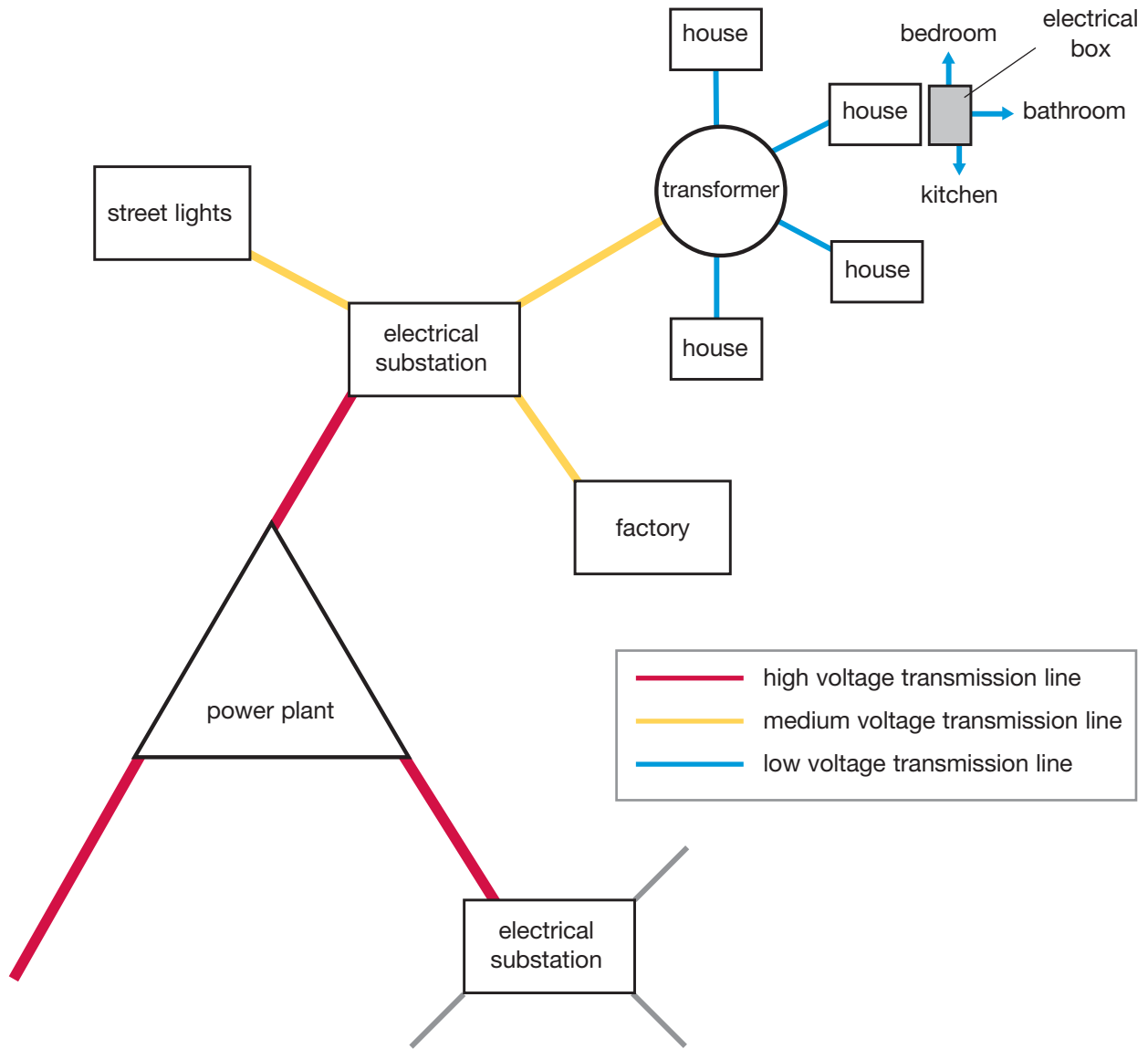
Calculating simple forces	41
Velocity relative to the earth and a train	42

Chemical formulas for some common compounds

Compound	Chemical Formula	Purpose
<i>Common compounds in nature and the environment</i>		
Calcium carbonate	CaCO ₃	chalk, limestone, marble
Carbon dioxide	CO ₂	air, soda, fire extinguishers
Carbon monoxide	CO	incompletely burned fuel
Methane	CH ₄	natural gas, marsh gas
Quartz	SiO ₂	light-colored rocks and sand
Glucose	C ₆ H ₁₂ O ₆	common sugar in humans
Alanine, an amino acid	C ₃ H ₇ NO ₂	the 20 amino acids are the building blocks of proteins
<i>Common compounds in the home</i>		
Water	H ₂ O	common throughout the world
Ammonia	NH ₃	window cleaning products, many industrial uses
Sodium chloride	NaCl	salt
Glucose	C ₆ H ₁₂ O ₆	a common form of sugar found in honey and fruit juice
<i>Common compounds in industry and health care</i>		
Calcium oxide	CaO	many industrial uses, also called lime
Hydrochloric acid	HCl	many industrial uses
Nitrous oxide	N ₂ O	mild anesthetic for dentistry, also called laughing gas
Sulfuric acid	H ₂ SO ₄	used to make paints, fertilizers, detergents, and explosives
Sodium hydroxide	NaOH	housecleaning products, many industrial uses
Vinyl chloride	C ₂ H ₃ Cl	building block of polyvinyl chloride, a common plastic



Fission of a uranium atom



Electrical power transmission and distribution