



Section I: Forces & Motion
Chapters one to five

Chapter 1

Science and Forces

- 1.1 Science and the Scientific Method
Activity: scientific method worksheet/ build electric racer part 1
- 1.2 Forces
Experiment: force/build the electric racer part 2
- 1.3 Push, Pull, and Newtons
Activity: forces and the racer
- 1.4 Forces: Direction, Magnitude and Cumulative Effect
-- vector diagrams
- 1.5 Forces in Construction
-- build the glider's wing

Chapter 2

Forces in our World

- 2.1 Gravity
Experiment: gravity's effect on objects
- 2.2 Friction
Experiment: racer with and without friction
- 2.3 Friction of fluids
Experiment: air as a fluid
- 2.4 Fluid Dynamics
-- fluid flow and Bernoulli's principle
- 2.5 Bernoulli's Principle continued
-- continue building the glider

Chapter 3

Mass, Inertia, Speed and Velocity

- 3.1 Mass and Inertia
Experiment: inertia and the racer
- 3.2 Force, Mass and Acceleration: Newton's 2nd Law
Experiment: mass and acceleration
- 3.3 Speed and Velocity
Experiment: velocity
- 3.4 Speed, Velocity, and Displacement
-- speed and velocity calculations
- 3.5 Displacement, Speed, and Distance
-- determine the velocity of the racer and glider

Chapter 4

Forces in Motion

- 4.1 Action and Reaction: Newtons 3rd Law of Motion
Experiment: action and reaction
- 4.2 Centripetal Force
Experiment: the racer in motion
- 4.3 Lubricants, Heat and Wear
Experiment: wet and dry lubricants
- 4.4 Graphing Motion
-- linear and nonlinear slopes
- 4.5 Graphing Analysis
-- graphing the glide ratio of the glider

Chapter 5

Pressure, Density, and Buoyancy

- 5.1 Pressure
Experiment: water pressure and height
- 5.2 Density and Buoyancy
Experiment: determine the density of different objects
- 5.3 Section Quiz
-- vocabulary quiz: chapters 1 - 5
- 5.4 Buoyant Forces
-- a deeper look
- 5.5 Buoyancy
-- building the steam boat

Section II: Machines and Energy
Chapters six to nine

Chapter 6

Measurement, Work & Power

- 6.1 Measurement
Activity: measuring activity
- 6.2 Work
Experiment: work and the racer
- 6.3 Power
Activity: power and the racer
- 6.4 Hydrometers
-- construct hydrometer, specific gravity
- 6.5 Experiment Design and Fluid Density
-- design experiment to test fluids density

Chapter 7

Machines

- 7.1 Machines
Experiment: machines and pulleys
- 7.2 Levers and Fulcrums
Experiment: levers and fulcrum points
- 7.3 Inclined Planes, Ramps & Wedges
Experiment: inclined planes and ramps
- 7.4 Machines, Heat Exchange, and Heat Engines
-- heat transfer and its ability to do work
- 7.5 Heat Engines continued
-- Understanding the steam boat

Chapter 8

Compound Machines

- 8.1 Compound Machines
Activity: compound machines worksheet
- 8.2 Gears, Pulleys, and Power
Experiment: pulley ratios
- 8.3 Special Gears and Pulleys
Experiment: fixed and moveable pulleys
- 8.4 Earth, Moon, Sun and Space
-- the machinery of the solar system
- 8.5 Prepare for Quarter Exam
-- organize and begin studying for exam



Chapter 9

Energy & its Forms

- 9.1 Kinetic, Potential, & Forms of Energy
Activity: worksheet/potential & Kinetic
- 9.2 Conservation of Energy
Experiment: energy conservation
- 9.3 Section review/quiz
-- vocabulary quiz
- 9.4 Flight and the Wright Brothers
-- finish studying for the exam
- 9.5 Quarter Exam

**Section III: Electricity
Chapters ten to fourteen**

Chapter 10

Electricity, Electrons, & Current

- 10.1 Electricity, Atoms, and Electrons
Activity: build circuit – part 1
- 10.2 Electrical Currents and Batteries
Activity: current worksheet/build circuit part 2
- 10.3 Voltage and Safety
Activity: voltage worksheet/test the circuit
- 10.4 Electrical Engineering
-- electricity and construction
- 10.5 Electricity and House Construction
-- build the house part 1

Chapter 11

Static Electricity, Conductors, & Insulators

- 11.1 Static Electricity
Experiment: static hair
- 11.2 Opposites Attract/ likes Repel
Experiment: repelling balloons
- 11.3 Conductors and Insulators
Experiment: determine materials conductivity or insulating properties
- 11.4 Induction
-- no contact attraction
- 11.5 Static Shocks and House Construction
-- build the house part 2

Chapter 12

Circuits & Resistors

- 12.1 Electrical Circuits
Activity: open and closed circuits
- 12.2 Series and Parallel Circuits
Experiment: series and parallel
- 12.3 Resistors
Experiment: resistance of pencil lead
- 12.4 House Wiring
-- alternating current, voltage, and wire gauge
- 12.5 Wiring the Mini House
-- build the mini house part 3

Chapter 13

Resistance, Voltage, & Switches

- 13.1 Resistance and Series/Parallel Circuits
Experiment: determine resistance of parallel vs. series circuit
- 13.2 Voltage and Batteries
Experiment: determine the effect of batteries in parallel vs. series
- 13.3 Switches
Activity: build a switch
- 13.4 Ohm's Law and LED Lights
-- how led lights work
- 13.5 The Mini-house and Ohm's Law
-- determine resistance of LED lights

Chapter 14

Fuses & Sources of Electricity

- 14.1 Fuses -- ADULT SUPERVISION REQUIRED
Experiment: steel wool as a fuse
- 14.2 Sources of electricity
Activity: sources of electricity worksheet
- 14.3 Section review/quiz
-- vocabulary words
- 14.4 Electrolytes and Ions
-- electric current and solutions
- 14.5 Electrolytic Solutions
-- ions, sodium, electrolytes

**Section IV: Magnetism
Chapters fifteen to eighteen**

Chapter 15

Magnets, Poles & Fields

- 15.1 Magnets
Activity: magnetic attraction
- 15.2 North and South Poles
Experiment: opposites attract
- 15.3 Magnetic Fields
Activity: invisible fields
- 15.4 Earth's Poles, Axis, and Seasons
-- Kepler's laws and the planets
- 15.5 Seasons and the Mini House
-- optimizing heating and cooling

Chapter 16

Compasses, Mapping, & Electromagnets

- 16.1 Compass
Activity: build a compass
- 16.2 Mapping and magnets
Activity: mapping
- 16.3 Electromagnets
Experiment: build and experiment with an electromagnet
- 16.4 Electromagnets
-- a deeper look
- 16.5 Experiment Challenge



-- build a better electromagnet

Chapter 17

Magnets, Motors & Generators

17.1 Uses of magnets

Activity: worksheet/build motor part 1

17.2 Generators and motors

Activity: worksheet/build motor part 2

17.3 Magnets and Motors

Activity: magnetic field and the motor

17.4 Navigating the Solar System

-- size and shape of the solar system and planets

17.5 Prepare for Quarter Exam

-- organize and begin studying for exam

Chapter 18

Motors & DC Current

18.1 Motors and DC current

Experiment: magnets/currents effect on motor direction.

18.2 Uses of Motors

Activity: build motor attachment

18.3 Section review/quiz

-- vocabulary quiz

18.4 Space Travel

-- finish studying for exam

18.5 Quarter Exam

Section V: Chemistry: matter **Chapters nineteen to twenty two**

Chapter 19

Chemistry & Matter

19.1 Chemistry and Matter

Activity: build balance scale part 1

19.2 Classifying Matter

Activity: worksheet/build balance scale part 2

19.3 Scales: Types and Uses

Activity: build balance scale part 3

19.4 Matter, Stars, Planets & Asteroids

-- make-up of the solar system

19.5 The Solar System

-- just how big is it?

Chapter 20

Mass, Elements, & the Periodic Table

20.1 Mass

Activity: determining the mass of objects

20.2 Elements and the Periodic Table

Experiment: elements

20.3 Atoms and Molecules -- ADULT SUPERVISION
REQUIRED

Experiment: separating H₂O into hydrogen and oxygen

20.4 Elements, Carbon, and Hydrocarbons

-- carbon and molecular bonds

20.5 Hydrocarbons and Candles

-- carbon build-up

Chapter 21

Molecules & Movement

21.1 Movement of Molecules

Experiment: expanding balloon

21.2 Conduction and Convection

Experiment: convection

21.3 Thermodynamics – heat transfer -- ADULT
SUPERVISION REQUIRED

Experiment: Flame proof balloon

21.4 1st Law of Thermodynamics

-- heat and energy: reactions giving off heat

21.5 The 1st law and the Steamboat

-- diagramming

Chapter 22

Physical & Chemical Properties

22.1 Physical versus Chemical Properties

Activity: determine the properties of materials

22.2 Metals

Experiment: metals and conductivity

22.3 Section review/quiz

-- vocabulary quiz

22.4 Thermal Transfer

-- change of phase

22.5 Change of Phase and Thermal Transfer

-- Digging deeper

Section VI: Mixtures & Compounds **Chapters twenty three to twenty seven**

Chapter 23

Mixtures & Molecules

23.1 Mixtures: solutions and suspensions

Experiment: solutions – salt and flour

23.2 Separating Mixtures

Experiment: separating ink

23.3 Miniature Images

Act: scanning microscopes

23.4 Working Fluids

-- thermal expansion

23.5 Heat Transfer

-- working fluids and the steam engine

Chapter 24

Compounds, PH & Salts

24.1 Compounds

Activity: worksheet – compounds vs. mixtures

24.2 Acids and bases

Activity: Ph – litmus paper

24.3 Salts

Experiment: salt and water

24.4 Compounds, Molecules, and Living Organisms

-- proteins, lipids, nucleic acids

24.5 Fats, Fuel, and Color

-- a deeper look



Chapter 25

Crystals & Chemical Bonds

- 25.1 Crystals
Experiment: growing crystals
- 25.2 Chemical Bonds
Activity: chemical bonds of sodium bicarbonate
- 25.3 Conservation of Matter
Experiment: conservation of matter
- 25.4 Covalent and Ionic Bonds
-- chemical bonds: a deeper look
- 25.5 Exploring Chemical Bonding
-- covalent and ionic

Chapter 26

Chemical Reactions

- 26.1 Types of Chemical Reactions
Activity: worksheet/build rocket part 1
- 26.2 Rockets
Activity: build rocket part 2
- 26.3 Rocket Launches
Activity: testing the rocket
- 26.4 Polymer Chemistry
-- polymers
- 26.5 Prepare for Quarter Exam
-- organize and begin studying for exam

Chapter 27

The Results of Reactions

- 27.1 Chemical Reactions
Experiment: chemical reactions and the rocket
- 27.2 Products of Chemical Reactions
Experiment: what products does the rocket reaction produce?
- 27.3 Section review/quiz
-- vocabulary quiz
- 27.4 Polymer Chemistry Applied
-- finish studying for the exam
- 27.5 Quarter Exam

Section VII: Sound
Chapters twenty eight to thirty one

Chapter 28

Sound

- 28.1 Sound
Activity: build the guitar part 1
- 28.2 Energy and Sound
Experiment: vibration test/ build the guitar part 2
- 28.3 Tone
Activity: tone worksheet/build the guitar part 3
- 28.4 Sound Energy
-- a deeper look
- 28.5 Sound and the Steam Boat
-- Determine why the steam boat "pops"

Chapter 29

Pitch & Sound Waves

- 29.1 Pitch
Activity: tune the guitar
- 29.2 Sound Waves
Experiment: sound waves and vibration
- 29.3 Mediums of Sound
Experiment: tuning fork
- 29.4 Resonance
-- vibration and amplitude
- 29.5 Resonating Glass
-- resonance and pitch

Chapter 30

Speed & Direction of Sound

- 30.1 Speed of Sound
Activity: clapping and the speed of sound
- 30.2 Sound Intensity: loud and soft sounds
Experiment: loud, soft, and vibrations
- 30.3 Echoes and Absorption
Experiment: test materials ability to reflect sound
- 30.4 Acoustical Engineering
-- sound and design
- 30.5 Roof and Ceiling Design
-- build the mini-house's roof

Chapter 31

Electricity & Sound

- 31.1 Musical Instruments
Activity: make a "band"
- 31.2 Electrical Signals and Sound
Activity: worksheet -- how a phone works
- 31.3 Section review/quiz
-- vocabulary words
- 31.4 Vibration, Heat, and Light
-- light, heat and thermals
- 31.5 Thermals and the Glider
-- riding the thermals

Section VIII: Light
Chapters thirty two to thirty six

Chapter 32

Light & Photons

- 32.1 Light
Activity: light worksheet/build solar fan part 1
- 32.2 Photons and Solar Energy
Activity: build solar fan part 2
- 32.3 How Light Travels
Experiment: traveling light
- 32.4 Thermal Energy and Temperature
-- joules and calories
- 32.5 Thermal Energy and the Steam Boat
-- comparing thermal energy



Chapter 33

Light Sources & their Affects

- 33.1 Light Sources
Experiment: light beams
- 33.2 Scattering Light
Experiment: scattering light
- 33.3 Shadows
Activity: make and use a sundial
- 33.4 Light Intensity
-- lumens and lux
- 33.5 Experiment Challenge
-- solar fan as an intensity tester

Chapter 34

Reflecting & Bending Light

- 34.1 Objects and Light: transparent, translucent, opaque
Activity: classify objects by light type
- 34.2 Reflection
Experiment: reflection
- 34.3 Refraction: bending light
Experiment: bending light
- 34.4 Light, Shadows, Moon & Earth
-- reflections and eclipse
- 34.5 House Placement and Energy Conservation
-- placement of the mini house

Chapter 35

Colors, Prisms, & Types of Lights

- 35.1 Colors and prisms
Experiment: make a simple prism
- 35.2 Types of Light
Activity: identifying light
- 35.3 Other uses of Light
Activity: uses of light worksheet
- 35.4 Light, Heat, and Reflection
-- roof insulation and the mini-house
- 35.5 Prepare for Quarter Exam
-- organize and begin studying for exam

Chapter 36

Optics

- 36.1 Optics: how the eye works
Experiment: lingering light
- 36.2 Optics and the Brain
Activity: spin machine
- 36.3 Section review/quiz
-- vocabulary words
- 36.4 Summarize and Organize
-- finish studying for the exam
- 36.5 Quarter Exam