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: Newton's 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

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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

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 VII: Sound
Chapters twenty eight to thirty one

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
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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
- **33.2** Scattering Light
- **33.3** Shadows
- **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
- **34.2** Reflection
- **34.3** Refraction: 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
- **35.2** Types of Light
- **35.3** Other uses of Light
- **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
- **36.2** Optics and the Brain
- **36.3** Section review/quiz
  - vocabulary words
- **36.4** Summarize and Organize
  - finish studying for the exam
- **36.5** Quarter Exam