

Westfield Studios

The 101 series

Labs and Materials Lists

Biology 101, Chemistry 101 and Physics 101

Wes Olson

Biology 101

Lab Materials

Segments 1

No lab

Segment 2

- Plant Identification book or the internet

Segment 3

- Fishing supplies or...
- Fishbowl
- Goldfish

Segment 4

- Animal Identification book or the internet

Segment 5

- Drawing paper
- Coloring pens
- A book on animal anatomy

Segment 6

No lab

Segment 7

- 1 yellow onion
- Fresh, crisp apple
- Blindfold
- Nose plug...or just your fingers

Segment 8

- Play-Doh® (*at least 3 different colors*)
- A book on basic human anatomy

Segment 9

- High powered microscope (*Borrowed or visit a local lab*)

Biology 101 Labs

Segments, Names and Times

Segment 1

Introduction: Life Defined

(No Lab)

Segment 2

Plants

Lab #1 Plant Identification (Identify 10 Plants – Vascular and Non-vascular) (No video)

Segment 3

Aquatic Creatures

Lab #1 Gone Fishing! (Catch a Fish) (No video)

Alternate Lab - Buy a Goldfish (Observe and Identify Parts of a Goldfish) (No video)

Segment 4

Avian Creatures

Lab #1 Animal Anatomy (Find and Identify 5 Flying Invertebrates and 5 Flying Vertebrates) (No video)

Segment 5

Land Animals Part 1

Lab #1 Animal Anatomy (Draw and Identify Animal Anatomy) (No video)

Segment 6

Land Animals Part 2

(No Lab)

Segment 7

Mankind Part 1

Lab #1 Plugged Nose (Tasteless Experiment) (Page 84 of Guidebook)

Lab #2 Blind Eye (Blind Spot) (Page 10 of Accreditation Program)

Segment 8

Mankind Part 2

Lab #1 Play-Doh[®] Person (Human Organ Model with Play-Doh[®]) (No Video)

Segment 9

Genetics

Lab #1 Looking at Blood (Blood Cell Under a Microscope) (No Video)

Chemistry 101

Lab Materials

Segment 1

- Pot with lid
- Water
- Salt
- Empty bottle
- Quarter

Segment 2

- Birthday candles
- Baking Soda
- Glass mason jar
- Play-Doh[®] (*just one or two colors*)
- Glass dish
- Water

Segment 3

- 9-volt battery
- Couple of pieces of solid copper wire.

Segment 4

- Get something phosphorescent (*"glow-in-the-dark"*)
- Get something fluorescent (*fluorescent light, fluorescent rock, etc*)

Segment 5

- Box or pillow case
- Six or seven fun items

Segment 7

- Big Box of Crayons. At least 7 main colors (red, blue, brown, etc) and 5-7 variations of that main color plus gold and silver if you can get them: *the more colors the better!*

Segment 6, 8

No labs

Segment 9

- Water faucet
- Comb
- Balloon

Segment 10

- Mentos[®] mints
- Liter of diet cola
- Bottle or jar
- Vegetable oil
- Salt
- Food coloring
- Alka-Seltzer[®] tablet

Segments 11, 12

No labs

Segment 13

- Can of diet and regular cola
- Water container (*see description in lab*)
- Sugar and aspartame packets (*next time you go to a restaurant ask the waitress and she'll let you take a couple of each home.*)
- Glow-in-the-dark stick (*virtually every store has these*)
- Safety glasses and gloves are useful here but not mandatory.
- Red cabbage
- Pot for boiling water
- Several small glass containers
- Baking soda, lemon juice, vinegar, bleach
- Paper or cloth strainer (*like a coffee filter*)

Segment 14

No lab

Segment 15

- Balloon
- Candle and matches
- Dry Ice pieces or chunks (*maybe 2 pounds*)

Segment 17

- Lemons (3)
- LED (*"light emitting diode"*)
- Galvanized nail
- Solid copper wire

Segment 17

- Magnesium fire starter (*in nearly every store*)
- Wood chips and tinder for fire
- Hot Dogs or marshmallows? (*optional*)

Segment 18

No lab

Segment 19

- Corn starch
- Bowl
- neodymium magnets (optional)*
- iron filings (optional)*
- vegetable oil (optional)*

Chemistry 101 Labs

Segments, Names and Times

Segment 1

The Last Alchemist

Lab #1 – Making Evaporated Water (Distillation Experiment) (19:20)

Lab #2 - The Clicking Quarter (Boyle's Law on Expanding Gasses) (29:30)

Segment 2

The Birth of Modern Chemistry

Lab #1 Invisible Fire Extinguisher (Carbon Dioxide vs Flame) (25:00)

Lab #2 Scientific Candle Snuffer (Phlogison Theory Disproven) (9:10)

Segment 3

The Bold Russian

Lab #1 Electricity in Water (Hydrogen Electrolysis) (10:15)

Segment 4

Lots of Mystery Rays

Lab #1 Glowly Stuff (Phosphorescents and fluorescents) (No video)

Segment 5

The Likeable Rutherford

Lab #1 Mousetrap or Dice? (Indirect Science) (No video)

Segment 6

The Periodic Table at Last!

(No Lab)

Segment 7

Periodic Table – The Main Group

(No Lab)

Segment 8

Periodic Table – Quantum Mechanics

(No Lab)

Segment 9

Neutrons, Isotopes and Ions

Lab #1 Bending Water (Comb and Faucet Experiment) (21:30)

Lab #2 Making Change (Ionizing Materials) (21:00)

Segment 10

Compounds and Molecules/ Part 1

Lab #1 Diet-Cola Geyser (Mentos Experiment) (03:20)

Lab #2 Do-It-Yourself Lava-Lamp (The Science of a Lava Lamp) (No video)

Segment 11

Compounds and Molecules/ Part 2

(No Lab)

Segment 12

Balancing Equations

Lab #1 The Mass of Water (Molecular Mass) (No video)

Lab #2 It's Easy... Really (Balancing Equations) (No video)

Segment 13

Essentials Wrap-up

Lab #1 Sweet Water (Density Cola) (03:30)

Lab #2 Chemical Light (Glow Sticks) (11:15)

Segment 14

The Four Main Columns

(No Lab)

Segment 15

Non-Metals and Poor Metals

Lab #1 Flameproof Balloon (Heat Dissipation) (No video)

Lab #2 Fun with Dry Ice (Dry Ice Experiments) (No video)

Segment 16

Transition Metals

Lab #1 Lights from Lemons (Lemon Battery Experiment) (32:10)

Segment 17

Rare Earths and Radioactives

Lab #1 Survival Fire (Misch Metal Fire) (No video)

Segment 18

The Future of Chemistry/ Part 1

(No Lab)

Segment 19

The Future of Chemistry/ Part 2

Lab #1 Weird Corn Starch (Shear Thickening Fluid) (25:45)

Physics 101

Lab Materials

Segment 1

- Physics 101 notebook

Segment 2

- Paper
- Glass of water

Segment 3

- Coin
- Glass mug
- Unopened glass soda bottle
- Cola soda to pour into mug
- Deep glass dish (6–8")
- Shiny spoon
- Concave shower mirror
- Magnifying glass (concave lens)
- Candle

Segment 4

- Dollar store jelly marbles

Segment 5

- Canned air horn
- String
- 2 plastic cups or tin cans

Segment 6

- Hat umbrella
- Cheap lavalier microphone with jack to plug into your cell phone
- Cheap ear buds
- Cell phone to record sound
- Ear plugs and sound muffs

Segment 7

- Trick party candles
- Candle
- Matches
- Empty clear plastic bottle
- Rubbing alcohol
- Plastic Baggie® or balloon

Segment 8

- Magnesium fire starter
- Wood for a bow drill

Segment 9

- Regular party balloons
- Plastic water bottle
- Pan
- Aerosol duster can
- Ivory® soap

Segment 10

- Balloon
- Styrofoam® cup
- Pieces of paper

Segment 11

- AA battery
- Gum foil wrapper
- 9-volt battery
- Steel wool

Segment 12

- Inexpensive volt meter
- Zinc washers
- Pennies
- Cardboard pieces
- Glass cup or bowl
- Foil
- Dollar store calculator
- Needle
- Long bar magnet

MAKE A MAGNET & ELECTRICITY

- Two D cell battery
- Iron nail

- 10 feet small electrical wire (plastic coated)
- Paper clips
- Inexpensive plastic compass

MAKE A MOTOR

- Plastic cup
- Rubber bands
- 2–4 magnets (the stronger the better)
- 2 Alligator clip leads

Segment 13

No lab

Segment 14

- Coin

Segment 15

- String

Segment 16

- Regular party balloon
- String
- Several marbles of different sizes
- Drinking straw
- 6' length of $\frac{3}{4}$ " pipe insulation
- Scissors
- Tape
- 4–5 different sized marbles
- Ruler

Segment 17

No lab

Segment 18

- Blindfold
- Money for ice cream!

Segment 19

No lab

Segment 20

No lab

Physics 101 Labs

Segments, Names and Times

Segment 1

Introduction

(No Lab)

Segment 2

The Physics of Light: *Light and Color*

Lab #1 Splitting Light (Color Spectrum) (No video)

Segment 3

The Physics of Light: *Mirrors and Lenses*

Lab #1 “Coin in a Mug” and “Edge of a Coke Bottle” (4:00 & 4:30)

Lab #2 Upside-down Projectors (“Real” Image Projection) (19:30 & 29:00)

Segment 4

The Physics of Light: *Invisibility and the Speed of Light*

Lab #1 Jelly Marbles (Refractive Index Marbles) (13:20)

Segment 5

The Physics of Sound: *Introduction to Sound*

Lab #1 Talk into a Cup (String Telephone) (8:50)

Lab #2 Fading Sounds (Dissipation of Sound Experiment) (16:30)

Segment 6

The Physics of Sound: *Acoustics – The Sound of Music*

Lab #1 Umbrella Microphone (Acoustic Resonator) (11:30)

Lab #2 How Good are Ear Plugs? (Bone Transmission Resonator) (No video)

Lab #3 Singing Glass (Musical Mechanism) (24:30)

Segment 7

The Physics of Heat: *What is Fire?*

Lab #1 Magic Candles (Vapor Trails) (20:00)

Lab #2 Funny Flame (Trick Candle Experiment) (No video)

Lab #3 Fireproof Balloon (Heat Dissipation) (23:00)

Lab #4 Fire Water (Water from Fire) (26:30)

Segment 8

The Physics of Heat: *The Three Laws of Thermodynamics*

Lab #1 Making Fire (Bow Drill Experiment) (No video)

Segment 9

The Physics of Heat: *Refrigeration: Hot & Cold*

Lab #1 Frozen Balloon (Expanding Gas Law) (8:00 & 8:35)

Lab #2 Cold Can (Pressure Release Equals Cold) (12:20)

Lab #3 Some Stuff is Colder (Conduction) (No video)

Lab #4 Ivory Soap (Expanding Gas Experiment) (30:30)

Segment 10

The Physics of Electricity & Magnetism: *What is Electricity?*

Lab #1 “Static” Electricity (Triboelectric Experiment) (20:00)

Segment 11

The Physics of Electricity & Magnetism: *Outlets and Circuits*

Lab #1 Electrical Fire (Pump Charge with a Battery) (16:00)

Segment 12

The Physics of Electricity & Magnetism: *Batteries & The Electromagnetic spectrum*

Lab #1 Make a Zap-Stick (Make a Battery) (3:30)

Lab #2 Which Way is North? (Make a Compass) (17:30)

Lab #3 Attractive Poles (Make a Magnet) (21:25)

Lab #4 Watts of Volts (Make Electricity) (23:00)

Lab #5 Make a “Go” Thing (Make a Motor) (24:00)

Segment 13

The Physics of Motion: *The Life of Isaac Newton*

(No lab)

Segment 14

The Physics of Motion: *The Law of Gravity*

Lab #1 Falling and Speed (Gravity and Horizontal Movement) (No video)

Lab #2 Dropping Stuff (Gravitational Constant Experiment) (3:00)

Segment 15

The Physics of Motion: *The 1st Law of Motion*

Lab #1 Cut the String (Centripetal Force Experiment) (21:00)

Segment 16

The Physics of Motion: *The 2nd and 3rd Laws of Motion*

Lab #1 Faster and Slower (Acceleration Appreciation) (No video)

Lab #2 Rolling Marbles (Mass Acceleration) (No video)

Lab #2 Newton’s 3rd Law and Rockets (Balloon Rocket Experiment) (No video)

Segment 17

The Physics of the Weird: *The Life of Albert Einstein*

(No lab)

Segment 18

The Physics of the Weird: *Relativity*

Lab #1 Fool the Passenger (Galilean Relativity Experiment) (No video)

Segment 19

The Physics of the Weird: *Quantum Mechanics*

(No lab)

Segment 20

The Future of Physics

(No lab)