STUDYWALKS · COURSE SYLLABUS

Physical Science — High School Course

Physical Science is the usual first high school science. It starts with how scientists work and how to measure, then covers matter and its properties, the states of matter and the gas laws, atoms and the periodic table, chemical bonds, reactions and equations, energy and rates in reactions, solutions, acids and bases, and nuclear chemistry. The physics half covers motion, forces and Newton's laws, momentum, gravity, fluids, work and machines, energy and heat, waves, sound, light, electricity and magnetism, and it ends with energy resources and a review. Every lesson is short, worked problems state each formula in words, and the free Physical Science Lab Guide adds twelve home labs that the parent grades.

CREDIT LABEL
1.0 credit
high school, with the study plan

HOURS GOAL
120 h
the 1.0-credit convention

STUDYWALKS LEARNING HOURS
28.5 h
measured runtime plus assessment time

SUGGESTED OFFLINE HOURS
91.5 h
working problems and review

28.5 h StudyWalks (7.9 h of lessons, 11.6 h of lectures, 9.1 h of quizzes and exams) + **91.5 h** suggested offline study = **120 h**. 565 lessons in 27 units.

High school credit is granted by the homeschool parent under the state's rules. StudyWalks supplies the record: hours, scores and this syllabus. The credit label is a suggestion; the parent makes the final call.

Course contents

Unit	Title and lecture topics	Lessons	Lecture
1	**Getting Started: How Physical Science Works** How the course works · What physical science studies · Asking and testing · How science builds knowledge · Safety and a famous candle · Doing the work	22	27 min
2	**Measurement and Scientific Math** The units scientists share · Mass, weight and temperature · How sure is a measurement? · Working with measurements	21	28 min
3	**Matter and Its Properties** Kinds of matter · Properties and changes · Density, ice and mass · Taking mixtures apart · Working with matter	21	26 min
4	**States of Matter and the Behavior of Gases** Particles and the states of matter · Phase changes · Gas pressure and the gas laws · Working with states and gases	21	25 min
5	**Atoms and Atomic Structure** How the atomic model grew · Inside the atom · Electrons at work · Working with atoms	21	25 min
6	**The Periodic Table** Building and reading the table · Metals, nonmetals and metalloids · The families · Trends across the table · Working with the table	21	23 min

Unit	Title and lecture topics	Lessons	Lecture
7	**Chemical Bonding** Why atoms bond · Ionic bonds · Covalent bonds · Metallic bonds · Formulas and ions · Working with bonds	21	25 min
8	**Chemical Reactions and Equations** What a reaction is · Balancing and the reaction types · Counting particles · Working with equations	21	26 min
9	**Energy and Rates in Chemical Reactions** Energy in reactions · Reaction rates · Reactions that run both ways · Working with energy and rates	21	24 min
10	**Solutions, Acids and Bases** How solutions form · How much can dissolve · Acids and bases · Neutralization, salts and safety · Working with solutions	21	26 min
11	**Nuclear Chemistry** The nucleus and radioactivity · Three kinds of decay · Half-life and dating · Fission and fusion · Radiation around you · Working with nuclei	21	25 min
12	**Describing Motion** Position and change of place · Speed and velocity · Graphs and relative motion · Working with motion	21	28 min
13	**Acceleration and Free Fall** What acceleration is · Falling objects · Reaction time and projectiles · Working with acceleration	21	28 min
14	**Forces and Newton's First and Second Laws** What forces are · Newton's first two laws · Forces you meet every day · Working with forces	21	26 min
15	**Newton's Third Law and Momentum** Newton's third law · The third law at work · Momentum and impulse · Collisions and stopping · Working with pairs and momentum	21	26 min
16	**Gravity and Circular Motion** Universal gravitation · Fields, weight and orbits · Moving in a circle · Tides, planets and pendulums · Working with gravity	21	27 min
17	**Work, Power and Machines** Work and power · How machines help · The simple machines · Working with machines	21	27 min
18	**Energy and Its Conservation** Kinetic and potential energy · Other forms of energy · Energy changes form · Working with energy	21	26 min
19	**Fluids and Pressure** Pressure · Floating and sinking · Fluids at work · Working with fluids	21	26 min
20	**Thermal Energy and Heat** Temperature and heat · How heat moves · Heat and matter · The laws of thermodynamics · Working with heat	21	26 min
21	**Waves** What waves are · Measuring waves · How waves behave · Working with waves	21	24 min
22	**Sound** What sound is · What you hear · Moving sources and echoes · Making and hearing sound · Working with sound	21	27 min

Unit	Title and lecture topics	Lessons	Lecture
23	**Light and the Electromagnetic Spectrum** What light is · The electromagnetic spectrum · Mirrors and lenses · Seeing and color · Working with light	23	27 min
24	**Electricity and Circuits** Electric charge · Current, voltage and resistance · Circuits and safety · Working with circuits	22	27 min
25	**Magnetism and Electromagnetism** Magnets · Earth as a magnet · Currents and magnets · Making electricity · Working with electromagnetism	21	26 min
26	**Energy Resources and Society** Nonrenewable resources · Renewable resources · Energy and society · Working with energy resources	21	24 min
27	**Capstone: Review and the Final** The final and your study plan · The big ideas · Science, society and what comes next · Mixed practice	15	23 min

Assessment and grading

- **Unit quizzes.** 27 quizzes, 10 questions each, checked as the student goes, each answer with the lesson to review. Untimed; retakes are unlimited.
- **Mid exam.** 50 questions on units 1–13, drawn fresh each time and scored at the end with a breakdown by content area. Untimed; retakes are unlimited.
- **Final exam.** 60 questions, 90 minutes, on the whole course. Scored 20–80; 50 passes (40 of 60 correct, about 67%). Retakes are unlimited with a 24-hour wait, each a fresh draw.

Suggested course-grade worksheet

Part	Weight	Score
Labs and lab reports from the free Physical Science Lab Guide (parent-graded with its rubric)	30%	
Final exam (percent correct)	30%	
Mid exam (best score)	15%	
Unit quizzes (average of best scores)	15%	
Science journal (parent's judgment)	10%	

Suggested letter scale

Letter	Composite
A	90–100
B	80–89
C	70–79
D	60–69
F	below 60

Suggested; the parent sets every weight and the grade, and enters one letter on the family dashboard. Essays are graded with the Writing Pack rubrics; the exams have no essay. A passing final is the completion standard for the course record.

Study plan

The 91.5 offline hours are spread over the units in proportion to each unit’s StudyWalks time. For each unit: do the unit's lab from the free Physical Science Lab Guide when the capstone names one, with the

parent nearby, and write the lab report; work each worked problem again by hand with new numbers; keep a science journal with one page per unit; and redo the unit quiz misses. Log the time as you go.

Unit	Title	StudyWalks	Offline, suggested	Unit total
1	Getting Started: How Physical Science Works	46 min	3 h 35 min	4 h 21 min
2	Measurement and Scientific Math	46 min	3 h 35 min	4 h 21 min
3	Matter and Its Properties	43 min	3 h 25 min	4 h 8 min
4	States of Matter and the Behavior of Gases	42 min	3 h 20 min	4 h 2 min
5	Atoms and Atomic Structure	43 min	3 h 25 min	4 h 8 min
6	The Periodic Table	41 min	3 h 15 min	3 h 56 min
7	Chemical Bonding	43 min	3 h 25 min	4 h 8 min
8	Chemical Reactions and Equations	43 min	3 h 20 min	4 h 3 min
9	Energy and Rates in Chemical Reactions	41 min	3 h 15 min	3 h 56 min
10	Solutions, Acids and Bases	44 min	3 h 25 min	4 h 9 min
11	Nuclear Chemistry	43 min	3 h 20 min	4 h 3 min
12	Describing Motion	46 min	3 h 35 min	4 h 21 min
13	Acceleration and Free Fall	45 min	3 h 30 min	4 h 15 min
14	Forces and Newton's First and Second Laws	44 min	3 h 25 min	4 h 9 min
15	Newton's Third Law and Momentum	44 min	3 h 25 min	4 h 9 min
16	Gravity and Circular Motion	44 min	3 h 25 min	4 h 9 min
17	Work, Power and Machines	44 min	3 h 25 min	4 h 9 min
18	Energy and Its Conservation	44 min	3 h 25 min	4 h 9 min
19	Fluids and Pressure	44 min	3 h 25 min	4 h 9 min
20	Thermal Energy and Heat	44 min	3 h 25 min	4 h 9 min
21	Waves	41 min	3 h 15 min	3 h 56 min
22	Sound	44 min	3 h 25 min	4 h 9 min
23	Light and the Electromagnetic Spectrum	46 min	3 h 35 min	4 h 21 min
24	Electricity and Circuits	45 min	3 h 30 min	4 h 15 min
25	Magnetism and Electromagnetism	43 min	3 h 20 min	4 h 3 min
26	Energy Resources and Society	42 min	3 h 20 min	4 h 2 min
27	Capstone: Review and the Final	35 min	2 h 45 min	3 h 20 min
Lessons and lectures		**19 h 30 min**	**91 h 30 min**	**111 h**
Quizzes, mid exam and final (stated time)		**9 h 6 min**	**—**	**9 h 6 min**

Unit times are the unit's lecture runtime plus its lessons at the course's measured average lesson length; totals can differ from the learning hours by rounding.

Sources

- **Anchor:** Paul Peter Urone, Roger Hinrichs and others. *Physics* (high school). OpenStax, Rice University, with the Texas Education Agency, 2020 (facts and skills progression only; nothing reproduced). CC BY 4.0
- **Anchor:** Paul Flowers, Klaus Theopold, Richard Langley and William R. Robinson. *Chemistry*, 1st edition (2015, retired). OpenStax, Rice University (facts only). CC BY 4.0
- **Anchor:** Paul Peter Urone and Roger Hinrichs. *College Physics*, 1st edition (2012, retired), chapters 11 and 12 on fluids. OpenStax, Rice University (facts only). CC BY 4.0
- **Witness:** Benjamin Crowell. *Light and Matter* and *Conceptual Physics*. CC BY-SA 3.0
- **Witness:** Stephen Lower. *Chem1 Virtual Textbook* (General Chemistry). LibreTexts. CC BY 3.0
- **Witness:** U.S. government works: NIST pages on the SI units; U.S. Energy Information Administration, *Energy Explained*; NASA Science and NASA Glenn Research Center, *Beginner's Guide to Aeronautics*; NIDCD, *Noise-Induced Hearing Loss*; U.S. Consumer Product Safety Commission, *Home Electrical Safety Checklist*; NOAA National Weather Service, lightning safety. Public domain in the US
- **Witness:** Wikipedia, for corroborating facts the other sources do not cover. CC BY-SA 4.0
- **Primary texts:** Michael Faraday, *The Chemical History of a Candle* (ed. Crookes, 1861); Isaac Newton, *Principia*, tr. Andrew Motte (1729); Galileo, *Dialogues Concerning Two New Sciences*, tr. Crew and de Salvio (1914); John Dalton, *A New System of Chemical Philosophy* (1808); Albert Einstein, *Relativity*, tr. Robert W. Lawson (1920); Marie Curie, *The Discovery of Radium* (1921). Project Gutenberg and the Internet Archive. Public domain in the US

This StudyWalks final is an end-of-course exam built from the Physical Science course, whose scope is modeled on common high-school physical science expectations. Scores are StudyWalks scores on a 20–80 scale. A basic or scientific calculator is allowed. Labs are not on the exam: they are done at home with the free lab guide and graded by the parent. The course and exam have not been reviewed, certified or endorsed by any state, standards body or testing organization, and passing does not award credit: high school credit is granted by the homeschool parent.

StudyWalks is a private educational site and is not affiliated with, endorsed by, or connected to any government agency, the College Board, DSST, ACT, Inc., the National Center for Competency Testing (NCCT), or any testing or licensing body.

studywalks.com/c/physical-science/syllabus/