

Agora Cyber Charter Middle School
Syllabus

Course Title: Physical Science
2013-14

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Dear Student/ Parent/ Guardian:

First, I am excited about meeting you and getting to know you! You can learn more about me from my website: mrbirdsphysicalscience.weebly.com. If you have any questions, please use my website as a resource to find the answers as MOST questions will be answered there! If you cannot find the answer you need, please do not hesitate to contact me via kmail or phone call.

Below you will find LOTS of information about your 8th grade Science class. We will be completing all ten units in the OLS.

Something exciting to note about this year is that you will be conducting your own experiment and presenting the findings! This will be the Unit 10 project! *We are starting Unit 10 at the end of Unit 1* and working through it throughout the year. All students will be expected to complete Unit 10. Unit 10 involves an independent research/experiment that will need to be conducted by the student. There are THREE options for the experiment. Each student will select one and will have to collect the supplies to conduct the experiment and present the findings.

If you have any questions about your/your child's progress in the class or other concerns, please kmail me or call me at 412-545-9994.

Sincerely,
Brandon Bird

COURSE DESCRIPTION:

Science is the field of asking "why." It is the field of questioning everything around you and then designing an investigation to attempt to discover the answer to your questions. In school, the subject of Science allows you the opportunity to put together everything that you are learning in all of your other courses (History, Math, Literature, Language Skills) and develop your skills further in a real-world way. Science is everything and everywhere around you.

K¹²'s Middle School Physical Science course presents the fundamentals of physics and chemistry. Students explore the amazing universe we live in, including motion, energy, the nature of matter and atoms, how chemicals mix and react, and the forces that hold the universe together.

Through class interactions at Agora, students will perform laboratory activities in each unit of study and will gain experience with not only the process involved in a scientific investigation but also science literacy. Students will hone their skills in order to distinguish among facts, reasoned judgment based on research findings, speculation in a text and be able to analyze information gained from a variety of sources regarding its respective value and reliability.

Students will study a variety of topics in physical science, including:

- Structure of Atoms
- Elements and the Periodic Table
- Chemical Reactions
- Forces, including gravitational, motion, acceleration, and mass
- Energy, including light, thermal, electricity, and magnetism

SUPPLIES:

Standard Curriculum Items-Provided by K12

- D Cell battery holder (2 batteries)
- Cork stoppers (2 sizes)
- 1 m enamel coated heavy gauge copper wire
- 1 m non-insulated copper wire
- 20 cm insulated copper wire strips (Set of 5)
- Plastic Bottle, 500 ml.
- Directional Compass
- Bar Magnet (Pair)
- Safety Glasses
- Lamp Bulbs (Set of 4)
- Lamp Bulb Receptacles (Set of 2)
- Advanced Thermometer
- Muriatic acid (30 mL)
- Phenolphthalein (20 mL)
- **Student Pages (Green workbook pages)**

Additional Curriculum Items

Some lessons require additional resources, including common household items, and books that are readily available online or in your local library. For example:

- Iron Filings

NOTE¹: Unit 10 is a student investigation that involves researching a topic, developing a procedure, conducting an experiment, collecting data, analyzing data, writing a lab report and presenting the findings for the experiment. EACH STUDENT will select ONE of the three investigation options from Student Pages 405-406. The student will need to find/provide the materials to complete that investigation.

NOTE²: Additional materials are listed in the Student Pages within the Laboratory Activities.

CLASSROOM POLICIES AND PROCEDURES:

ATTENDANCE and PARTICIPATION:

The Agora Cyber Charter School attendance policy is designed to promote maximum achievement, develop time management skills and foster success in the online environment. We will be following the Attendance Policy as outlined in the student handbook. Please see the student handbook at <http://www.agoraeagles.org/6th-8th.html> under the "Our School" tab.

The teacher cannot excuse absences. All notes and technical excuses must be sent to the attendance office via k-mail.

GRADING POLICY:

Please refer to handbook for more information.

- Each graded assignment will be assigned a specific due date.
- After the due date or multiple attempts, teachers are permitted to request a meeting with the Learning Coach and student before unlocking or accepting late assessments/assignments.
- Extra Credit is only awarded for work above the course curriculum/assessments when all assignments/assessments are up to date. Assigning students extra credit is up to the teacher's discretion.

GRADED ASSIGNMENTS:

Grades for this course will be derived quarterly based upon the following points:

- 50 points of your grade will come from summative unit assessments
- 15 points of your grade will come quizzes and assessments (assigned at teacher discretion)
- 35 points of your grade will come from lab reports/projects to complete the Unit 10 project.

NOTE: This will be consistent with the Agora weighted grading policy. Physical Science will use a 100 point scale, in which 50 points will be unit assessments or the equivalent to 50% of the quarterly grade, 15 points will be quizzes and assessments or the equivalent to 15% of the quarterly grade, and 35 points will be Unit 10 lab reports/projects or the equivalent to 35% of the quarterly grade.

DUE DATES:

Due dates will be determined for each assignment and at teacher discretion. Please remember to check the class website and your kmail often to keep up on assignment due dates and mark them on a calendar. Failure to meet a deadline will require students to meet with the teacher in order to establish criteria for the assignment to be accepted.

CLASS EXPECTATIONS:

- Students will ACTIVELY participate in daily live sessions.
- Students will complete daily assignments and OLS lessons by due date.
- Students will check K-mail at least twice a day.
- Students will contact the teacher when completing assignments or assessments late.

Course Outline

Unit 1: Introduction to Physical Science

What does the study of physical science involve? Everything physical involves quite a lot of the world around us. Begin your journey into physical science by learning about measurements and proper lab procedures. You will also be introduced to lessons that will prepare you for standardized tests in science.

- Introduction to Physical Science
- Physical Systems
- Measurement and the International System
- Laboratory: Measured Steps
- Laboratory: Density
- Working with Model Problems
- Model Problems

NOTE: We will be starting Unit 10 at the end of Unit 1 and working on Unit 10 project throughout the school year.

Unit 10: Scientific Investigation

Scientists conduct experiments and form conclusions. Now you can do the same thing. Be a scientist as you design and carry out your own experiment. Discover how the scientific process works, what makes it different from just guessing, and why it's the most powerful and successful way of figuring out how the forces of nature work.

- Scientific Methods
- Design and Set-Up Your Experiment
- Data Collection
- Data Analysis
- Reporting Conclusions
- Create a Display
- Oral Presentation

Unit 2: Matter

Have you ever played solitaire, where you arrange cards horizontally and vertically looking for connections? Russian scientist Dmitri Mendeleev did, and he was inspired to create the pattern of the Periodic Table. This pattern displayed in the periodic table helps us understand atoms, chemical reactions, chemical formulas, chemical compounds, atomic mass, and other concepts covered in this unit.

- Atoms
- Atomic and Mass Numbers
- Elements and the Periodic Table
- Design of the Periodic Table
- Molecules
- Properties of Matter
- States of Matter
- Physical and Chemical Changes

Unit 3: Chemistry

When you see the word *chemistry*, you may have an image of someone in a lab wearing goggles pouring liquids from one beaker to another. But chemistry surrounds you every day. Cars are built with chemicals and run on chemical fuel. Chemicals make up the clothes you wear and the food you eat. You breathe chemicals, your computer and radio are composed of chemicals, and our world today is dependent on chemicals.

- Chemical Bonding
- Chemical Reactions
- Chemical Formulas
- Laboratory: Testing and Producing Gases
- Rates of Chemical Reactions
- Chemical Equations
- Laboratory: Dissolving Metals
- Mixtures
- Separating Mixtures
- Solutions

- Substances
- Laboratory: Separating Ingredients
- Acids and Bases

Unit 4: Force and Motion

When you roll a marble across a room, you open the door to understanding the same rules of motion that keep airplanes flying and pendulums swinging. What are these forces? What are the "laws" of motion? Come learn about displacement, speed, acceleration, Newton's laws of motion, and gravitation.

- Force
- Gravitational Force
- Motion
- Laboratory: Calculating Speed
- Speed and Velocity
- Measuring Speed and Velocity
- Acceleration
- Newton's First Law of Motion
- Mass and Weight
- Newton's Second Law of Motion
- Newton's Third Law of Motion
- Buoyant Forces
- Laboratory: Precious Cargo

Unit 5: Semester Assessment

Review of Units 1 through 4.

Unit 6: Energy

Nothing stays the same, at least not in our universe. Energy is constantly changing from one form to another, whether it's the light in your house or the sound of a horn. The good thing is you can use this changing energy to do all sorts of work. Scientists can use mass to create energy, use explosions for transportation, and use electricity to make our work easier. Learn about the different energy that constantly surrounds you, and how you use this energy in your everyday life.

- Energy
- Work
- Kinetic Energy
- Potential Energy
- Laboratory: The Pendulum
- Laboratory: Using a Lever
- Simple Machines
- Compound Machines
- Laboratory: Heat Flow
- Thermal Energy
- Temperature

NOTE: We are reversing the order of Units 7 & 8 so that you will be better prepared to take the Science PSSA this spring.

Unit 8: Electricity and Magnetism

You've investigated forces, learned about energy, and examined waves; now look at electricity and magnetism, two particular forms of energy that are quite important to you. Yes, electricity keeps your computer on and your mp3 player going. But do you know why electricity is so useful? Do you wonder how to build your own circuits and currents? Do you know how to build a basic motor?

- Electric Charge
- Electric Currents
- Electric Circuits
- Laboratory: Series and Electric Circuits
- Magnetism
- Electricity and Magnetism
- Laboratory: Motoring On!
- Motors and Generators

Unit 7: Waves, Sound, and Light

At this very moment, you have a lot of waves traveling to your body. You have sound waves you can hear and light waves you can see, but there's even more that you cannot see. There are radio waves, radiation, magnetism, and other invisible waves that you use to cook with, navigate by, and communicate. Explore the different waves you're being exposed to every second of every day.

- Waves
- Electromagnetic Waves
- Light Waves
- Laboratory: Path of Light
- Reflection and Refraction
- Lenses

Unit 9: Semester Assessment

Review of Units 6 through 8.

Tentative Graded Assignments

Changes to this tentative schedule will be announced in class and on the class calendar as posted on the teacher's website.

1st Quarter

- Unit 1 – 25 point test assigned on 9/23
- Unit 10 – 10 point Choose a Topic assigned on 9/27
- Unit 2 – 5 point Quiz on Lessons 1-6 assigned on 10/10
- Unit 2 – 25 point test on Lessons 7-9 assigned on 10/22
- Unit 10 – 25 point Writing a Procedure assigned on 10/24
- Unit 3 – 10 point quiz on Lessons 1-2 assigned on 10/31

2nd Quarter

- Unit 3 – 25 point test on Lessons 3-6 assigned on 11/12
- Unit 3 – 25 point test on Lessons 8-13 assigned on 11/26
- Unit 3 – 5 point quiz on Lesson 14 assigned on 12/2
- Unit 10 – 25 point Data Table assigned on 12/4
- Unit 4 – 5 point quiz Lessons 1-8 assigned on 1/7
- Unit 4 – 5 point quiz Lessons 9-14 assigned on 1/21
- Unit 10 – 10 point Data Analysis/Creating Graphs assigned on 1/23

3rd Quarter

- Unit 5 – 25 point semester assessment assigned on 1/30
- Unit 6 – 25 point test on Lessons 1-5 assigned on 2/12
- Unit 6 – 10 point quiz on Lessons 7-9 assigned on 2/20
- Unit 6 – 5 point quiz on Lessons 10-12 assigned on 2/27
- Unit 10 – 35 point Writing a Lab Report assigned on 3/3

4th Quarter

- Unit 8 – 25 point test assigned on 5/7
- Unit 10 – 35 point Creating a Display assigned on 5/9 ***DUE on 5/29
- Unit 7 – 15 point quiz assigned on 5/27
- Unit 9 – 25 point semester assessment due on 6/4