SCI 1A – LECTURE SYLLABUS
Integrated Physical Science – Fall 2021

INTRODUCTION TO COURSE AND INSTRUCTOR

This is an in-person course (You will be expected to arrive in person and on time. In the event that this course changes to an online setting, we will still meet on the same days and at the same times via Zoom.)

COURSE NUMBER: 57740	
Course Name: SCI 1A	**Reedley College:** Division B - Math, Sciences, Engineering
Units: 4	**Instructor:** Kurt Shults
Time: Mon (Lecture) Wed (Lab) - 6:30-9:20 pm, August 9th – December 10th	**E-Mail:** kurt.shults@maderacollege.edu (You can expect a response within 24 hours during weekdays, 8 am-5 pm. Weekend emails will typically be responded to on Mondays.)
Virtual Office Hours: By appointment via email (Meetings will take place via Zoom)	
Lecture/Lab Classroom: PHY 70	
Website: Students will use Canvas to complete and submit homework assignments.	

Safety Measures: Consistent with the updated state public-health guidelines, face masks or cloth face coverings are required to be worn in public spaces on-campus to reduce possible exposure to COVID-19 and prevent the spread of the virus. Good hygiene of hand washing for a minimum of 20 seconds or using hand sanitizer is required. Please avoid touching your face with unclean hands. Disposable face masks will be provided to anyone who arrives to campus without one.

Teaching and Learning in Fall 2021: We are living in the midst of a global pandemic and it is important to be conscious of this throughout the course. This pandemic, among everything else going on, has and will affect us all in different ways. Therefore, it is vital that we are considerate, kind and empathetic towards ourselves and others. As your instructor for this course, I want you to understand that your health and the health of those around you are the most important thing, and any learning should be secondary. To this end, please communicate with me on how you are doing throughout the course and if I can help in any way through either extensions or other support, please know that I will be attentive and flexible to addressing your concerns.

Course description: Integrated Physical Science – Basic concepts and alternative intuitive ideas in physical science and their relation to everyday phenomena. Engaging activities/demonstrations in class, household-related experiments, and experiments of interest to K-12 teachers.

It is usually expected that students will spend approximately two hours of study time outside of class for every one hour in class. Since this is a four-unit class, you should expect to study an average of four hours outside of class each week.

REQUIRED COURSE MATERIALS

Lecture text: A free Introductory Chemistry textbook and two free Introductory Physics textbooks are available on Canvas that cover the topics in this course, but are organized differently from the course content and contain additional material beyond the scope of the course. The instructor class material and notes are thorough enough to do well in this course, provided classes are regularly attended and homework is regularly completed. Homework is completed through Canvas.

Scientific calculator: Calculators should have square root, log, 10x, scientific notation, and basic statistics functions.

Access to Canvas: Homework will be assessed through Canvas. Reference documents will also be posted to Canvas. Access to Canvas is required and should be checked on a daily basis.

COURSE SPECIFICS

Course Goals: To improve future teachers' understanding and engagement with disciplinary core ideas (DCIs), science and engineering practices (SEPs), and cross-cutting concepts (CCCs) for Physical Science. Future teachers will detail common K-12 student ideas for Physical Science topics and will consider pedagogical strategies to support students to understand normative Physical Science concepts that effectively distinguish such concepts from common intuitive and emerging ideas. These objectives align with the Common Core (http://www.cde.ca.gov/re/cc/) and Next Generation Science Standards (NGSS; http://www.nextgenscience.org/next-generation-science-standards).

The course aims for students to reach a high-school level understanding of Physical Science. Even if a future teacher intends to teach at the elementary level, it is important to have a firm grasp of these concepts so as not to inadvertently introduce intuitive, but incorrect ideas early in a child's education or limit children to curriculum document guidelines if children are eager to learn more about Physical Science. Curriculum documents such as the NGSS are the minimum learning children should be demonstrating at a particular grade. Hence, children can learn more if they are ready. Additionally, whether you like Physical Science or have had good/bad experiences previously, you have an incredibly important responsibility in influencing future generations and should be mindful that you use these experiences (good or bad) to positively influence your future students.

Further, I would encourage you to view this course in broader terms of becoming a more informed citizen. It is important to know how we and others investigate the world around us and how we discuss and represent our findings, so that we can reach shared agreement, make informed decisions, and not be misled by scientific

jargon. It is a common marketing/political strategy to use scientific terms to mislead people. Don't be misled or let your students be misled!

Student Learning Outcomes: After completing this course, students will be able to:

1. Use models to explain scientific phenomena and solve problems.
2. Use common units of distance, time, volume, mass, concentration, and composition to clearly describe the quantities involved in chemical and physical changes.
3. Classify matter and its interactions using common vocabulary and concepts including phase, composition, motion, electronic properties, etc.
4. Balance chemical equations to describe chemical changes and predict the outcomes of chemical reactions.
5. Predict the behavior of matter when energy is added or removed to various systems through physical or chemical formulas.
6. Predict the behavior of matter across microscopic and macroscopic scales.

Course requirements and grading policy: Your scores in the course assessments below will determine your final grade for this course.

Class Participation	10%	(Required for all but three classes)
Canvas Homework	20%	(Due every Friday)
Laboratory	25%	(Attendance required)
Peer Lesson Plan Assignment	25%	(See Course Schedule)
Book Club/Toy Project	20%	(See Course Schedule)

The letter grades assigned at the end of the course will be based on your cumulative points as follows:

A	90-100%
B	80-89%
C	70-79%
D	60-70%
F†	0-59%

†Failure of the laboratory or overall lecture (non-laboratory) portions of the course will result in an F for the entire course regardless of your performance in the other portions.

Students absent from class with a valid reason (for example, having a doctor's note (for them or for a family member needing assistance), representing the college elsewhere through valid documentation, or a funeral notice/wedding invite of direct relative) will receive credit for in-person assignments. Absenteeism due to work conflicts or vacations are not valid reasons for missing class, no matter how much notice is provided. Such absence will receive zero for the relevant class. In all cases, please notify me two weeks in advance of an unavoidable absence.

Final grades will be rounded within .5%(e.g., an 89.5% would be rounded to 90% and would receive an A; an 89.44% will not be rounded up). Further, please note that completing all assignments on time and attending all classes does not

necessarily guarantee a desired grade. The best way to achieve a desired grade is to work consistently from the beginning to the end of the semester across all assignments and complete follow-up reading on all topics covered.

All assignments listed above are subject to Reedley College cheating/plagiarism policies. Cheating will result in an immediate F in the course and a formal report to the college.

Class Participation (10%)

This course will be taught in person and attendance/participation is expected. I will take advantage of Google Documents to support your active engagement. The class will not be a "conventional" lecture where I talk at you and you take notes. The reasoning for this approach is to support your participation in the course and to support your conceptual development by eliciting your prior ideas and building on these ideas towards more refined understanding about the course topics. For example, there is no point in me talking about ideal gas law equations if most students are in early development of their understanding of the differences across temperature scales. Hence, I would need to explain temperature scales first before considering ideal gas law equations. Such an approach is referred to as just-in-time teaching. If I ask a question and everyone knows the answer, I will move on to a different concept. However, if many students answer incorrectly, I will spend more time on the concept. In addition, such an approach using Google Documents is conceptually non-confining in that if you have a particular question you are curious about, you can look to answer it. It may be something I have not thought about either in which case we will all learn something.

I appreciate that participating in all lecture sessions will be challenging so I will **drop the three lowest scores** in terms of lecture participation. Please do catch up if you miss a lecture session as it is easy to fall behind with the pace of concepts covered.

Canvas Homework (20%)

Homework will be posted on Canvas. Homework will involve Conceptual Homework and Pedagogical Homework, and will be available after every Monday class. The conceptual homework will involve true/false and multiple-choice questions on Canvas for the material covered in class that week. I strongly encourage you to work the problems by hand on paper and enter the answers online. I would suggest working on the homework in small online study groups with the goal of learning and understanding the material, not just getting the right answer. Copying the answers from another student or searching online for the solution will not help you learn the material. Students need to understand how to find the pathway to the solution.

The Pedagogical (related to teaching) Homework will involve debating a controversial scientific issue, Physical Science education resource sharing and discussions, or working towards your Peer Lesson Plan Assignment (PLPA). The details of the PLPA will be explained in more detail under the Peer Lesson Plan Assignment section (Assignments during the semester for the PLPA are part of the PLPA grade below.).

Late submissions of homework will only be excused for approved reasons. As everyday citizens and prospective teachers, it is vital for students to be aware of their difficulties with the material, to consider the difficulties others may have with the material, and how such difficulties can be addressed.

Laboratory (25%)

Labs will cover the following topics:

Physics

1. Measurements/units
2. Position, displacement, velocity and acceleration
3. Net force from Newton's Laws
4. Energy types and calculating energy conservation
5. Buoyancy
6. Calorimetry
7. Matter phases

Chemistry

8. Lab safety and quiz
9. Chemical and physical reactions
10. acids and bases
11. The mole concept

Final Project - Peer Lesson Plan Assignment (25%)

The Peer Lesson Plan Assignment (PLPA) is a **group assignment** focused on student planning and teaching of a Physical Science topic to peers online for a 30 minute class. This lesson is normally taught in a K-8 classroom, but is currently unavailable due to the COVID-19 pandemic. I appreciate that teaching to peers may feel somewhat artificial, but I believe there is value in planning, preparing, and implementing a lesson, and also receiving feedback from peers.

Example topics include Electricity, Heat, Light, Sound, Magnetism, Motion, Pressure, Phase Change, etc. All PLPA work should be completed through Google Documents so that all students' contributions are obvious through the Revision History feature in Google Documents. As an instructor, I cannot resolve any group work issues that arise if you have not completed your work through Google Documents.

Your PLPA should include the lesson title that includes the topic, the (potential) grade level, the lesson learning aim and objectives, the lesson length, the learning assessment (how you will know students learned), materials and resources (including website links), three classroom management strategies for maintaining students' attention, five common student intuitive, but incorrect ideas for the topic, connections for the topic/teaching activities to the Next Generation Science Standards (Disciplinary Core Ideas, Science and Engineering Practices, and Cross-Cutting Concepts; two of each), three teaching activities (Opener, Main Lesson Activities, Closer/Extension), and a three column table with Time, Teacher Activities, and Student Activities for the lesson length, and necessary tidy-up. Relevant activity sheets or worksheets can be included as appendices. A grading scoring guide will be provided during the course.

You will need to find at least **five peer-reviewed academic articles** and briefly discuss **five common Physical Science intuitive, but incorrect ideas** children of a particular grade level have for your topic based on these five peer-reviewed articles. Please note that intuitive, but incorrect ideas are not the same thing as "student difficulties" with the topic. For example, an intuitive, but incorrect idea would be that students think that household metal and wooden spoons have different temperatures, even after being left in the same room for hours. A "student difficulty" would be in understanding why two objects have the same temperature, but one feels colder than the other. It is a difficulty rather than an intuitive idea. Online magazine style articles will not suffice for identifying intuitive student ideas, including magazine style articles from NASA, National Geographic, etc. The articles need to be peer-reviewed and report data on K-12 student learning, not teacher learning.

The PLPA will also need to explain **three teaching activities** (opener, main activity/ies, closer/extension) to tackle some of these five intuitive, but incorrect ideas (It will be impossible to tackle all five in one lesson in a meaningful way). For these three teaching strategies, you can take advantage of resources such as textbook examples, online resources, and particular technologies. The teaching strategies/activities do not need to be from peer-reviewed sources that report student data. All resources used must be properly cited following the 7th APA format. Please be specific about the teaching activities and ensure they tie directly to the topic. Do not simply say that there will be a discussion with students. If there is a discussion, be specific about what the discussion would involve. What type of questions would be asked? Who is talking? How are students scaffolded to participate? How does the discussion connect to the topic? Is the instructor doing all the talking?

Please search *Google Scholar* for peer-reviewed articles (It has a better search function than Fresno State library). If it is not obvious if an article is suitable, please ask me via e-mail. Recommended journals for identifying **intuitive ideas** include:

1. *Journal of Research in Science Teaching,*
2. *Science Education,*
3. *International Journal of Science Education,*
4. *Research in Science Education,*
5. *Computers and Education,*
6. *Journal of STEM Education,*
7. *Review of Educational Research,*
8. *Journal of Elementary Science Education,*
9. *Journal of Science Education and Technology, and*
10. *Journal of the Learning Sciences.*

Other journals may also be included, but please ensure that they are peer-reviewed and include a research component with data on student learning. Some journal articles use terms such as 'misconceptions', but this term is now considered a deficit and disrespectful way of talking about the rich and diverse ideas students

bring to science classrooms. However, using 'misconceptions' as part of your search terms will bring up relevant articles.

Below are journals that are not suitable for identifying intuitive student ideas, as they commonly do not have a research focus with data reported on student learning. However, these journals should be helpful for identifying possible teaching activities. Examples of such journals include:

1. *The Science Teacher*,
2. *Science Scope*,
3. *The Physics Teacher*,
4. *Journal of Chemical Education*,
5. *Science Activities*, and
6. *Science and Children*.

The PLPA should be 2000-4000 words (references and appendices excluded). The structure of the PLPA (including references) should follow the 7th APA guidelines (http://www.apastyle.org/) that explain how headings should be used and how references should be formatted. Mendeley Desktop (www.mendeley.com) may be a useful resource to help with organizing and correctly citing references.

Guidance and grading for the assignment will be discussed in lecture. The PLPA submission is worth 25% of your overall grade

Physical Science Book/Toy Club Project (20%)

The purpose of the Physical Science Book/Toy Club Project (BTCP) is an individual assignment to encourage you to connect science with literacy and play for your future students. Many teachers unfortunately see science, literacy, and play as separate entities, but this is not the case. Science is a language in itself with many engaging and playful narratives that inspire wild curiosity in children and teenagers alike, and adults too of course (!).

For this project, you will be expected to critique four books or toys altogether (can be four books, four toys, or any combination of the two) suitable for the K-12 grade levels with a **Physical Science topic** focus (Not Life Sciences or Geology/Earth Science!). You will find these books/toys either in a local library, the Fresno State Library (Teacher Resource Area; Third Floor, North Wing, to your left coming off the elevators), or you can purchase/view them online (You may wish to have them for your future teaching or as a gift for a family member; Also, there are many youtube channels that provide readings of the book that will suffice – save those $$$!). The books should be leisurely reading (a parent could read it to their children) and not specifically targeted for use in schools. The books can be any language (English, Spanish, French, German, Hmong, Armenian, etc. – if you cannot find a suitable book in a particular language, a future career goal could be to write such a book!)

Some examples of books include (This list is not exhaustive):

- "Quién fue Albert Einstein?" (Who was Albert Einstein?) by Jess M. Brallier
- "Los planetas: Explora tu mundo!" (The planets: Explore your world) by Penelope Arlon

- "I can save the Earth! One little monster learns to reduce, reuse, and recycle" by Alison Inches and Viviana Garofoli
- "All the colors of the rainbow" by Allan Fowler
- "What makes a magnet?" by Franklyn M. Branley
- "Energy makes things happen" by Kimberly Bradley
- "How do you lift a lion?" by Robert E. Wells
- "Amber's Atoms: The first ten elements of the Periodic Table" by E.M. Robinson
- "Halley Harper Science Girl Extraordinaire: The friendship experiment" by Tracy Borgmeyer
- "STEAMTeam 5: The beginning" by Greg Helmstetter and Pamela Metivier

The toys can be general or K-12 targeted. Some examples of toys include (This list is not exhaustive):

- 4M Salt Water Powered Robot
- Discovery Kids #MindBlown Test Tubes Science Activities
- Smartmax Magnetic Discovery
- Edible Chemistry Kit
- Boom! Fun with Science
- Ultimate Volcano Science Kit
- Scientific Explorer My First Mind Blowing Science Kit
- Crazy Drinks Science Lab
- Science Kit for Young Researchers: Optical Illusions
- Crayola – Color Chemistry Super Lab Set

You will be expected to critique these books/toys based on different factors (A specific grading scoring guide will be provided on Canvas) such as:

- Physical Science concepts they support for topics such as heat, magnetism, electricity, elements, states of matter, chemical reactions, etc.,
- Possible Physical Science intuitive, but incorrect ideas (The moon only being visible at night is a common one in books!),
- Suitable Grade(s) for this book/toy (Is this book suitable for second graders? Is the toy suitable for seventh graders?)
- NGSS connections (How could this book be connected with NGSS? DCIs, SEPs, or CCCs? For example, is a toy focused on helping students become better at identifying patterns (CCC)?)
- Gender (mis)representations (Strong female or male characters or no characters? Who is commonly explaining in pictures in books/toy boxes? Who is commonly listening in pictures in books/toy boxes? Who is commonly holding equipment/collecting data? Provide examples.)
- Cultural (mis)representations (Asian, Black, Hispanic, White, etc. or None represented)
- Animal (mis)representations (Sharks, for example, are commonly portrayed as scary, but sharks play important roles in marine ecosystems).
- Safety – do parts of a toy present a choking hazard?
- Advertising – is the toy accurately advertised? Are some parts smaller/bigger than advertised? Does the toy require construction or

painting that has not been explained? Are batteries required, but it hasn't been explained? Does the toy require ingredients that are not included? Etc.
- Cost – Is the book/toy worth its asking price? Are there other cheaper options available for similar outcomes?
- Would you recommend this book/toy after your critique? Explain.

COURSE POLICIES

In order to maintain a classroom environment conducive to learning for all students, certain policies must be adhered to for this course. By attending online classes, you agree to the following course policies:

- I will have several activities in the semester that will require discussion and collaboration with your peers so active participation is expected (for example, Google Documents).
- Audio and Video recording is not permitted without consent from me, except for disability services that are approved through the university.
- I am happy to answer questions that come up or to clarify anything.

Failure to adhere to any of these policies may result in you being excused from lecture and your participation points withdrawn for the lecture. Depending on the nature of the infringement, additional participation points may be withdrawn for a total of five participation points. Further issues may result in a student's withdrawal from the class.

Virtual Office Hours

Virtual Office hours can be set up by appointment via email. Please feel free to arrange virtual office hours to ask questions about the class material or any general queries. I strongly encourage you to arrange virtual office hours (or e-mail me if it is more convenient) if you are having any difficulty with the material. Do not leave it until the end of the course when it is usually too late. Sometimes a concern that one student has may be also shared by their peers, but I cannot do anything to help until someone informs me so do not be shy.

Late work and make-up work policy: All work should be submitted by the deadlines included on Canvas. If for whatever reason you are having difficulty with the deadlines, please let me know as soon as possible. I will try to be flexible where possible. My overall goal is that all students complete all assignments. Any extensions on assignments should be granted to all students and thus, early communication with me is key.

Students with Disabilities: Upon identifying themselves to the instructor and the college, students with disabilities will receive reasonable accommodation for learning and evaluation.

Subject to Change Statement

This syllabus and schedule are subject to change in the event of extenuating circumstances.

Tentative Course Schedule

This schedule is intended to help you plan and prepare for the course. It may change as the course progresses, including the ordering of topics and due dates. The topic questions in the schedule are focused on physical science phenomena that K-12 students are commonly curious about. The course schedule includes links to the Disciplinary Core Ideas (DCIs) for Physical Science from the Next Generation Science Standards (PS1-PS4).

	Date	**Topic**
1	August 8, Part 1	-What do I need to do to be successful in this course? -What is Physical Science? -What do you think a chemist or physicist looks like? -How is Physical Science similar and/or different from other disciplines? -Is it correct to say something is "just a theory"? (Course Introduction/Nature of Science – NGSS: Appendix H)
	August 8, Part 2	-If I measure a distance, will it be the same numeric value as the rest of my classmates? -How do we reach agreement if we lack agreement? -How do we represent precision of measurements across different instruments? (Measurements & Significant Figures)
2	August 15, Part 1	-How can we represent really large numbers and really small numbers in an efficient way? -How do we convert between different units used here and in other countries such as miles and kilometers? -What happens when units are not converted properly in a laboratory/industry? (Scientific Notation and Unit Conversions)
	August 15, Part 2	**NGSS Overview** -What are the NGSS? -What are Performance Expectations? -What are CCCs, SEPs, and DCIs? -Why are the NGSS important for my practice? -What are useful resources in supporting NGSS in the classroom?
3	August 22, Part 1	-Can we continually make things smaller? -What is smallest thing in the universe? -Do all objects look the same at the "incredibly small" (microscopic) level?

		-How do differences at the microscopic level result in differences at the surface level (macroscopic)? -Where do elements get their names? -How are elements similar or different? (Matter and Its Interactions, PS1)
	August 22, Part 2	-What are elements? -What are properties of elements? -How was the Periodic Table developed? -How do we know if elements will combine to make compounds? (Matter and Its Interactions, PS1)
4	August 29, Part 1	-What are compounds? -How do we name these different compounds? -What are some common examples of compounds in everyday life? (Matter and Its Interactions, PS1)
	August 29, Part 2	-Why do puddles disappear after rainfall? -Would frozen food defrost faster on a metal surface or a wooden surface? -Do objects at the same temperature feel the same? -How much energy is required for a phase change? -What happens at the microscopic level when a phase change occurs? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3)
5	September 6	Labor Day Holiday, No Class/Lab
6	September 13, Part 1	-What is a chemical property, a physical property, or both – fire burning, bananas browning, breaking glass, etc.? -How is a chemical change represented? -How do we balance a chemical equation? (Matter and Its Interactions, PS1)
	September 13, Part 2	-Do some elements have stronger interactions than others? -Why should I wash my hands with soap? -Why is a water droplet a round shape? (Matter and Its Interactions, PS1)
7	September 20, Part 1	-How can you be both at rest and moving at 100,000 km/h at the same time? -Are mass and weight the same thing?

		-How do large bridges not collapse? -Does a hockey puck need a force to keep it sliding? -What is speed and how is it determined? -What is acceleration and how is it determined? -Do heavier objects fall faster than lighter objects? (Motion and Stability – PS2)
	September 20, Part 2	-If you were hit in the face by a baseball, would it be more painful thrown at a distance of 50 cm from the thrower's hand or 5 meters? -How do airbags work? -What are different types of energy? -Are temperature and heat the same thing? (Energy – PS3)
8	September 27, Part 1	-What is gravity and how strong is it? -Do all objects have gravity? -How much does the earth weigh? -Is gravity different on different parts of the earth? -Would I feel lighter on the moon? -Why would I feel weightless in space? What speed does a rocket have to reach to break the Earth's pull of gravity? (Motion and Stability, PS2; Energy, PS3)
	September 27, Part 2	-How is it possible to lie on a bed of nails? -Does pressure vary at different levels in a fluid? -What is air made out of? How much does the sky weigh? -Where does the wind come from? -What is the maximum length of a working straw? (Motion and Stability, PS2; Energy PS3)
9	October 4, Part 1	-An empty fruit juice carton will expand when the lid is put back on it and it is left for a while. Why? -How does a hot air balloon work? -Is it better to attempt to break an Olympic record at a low or a high altitude? -Does water boil at the same temperature everywhere on earth? (Motion and Stability, PS2; Energy PS3)
	October 4, Part 2	-Why do boats float? Why is some of the boat underwater and some of it is not? -How would you know if gold or other types of metal were real?

		-What was the story of Archimedes and King Heron II of Syracuse? (Motion and Stability, PS2; Energy PS3)
10	October 11, Part 1	-How do we account for the different amounts of various elements or compounds in a chemical reaction? -If elements combine to form a compound, does the mass change? -Are all chemicals dangerous? -What do chemical equations tell us about how different elements and compounds react to form products? -What is the relationship between the mass of the reactants and the mass of the products in a chemical equation? (Matter and Its Interactions, PS1)
	October 11, Part 2	-What is concentration? -Does sugar/salt no longer exist when dissolved in water? -Why does a can of soda fizz when opened? -What is desalination? (Matter and Its Interactions, PS1)
11	October 18, Part 1	Why do sour patches taste the way they do? Why is the sea salty? What causes acid rain? What does pH mean? What compounds are used to make toy volcanoes erupt? (Matter and Its Interactions, PS1; S1-S2)
	October 18, Part 2	**REVIEW OF ASSIGNMENT GRADING SCORING GUIDES**
12	October 25, Part 1	--What is static electricity? -Why does my hair stand up after I take off my hat on a cold and dry day? -Why doesn't plastic wrap cling to a metal bowl as well as it does to a glass bowl? -What causes the pain induced from touching a piece of tinfoil on a tooth filling? -What causes lightning? -Why don't all fish die when lightning hits the sea? -What happens before lightning hits someone? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3)

	October 25, Part 2	What is electricity in a wire? -What is needed to make a light switch work? -How do multiple light switches to work? -Why aren't birds electrocuted on electricity wires? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3)
13	November 1, Part 1	-What is magnetism? -What is electromagnetism? -Are certain elements naturally magnetic? -Can other elements be made magnetic? -How does a nail get attracted to a magnet? -What causes the aurora borealis? (Matter and Its Interactions, PS1; Energy, PS3) (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3)
	November 1, Part 2	-Why is grass green? -Why is the sky blue? -Why is the sky sometimes red? -What causes a rainbow? -Why do different elements produce different colors? -What does infrared or ultraviolet mean? -Would ants survive in a microwave? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3; Waves and Their Applications in Technologies, PS4)
	November 1	**BOOK/TOY CLUB ASSIGNMENT DUE (11:59 PM)**
14	November 8, Part 1	-What is reflection? -What is refraction? -How does a periscope work? -What is inside a telescope? -How do reading glasses work? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3; Waves and Their Applications in Technologies, PS4)
	November 8, Part 2	-Could a sound kill you? -How do we hear sounds? -Do we hear a sound coming from underwater better if we are above the water or in the water? -Why can't we hear dog whistles? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3; Waves and Their Applications in Technologies, PS4)

15	November 15, Part 1	-What happened in the Chernobyl nuclear disaster? -What is radioactivity? -Are there different types of radioactivity? -Is there radioactivity all around us? -What is the safe level of radioactivity to be exposed to? -What are practical uses of radioactivity? -Why do comic books mention radioactivity so much? (Matter and Its Interactions, PS1; Motion and Stability, PS2; Energy, PS3; Waves and Their Applications in Technologies, PS4)
	November 15, Part 2	-Why do we sometimes see the moon during the day? -Would life be possible on earth without the moon? -What would happen if the moon were bigger or smaller? -What is a solar eclipse? -How are low tides and high tides caused? (Motion and Stability, PS2)
16	November 22	Peer Lesson Review
	November 29	**PEER LESSON PLAN ASSIGNMENT DUE (25%)**