

Students: Pick 3 activities to work on from the choices on front and back and complete them this week. Please contact your teacher to ask for help or if you have any questions. Submit via email or post link to video. Keep this table for use later if necessary.

Week 3+ Science Department Projects (Students have to pick one box from each category of subject and/or activity type)

	<u>Astronomy</u>	<u>Physics</u>	<u>Chemistry</u>	<u>Biology</u>	<u>Earth/Weather Science</u>
<u>Diagrams</u>	Draw and label a diagram showing the position of the earth relative to the sun on the Spring and Autumnal Equinoxes and the Summer and Winter Solstices. Be sure to show the earth's tilt relative to the sun at each time point. Also draw and illustrate a diagram of the phases of the moon, including a solar and lunar eclipse.	Draw and caption a cartoon of how the Doppler effect works. Use the shift in light wavelength (blue-red shift) and in sound intensity as examples.	Use either particle models or Lewis structures to show how mass is conserved in a simple chemical reaction of your choice. Your visual model should match what is represented in the balanced chemical equation for your chosen reaction.	Draw and label a diagram illustrating the production of a 10 amino acid protein from DNA to RNA to protein. You may make up any DNA sequence to use as the template.	Draw and label an illustration of the Earth's layers. Be sure to include each layer's width and include the lithosphere and asthenosphere.
<u>Math</u>	Using the length of a light year in kilometers, calculate the distance (in km) from our sun to 5 other stars in the Milky Way galaxy.	Look up information about the height, mass, and top speed (km/h) of your favorite roller coaster and calculate the amount of potential energy it has at the top of its highest hill. Assume that it stops moving at the top of the hill. Also, calculate the amount of kinetic energy it has at its maximum speed.	Determine the usual mass and volume of the following items: pro basketball (inflated), baseball, golf ball, 1 liter of liquid water, and 1 liter of solid water (ice). You may use reputable sources to find these measurements. Next, calculate the density for each item and compare them to each other. Answer this using your calculations: Why does ice float? Show the calculations to answer the question.	Look up a human genetic disorder and determine the probability (fractional and percentage) of inheriting the disorder for both male and female offspring. Use different parent genotypes and Punnett squares to solve.	Using the known densities of each layer of the earth, calculate the average density of the entire earth. Compare this to the known density of earth and the densities of the other terrestrial planets.
<u>Short Answer</u>	Using a diagram and a short paragraph, explain why the northern hemisphere experiences summer when the earth is the furthest away from the sun. (See "Diagram" activity above)	Design a bridge out of a material of your choosing and test its weight capacity. After your first trial, design and make improvements to your bridge and test its weight capacity again.	In 1 to 2 paragraphs briefly describe potential physical changes and chemical changes that may occur in the process of cooking or baking a food of your choice.	In 1 or 2 paragraphs, explain how a variety of factors lead to the evolution of Darwin's Finches on the Galapagos Islands.	Use a diagram and short answer (1-2 paragraphs) to explain why a storm surge for a hurricane that hits the U.S. east coast is highest on the northwest side of the hurricane.

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<p><u>Extended Response</u></p>	<p>Using diagrams explain the lifecycle of our sun. Talk about the major phases our sun will have during its life cycle. What will happen to the earth?</p>	<p>Make a video of your own gravity experiments. Use objects of different mass but similar shape and see which hits the ground first. Then see what happens if you use objects of different shapes. During the video, explain why these objects either hit the ground at the same time or at different times.</p>	<p>Using both visual and written descriptions compare and contrast the processes of dissolving table salt (NaCl) and table sugar (sucrose-C₁₂H₂₂O₁₁) in water. Your descriptions should include the role of water in the solution process and what similarities and differences are observed between the two solutions.</p>	<p>Describe the process of genetic engineering using recombinant DNA and how this is used to produce Genetically Modified Organisms (GMOs). Pick a side (GMOs Yes/GMOs No) explain why GMOs are good/bad for people and the environment. Use specific evidence from reputable sources to support your position.</p>	<p>Look up information on the 3 types of plate boundaries (convergent, divergent, and transform) and use an example of each to describe how geological plates move and create earthquakes and volcanoes. Diagrams may be useful.</p>
<p><u>Miscellaneous</u></p>	<p>Give a weather report from a planet other than Earth. Cover topics such as temperature, pressure, clouds, precipitation, and any other atmospheric conditions. You may want to look up what is known about some exoplanets and use one of those.</p>	<p>Make a Youtube style video or poster that illustrates Newton's three laws of motion. Include the description of each law and an explanation of how your example illustrates each law.</p>	<p>Make a "baking soda volcano" and film or photograph it erupting. Then explain what is happening chemically to produce the eruption. Please get parental permission and assistance to complete this activity.</p>	<p>Build your family tree using as many generations as you can. Document a few genetic traits that are passed down your families generations (height, hair color, facial features, etc...) Use pictures if they are available to you.</p>	<p>Using a 2 liter bottle, look up how to make a "Tornado in a bottle" and make a Youtube style video of the tornado explaining how this is, and is not, like a real tornado.</p>