**Challenger Middle School Course Syllabus Course Name: Science of Technology Grade: 7th & 8th**

**Quarter 3 Start Date: 04/15/24 Quarter 3 End Date: 06/14/24**

**Science of Technology 7/8**

**District Course Code:**

**CEDARS Course Code: GTT Science of Technology**

**Certificated Teacher: Scott Birdseye**

**Grading:** A, B, C, D, F

**Course Description:**

Science impacts the technology of yesterday, today, and the future. Students apply the concepts of physics, chemistry, and nanotechnology to STEM activities and projects, including making ice cream, cleaning up an oil spill, and discovering the properties of nano-materials.

**Text/Resources Provided:**

No paper resources

**Online resources:**

Canvas and the PLTW online textbook

**Common Core Standards Addressed In This Course :**

**International Society for Technology in Education**

* Design in Technology and Engineering Education
  + STEL-7V Improve essential skills necessary to successfully design.

**Next Generation Science Standards**

* Engineering Design
  + NGSS.MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
* Motion and Stability: Forces and Interactions
  + NGSS.MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
* Energy
  + NGSS.MS-PS3-2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
* Science and Engineering Practices
  + Asking Questions and Defining Problems
  + NGSS.P1 ⦁ that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
* Using Mathematics and Computational Thinking
  + NGSS.P5 Use mathematical representations to describe and/or support scientific conclusions and design solutions.
* Constructing Explanations and Designing Solutions
  + NGSS.P7 ⦁ Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
* Obtaining, Evaluating, and Communicating Information
  + NGSS.P8 ⦁ Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
  + NGSS.P8 ⦁ Communicate scientific and/or technical information (e.g. about a proposed object, tool, process, system) in writing and/or through oral presentations.

**Course Objectives:**

To pass this course, the student will demonstrate mastery of standards through assignments, projects and/or assessments:

**Summative Assessments:**

**Lesson 1: Applied Chemistry**

* Chemical engineering is the profession that combines chemistry and engineering concepts to help solve problems related to world hunger, pollution of our environment, creating new materials, or meeting demands for energy. Chemical Engineers are instrumental in the production of virtually all pharmaceuticals as well as life-saving devices such as the artificial kidney or angioplasty catheters. They are working on ways to recycle plastics, reduce pollution, and develop new sources of environmentally clean energy. Chemical engineers have the background knowledge of chemistry coupled with an understanding of chemical processing that allows them to tackle most any chemical problem, from waste minimization, to environmental remediation, to pollution prevention, to clean- up of stack gasses, to purification of drinking water. Most major chemical companies hire chemical engineers to fill their technical positions in environmental engineering. In this unit students will explore the chemistry behind making ice cream, creating adhesives, and cleaning up an oil spill.

**Lesson 2: Nanotechnology**

* Nanotechnology is a multidisciplinary field of discovery. Scientists and engineers working in physics, chemistry, biology, information technology, metrology, and other fields are contributing to today’s research breakthroughs. The worldwide workforce necessary to support the field of nanotechnology is estimated at 2 million by 2015. In this lesson students will be introduced to the many facets of nanotechnology, and they will explore nanomaterials and their application.

**Lesson 3: Applied Physics**

* Throughout the ages humans have sought to make life easier through innovation and invention. At the beginning of civilization, hand tools were used exclusively. These hand tools were comprised of one or more of the six simple machines: lever, wheel and axle, pulley, screw, wedge, and inclined plane. Modern machines that are run by electricity have many of their moving parts based on these simple machines. This lesson will provide students with an understanding of machines and how they are used to create motion. This understanding will prepare students to analyze and improve the mechanisms society uses today.

**COURSE GRADE REQUIREMENTS**

**Standards-Based Grading:**

Grading will be standards based. All assignments are expected to be completed to standard; this is a "B". "A" is exceeding standards; demonstrating a deeper and extended understanding of the material. If tests/projects do not meet standard they will need to be revised within the grading period.

**Formative Assessment – 20%:** This includes assignments that assess student learning of a concept and may be a worksheet, team projects, or a quiz.

**Summative** **Assessment- 80% of grade:** Students cannot earn a cumulative passing course grade without meeting standards which may be assessed by tests, essays, and/or projects. Assessments are directly tied to one or more standards.

**Make up/Retake policy**: All assessments can be resubmitted until the student demonstrates mastery of the content. Retake opportunities may require extra preparation.

**Grading Scale: This year we are transitioning to a 4 point standards based scale, similar to what is used in elementary school.**

| **22-23 CHALLENGER MIDDLE STANDARDS-BASED GRADING SCALE** | | |
| --- | --- | --- |
| **SBG SCORE** | **DESCRIPTION** | **LETTER ALIGNMENT** |
| **4** | **Exceeding Standards -** Consistently meets requirements for exceptional work related to course standards and demonstrates a deep level of knowledge and skill | A  80-100 |
| **3** | **Meeting Standards -** Consistently meets most requirements for proficient work related to course standards and demonstrates grade level knowledge and skills | B  60-80 |
| **2** | **Approaching Standards -** Consistently meets some requirements for proficient work related to course standards and demonstrates some grade level knowledge and skills | C  40-60 |
| **1** | **Attempting Standards -** With or without consistent support student is making limited progress towards standards - progress report meeting required | D  20-40 |
| **0** | **Insufficient Evidence -** With consistent help, no  demonstration of key standards - progress report meeting required | F  0-20 |

**Academic Honesty:**

We are here to learn and grow as scholars and as such strive to produce our best original work. As such, we will be exploring the concepts of plagiarism, cheating, and academic integrity throughout our courses and will treat each instance of academic dishonesty as a learning opportunity. All of us (adults and students) are expected to work under the directions and guidelines provided by each learning opportunity, assignment, and assessment to the best of our individual and unique ability. Should a student demonstrate a pattern of behaviors that show a pattern of academic honesty violations, progressive interventions including disciplinary action may apply.

Progress and course assignment/project completion will be evaluated at least monthly by the teacher.

**Classroom Expectations and Norms:**

**Expectation:**

If what you are doing: INTERFERES with learning, HURTS someone's heart, PREVENTS you from being your best self… You shouldn’t be doing it!

**Norms:**

* Everyone has the right to be heard.
* Be respectful while still being critical.
* No name calling.
* One person speaks at a time.
* Hold yourself and each other to high standards of excellence at all times.
* Have the humility to recognize that you do not know everything and that everyone can stand to improve.
* Recognize that everyone will start from different bases of knowledge.