



## Project-Based Science Syllabus CHS Science Department

**Contact Information:** Parents may contact me by phone, email, or visiting the school.

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**CCSD Vision Statement:** The Chillicothe City School District will provide tomorrow's leaders with a high quality education by developing high expectations and positive personal relationships among students, staff, and community members.

**CCSD Mission Statement:** The Chillicothe City School District empowers students to learn, to lead, and to serve.

### **Course Description and Prerequisite(s) from Course Handbook:**

**Project-Based Science - 317**

**State Course #:** 139998

**Prerequisite:** Successful completion of at least Physical Science and Biology I

**Elective**

**Grade:** 11-12

**Graded Conventionally**

**Credit:** 1

**Course Description:**

Project-based learning (PBL) provides students the opportunity to work individually or as teams to complete a project that can range anywhere from a week to several weeks. They are engaged in real-world problem solving and/or answering questions. Students demonstrate their knowledge and skills by developing a product or presentation. As a result, students will gain deep content knowledge, specifically regarding science, and critical thinking skills, communication skills, and creativity. Students will be expected to interact with the community at times. They will also occasionally be working with other subject areas at CHS where applicable, such as Art, Math, and others. Throughout the semester, we will explore careers linked to Science and STEM, and interact with employees who represent those careers. **There is a \$15 lab fee.**

**Learning Targets:** Defined below for clarity are the Unit Titles, Big Ideas of every Unit taught during this course, and the Essential Questions to be answered to better understand the Big Ideas. A student's ability to grasp and answer the Essential Questions will define

whether or not he or she adequately learns and can apply the skills found in Big Ideas. This will ultimately define whether or not a student scores well on assessments administered for this course.

- **1st Quarter**

- **Unit I: Importance of Composting and Pollinators**

- **Big Idea #1:** I can connect everyday waste products to an end result of useful compost.
  - *Essential Question #1: What is humus?*
  - *Essential Question #2: Which items are classified as green or brown waste materials that can be composted?*
  - *Essential Question #3: How do worms and other decomposers aid in making compost?*
- **Big Idea #2:** I can create a personal composting plan.
  - *Essential Question #1: Where is the best location for a compost bin at my house or my school?*
  - *Essential Question #2: What is the most appropriate compost bin for my house or my school?*
  - *Essential Question #3: How can I use the compost I make?*
- **Big Idea #3:** I can design a pollinator garden.
  - *Essential Question #1: What are the parts of a flower?*
  - *Essential Question #2: What are pollinators?*
  - *Essential Question #3: What is the relationship between pollinators and food production?*
  - *Essential Question #3: What types of adaptations have flowers made to encourage pollinators?*
  - *Essential Question #4: How can I design a pollinator garden for my house or my school?*

- **Unit II: Hydroponics/Aquaponics**

- **Big Idea #1:** I can grow my own food by using hydroponics.
  - *Essential Question #1: What is hydroponics?*
  - *Essential Question #2: Which type of plants grow well hydroponically?*
  - *Essential Question #3: How can I make my own hydroponics system to grow a plant?*
- **Big Idea #2:** I can use a Tower Garden to produce foods for consumers.
  - *Essential Question #1: What types of plants can be grown in the Tower Garden?*
  - *Essential Question #2: What is the relationship between nutrient solution and pH?*
  - *Essential Question #3: What light requirements are needed for the plants growing in the Towers?*
- **Big Idea #3:** I can connect hydroponics and aquaponics.
  - *Essential Question #1: What is aquaponics?*

- *Essential Question #2: How can fish and plants maintain a symbiotic relationship?*
  - *Essential Question #3: How can I make my own aquaponics system to grow a plant?*
- **2nd Quarter**
  - **Unit III**
  - **Big Idea #1:** I can depict how solar and geothermal energy can be more efficient and cleaner than fossil fuels.
    - *Essential Question #1: Why should I use solar energy to conserve resources?*
    - *Essential Question #2: Why should I use geothermal energy to conserve resources?*
    - *Essential Question #3: How can I build a prototype of how solar or geothermal energy could provide more efficient energy?*
  - **Big Idea #2:** I can show how wind and water are acceptable alternative fuels.
    - *Essential Question #1: Why is wind considered an alternative fuel?*
    - *Essential Question #2: How does water generate electricity?*
    - *Essential Question #3: How can I build a prototype of how wind or water energy could provide more efficient energy?*
  - **Big Idea #3:** I can prove that biomass is a legitimate way to conserve energy use from fossil fuels.
    - *Essential Question #1: What is biomass?*
    - *Essential Question #2: How is biomass used for heating, power (electricity) generation, consumption of products or transportation needs?*
  - **Unit IV: Wildlife Management/Endangered Species**
    - **Big Idea #1:** I can identify the status of specific species of wildlife.
      - *Essential Question #1: How can I determine if an animal is endangered, threatened, or extinct, or if it is considered game or nongame?*
      - *Essential Question #2: What is the difference between wild and domesticated?*
      - *Essential Question #3: What are the effects of decline and/or recovery of wildlife?*
    - **Big Idea #2:** I can explain why wildlife management is necessary.
      - *Essential Question #1: How can habitat surveys help officials with counts of wildlife?*
      - *Essential Question #2: Which types of control methods are used to maintain manageable numbers of wildlife, globally and locally?*
      - *Essential Question #3: What are examples of wildlife legislation put in place to protect species, globally.*
    - **Big Idea #3:** I can research endangered and threatened species.
      - *Essential Question #1: What organizations represent species conservation, locally and globally?*

- *Essential Question #2: What can I do to support wildlife and endangered species conservation?*

- **MID-TERM EXAM**

- **3rd Quarter**

- **Unit V: Consequences of Ocean Pollution**

- **Big Idea #1:** I can investigate the causes of ocean pollution.
  - *Essential Question #1: What is the Great Pacific Garbage Patch?*
  - *Essential Question #2: How are oil spills cleaned up?*
  - *Essential Question #3: What are other examples of ocean pollution?*
- **Big Idea #2:** I can determine the consequences of ocean pollution.
  - *Essential Question #1: What is causing the deaths of coral reef systems?*
  - *Essential Question #2: How is ocean biodiversity being affected by pollution?*
  - *Essential Question #3: What is being done to reduce ocean pollution?*
- **Big Idea #3:** I can discuss instances in which damage is being done to oceans and coasts, but also success stories to confirm conservation efforts.
  - *Essential Question #1: What do algal blooms in Lake Erie and Chesapeake Bay issues have in common?*
  - *Essential Question #2: What do overfishing and aquaculture have in common?*
  - *Essential Question #3: Why is coastal erosion becoming a problem?*

- **Unit VI: Living In Space**

- **Big Idea #1:** I can theorize how humans can exist in space.
  - *Essential Question #1: How will humans be transported into space?*
  - *Essential Question #2: What are the effects on humans who spend time in space?*
  - *Essential Question #3: Why do human needs differ depending on where in space they might inhabit?*
- **Big Idea #2:** I can determine what humans would need to live in space.
  - *Essential Question #1: What food, air, and water resources must be made available to humans in space?*
  - *Essential Question #2: What would be the best types of housing for humans to build in space?*
  - *Essential Question #3: How would waste management be maintained in space?*
- **Big Idea #3:** I can design a fictitious colony in space.

- *Essential Question #1: What type of facilities would be necessary for humans to live and thrive in space?*
  - *Essential Question #2: What types of transportation systems would be available to humans in space?*
- **4th Quarter**
  - **Unit VII: Weather & Climate**
    - **Big Idea #1: I can monitor weather.**
      - *Essential Question #1: What types of instruments are used to forecast weather?*
      - *Essential Question #2: How do I read a weather map?*
      - *Essential Question #3: How can I track weather and analyze trends?*
    - **Big Idea #2: I can perform tasks like a meteorologist.**
      - *Essential Question #1: What is a meteorologist?*
      - *Essential Question #2: How accurate are meteorological predictions?*
    - **Big Idea #3: I can determine what distinguishes weather from climate.**
      - *Essential Question #1: What factors can affect temperature?*
      - *Essential Question #2: What is the difference between weather and climate?*
      - *Essential Question #3: What types of extreme weather occur, and how does it relate to climate?*
  - **Unit VIII: Forensics**
    - **Big Idea #1: I can investigate types of careers in forensics.**
      - *Essential Question #1: What are the different careers offered in the field of forensics?*
      - *Essential Question #2: How is a crime scene preserved and recorded?*
      - *Essential Question #3: What are types of physical evidence?*
    - **Big Idea #2: I can distinguish among other types of evidence.**
      - *Essential Question #1: How do I read or process blood spatter patterns?*
      - *Essential Question #2: What are types of trace evidence?*
      - *Essential Question #3: How is arson detected?*
      - *Essential Question #4: How do fingerprints determine what happened at a crime scene?*
- **END OF COURSE EXAM**

**Course Materials:**

- Google Chromebook
- notebook paper
- 3-ring binder
- writing utensils
- ear buds
- positive attitude!

**Electronic Resources:**

- Google Classroom
- email
- various websites used throughout the course

**Course Expectations:**

- This course is meant to be fun, but engaging. We will focus on aspects of Science that you may not have encountered in other high school science classes. There will be a year-long project (the courtyard), as well as numerous smaller projects, because this is a *project based learning* course. Your summatives will likely be in the form of some kind of project (whether physical or written) and graded by rubric. Along with each project, we will also be learning about the subject, as we do in a normal classroom setting, and you will have quizzes and sometimes work to do at home. This is important: **YOU WILL BE REQUIRED TO WORK TOGETHER IN GROUPS FOR SOME PROJECTS AND YOU WILL BE ASKED TO DO PRESENTATIONS OF YOUR WORK FOR SOME PROJECTS.** It is **expected** that you will participate individually, but also in the group setting. It is necessary to work as a team in this course. You should become personally invested in the work we do in PBS. It will make your learning experience more valuable and interesting. Some projects may be displayed in local businesses, and/or the school, and/or the Ross County Fair CHS booth. Part of your coursework will require you to work with the Tower Gardens, as well.
- It is imperative that you come to class each day with a positive attitude and ready to work! When you enter the room, there will be a bellringer on the board. You should sit in your seat and begin the bellringer. The restroom may be used, **ONLY** if you tell me, before class begins. Once the bell rings and class starts, you must use the pass to go to the restroom, but remember--you only have \_\_\_ passes for the 9 weeks. Use them wisely. Please try not to interrupt the learning process unless it is an emergency.
- We will work from bell to bell. The bell releases you, not you. Do not get up and stand by the door. Everyone must be sitting in their seats until the bell rings or the class will stay as long as it takes for everyone to sit.
- **ABSOLUTELY NO PHONES.** All phones will be placed in the pocket by the door with your name on it as soon as you enter the room. I will follow this policy closely. If you are caught with your phone, you will begin the climb up the classroom discipline ladder.
- This is a science room, which means lots of labs and equipment will be out at times on the counters. Respect each other's work. Please don't mess with another class's experiments or projects, or your classmates' work. We will also be working with small tools at times, so learn how to use them correctly, maturely and safely.

**Grading:**

Unit Exams	50%
Assessments (Including: Quizzes, Essays, Labs, and Projects)	30%

Class work/Homework 20%

- Each nine week's grade comprises 20% of a student's final grade.
- The Mid-Term Exam and End of Course Exam each comprise 10% of a student's final grade.

**Grading Scale:**

The grading scale for Chillicothe High School can be found in the student handbook or online at <http://www.chillicothe.k12.oh.us/1/Content2/studenthandbook>.

**Late Work:** Late work will be subject to the Board-adopted policy on assignments that are submitted late (to be reviewed in class).

- Regardless of the absence type (excused, unexcused, OSS, etc.), students are expected to make up work and be held accountable for learning all material they missed.
- Any student who is absent from school will receive one (1) additional day for every day he/she missed to make up his/her work for full credit (100%).
- Any student who exceeds the allotted time to turn in an assignment for full credit may still submit work late for partial credit.
  - Any student who turns in work up to 1 week late must at least be given the opportunity to earn 75% on that assignment.
  - Any student who turns in work between 1 and 2 weeks late must at least be given the opportunity to earn 60% on that assignment.
- The end of the 9 weeks is the cut off point for teachers to accept late work from students for full or partial credit unless the teacher decides to give the student an incomplete for the 9 weeks due to extenuating circumstances.

**Performance Based Section: Writing**

**Assignments/Exams/Presentations/Technology**

One or more of the End of Unit Exams may be Performance Based. According to the Ohio Department of Education, "Performance Based Assessments (PBA) provides authentic ways for students to demonstrate and apply their understanding of the content and skills within the standards. The performance based assessments will provide formative and summative information to inform instructional decision-making and help students move forward on their trajectory of learning." Some examples of Performance Based Assessments include but are not limited to portfolios, experiments, group projects, demonstrations, essays, and presentations.

### CHS Project-Based Science Course Syllabus

After you have reviewed the preceding packet of information with your parent(s) or guardian(s), please sign this sheet and return it to me so that I can verify you understand what I expect out of each and every one of my students.

Student Name (please print): \_\_\_\_\_

Student Signature: \_\_\_\_\_

Parent/Guardian Name (please print): \_\_\_\_\_

Parent/Guardian Signature: \_\_\_\_\_

Date: \_\_\_\_\_