Astronomy
Instructor: Tim Brennan, tbrennan@wcsu.net 2019-20

Course Overview:
Astronomy is the study of not only the celestial bodies that have fascinated humanity for all of recorded history, but also the origins of the Universe, its evolution over time, and the growing understanding that, by studying the Universe at large, we come to know ourselves. This is true on a metaphoric level but also, in some very real, very literal sense.

Units and Activities: What will we be learning about and doing in this course?

<table>
<thead>
<tr>
<th>Unit</th>
<th>Main Ideas of the unit</th>
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<tbody>
<tr>
<td>Unit 1 - Cycles of the sky</td>
<td>Moving from describing what happens to understanding why those things happen.</td>
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<tr>
<td>Unit 2 - Stellar Lives</td>
<td>Understanding the role of fusion and the roles that gravity and mass play out in the life cycle of a star.</td>
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<tr>
<td>Unit 3 - Big Bang Theory - Predictions and Confirmations</td>
<td>Understanding the idea of a scientific theory, the specificity of predictions and the amazing agreement between those predictions and our observations.</td>
</tr>
<tr>
<td>Unit 4 - Earth History</td>
<td>Exploring deep time and the connections between astronomy, the lives of stars, geology, and biology!!</td>
</tr>
</tbody>
</table>

We will use a project-based approach to these units. For example, we will begin the first unit with an appreciation for simple tools used by ancient civilizations (like sundials) and come to understand the powerful insight they provide us about the heavens and human nature. We will use these early instruments to develop design skills and increase our understanding of the complexity of the night sky.
Standards: What knowledge and skills will I gain by the end of this course?

**Anchor Standards:** This course will assess the knowledge and skills students build in key Anchor Standards. A student will have multiple opportunities to show their proficiency in each Anchor Standard. Below, each Anchor Standard for this course is named and described.

**Designing** - Students will engage in the production of publicly-shared projects and, as such, will engage in a variety of designing activities.

*Communicating Scientific Information* - As part of the process, students will obtain and assess scientific texts, then texts into their own words or actions. Their final designs will big ideas to an audience and they will reflect on their own “designers.”

**Computational Thinking** - Students will move back and forth from the concrete experiences of the classroom to the abstract realm of mathematics and computational thinking. Mapping reality into symbolic language is a key science skill.

**Course Standards:**

From the Next Generation Science Standards:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-ESS1-4.</td>
<td>Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.</td>
</tr>
<tr>
<td>HS-ESS1-1.</td>
<td>Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun’s core to release energy in the form of radiation.</td>
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<tr>
<td>HS-ESS1-3.</td>
<td>Communicate scientific ideas about the way stars, over their life cycle, produce elements.</td>
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<tr>
<td>HS-ESS1-2.</td>
<td>Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.</td>
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<tr>
<td>HS-ESS1-6.</td>
<td>Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth’s formation and early history.</td>
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Assessment of Learning

Assessment Types:
Three types of assessments will be used to determine if you have gained the necessary knowledge and skills of this course: Formative assessments, Summative assessments, and Habits of Work for Learning. Each is briefly described below:

Formative Assessments: Formative = Forming my knowledge and skills. Formative Assessments receive a weight of .1 in the overall grade. Formative assessments are information for teachers, students, and parents on the progress students are making as they practice gaining knowledge and skills found in Anchor Standards. Teachers use the results of these assessments as data to understand individual student learning needs, adjust instructional pathways, and modify lessons to help students better meet course standards. Students use the results of these assessments to determine how they are progressing and to plan steps to ensure their success.

Summative Assessments: Summative = Summation of my knowledge and skills. Summative Assessments can receive three different weights: 1, 1.5, or 2 depending on the size of the assessment, and therefore have the greatest impact on the Overall Course Mastery Grade. Summative assessments are used as a measure of independent student achievement in Anchor Standards. Throughout this course, summative assessments provide benchmark student achievement data. A summative assessment will always have clear scoring criteria for students to understand how they are performing.

Habits of Work for Learning: Habits of Work for Learning (HOWLs) are skills and dispositions that are essential to the learning process but do not provide evidence of what a student knows or can do in relation to content. WUHSMS teachers work to foster Habits of Work for Learning in three categories: preparation, participation, and perseverance.
Assessment Scoring:
Teachers will provide framing for summative assessment scores using proficiency level scoring criteria for grading similar to the example below:

**Anchor Standard:** Computational Modeling

<table>
<thead>
<tr>
<th>Course Standards: NGSS LS-L2-1 Use mathematical and/or computational representations to support explanations of factors that affect the carrying capacity of ecosystems at different scales. NGSS HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Representation</strong></td>
</tr>
<tr>
<td>I can identify the components of a system.</td>
</tr>
<tr>
<td>I can represent the components of a system using numbers or variables.</td>
</tr>
<tr>
<td>I can show connections between components of a system using a computational model.</td>
</tr>
<tr>
<td>I can use mathematics and/or a computational representation to make predictions about how changing one variable or component will affect the system.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1.0*</th>
<th>1.3*</th>
<th>1.7*</th>
<th>2.0</th>
<th>2.3</th>
<th>2.7</th>
<th>3.0</th>
<th>3.3</th>
<th>3.7</th>
<th>4.0</th>
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<tbody>
<tr>
<td>NC*</td>
<td>NC*</td>
<td>NC*</td>
<td>C</td>
<td>C+</td>
<td>B-</td>
<td>B</td>
<td>B+</td>
<td>A-</td>
<td>A</td>
</tr>
</tbody>
</table>

Beginning | Approaching | Proficient | Distinguished

*Scores in the “Beginning range” are well below proficient and thus they are below passing.

HOWL Scoring:
HOWLs will be scored at least once per checkpoint, and will be based on the frequency with which students demonstrate each of the habits: preparation, participation, and perseverance.

How is my Overall Course Grade Determined?
Overall course grades will be reported as letter grades and will be comprised of:
- Formative & Summative Scores: 95%
- HOWLs: 5%

For more information, please see the WUHSMS student handbook.

Communication:
How Do I Know My Grades?
- On Summative Assessments, a teacher will provide both a 4-point grade and a letter grade.
- You can monitor your progress in the following ways:
  - By reading feedback and scoring returned to students on summative assessments
  - By monitoring the scores and Overall Course Mastery Grade in the Parent/Student portal on JumpRope
  - By monitoring the grades sent home quarterly through report cards
Where Can I Find This Syllabus during the School Year?
● This syllabus will be available on the school website in each subject’s department tab once the school year is up and running.

How Do I See What’s Due?
● Summative assessment due dates and handouts are posted to the blue “Upcoming Assessment” section of the JumpRope Parent/Student Portal on or before the day they are assigned to students.

How Do I See What’s Past Due?
● If a student is missing an assessment, it will be listed in the red “Missing Assessment” section of the JumpRope Parent/Student Portal along with any attachments.

Best Way to Contact Me:
Please don’t hesitate to be in touch with me via phone or email, though email is very much the better mode: tbrennan@wcsu.net. As my schedule settles in, I will alert you to free periods I have during the school day. Finally, I urge you to use ARE block as a convenient way to see me should you need any review or support!!

Materials:
We will not be using a physical textbook in this class. We will frequently need to access digital materials on Google Classroom and elsewhere. Please ensure that you bring your laptop/tablet/netbook to class for full participation.

Schoolwide Procedures:

Please see the Student Handbook for Procedures and Policies related to: Due dates and deadlines, extra credit, retaking assessments, and turnaround time for grade entry.

Personal Mobile Devices: This class will follow the procedures outlined in the student handbook.
Class Expectations:

Four norms I will seek to establish with my you:

1) **Equity** - We each have a voice. We each have the right to be heard. We each have an obligation to contribute our thoughts.

2) **Respect** - We each deserve to be heard and understood. We owe one another the basic decency of attention and consideration. We can disagree without being disagreeable.

3) **Reason** - We need to focus on evidence and logic. We should expect to provide a rationale for our thoughts. We should expect to be asked for such.

4) **Stewardship** - We each have a role to play in establishing a positive classroom culture. We each have a role to play in our own learning.
I have read this syllabus, and I have contacted the teacher with any questions I have.

Student name (printed): ____________________________

Parent/Guardian name (printed): ____________________________

Signed: ____________________________ Date: ____________________________