Progenitor-X Curriculum Unit

Games+Learning+Society

Grades: 6-8
Time Length: 1 week, 40 min class periods
Subjects: Science, Math, Social Studies, Reading, Language Arts
*Progenitor-X game play is divided across four class periods (Parts I, II, III, and IV) and integrated with subject lessons.

WEEK ONE	Day 1	Day 2	Day 3	Day 4	Day 5
Science	**- Progenitor-X** **- Game Play (Part I)** **- 20 min.** Students should begin and complete Mission 1: Madison, WI. Within 20 minutes of game play, students will be introduced to five types of cells: Fibroblasts, Purple iPS Cells, Red Mesoderm Cells, Blue Ectoderm Cells, and Green Endoderm Cells.	**- Cells/Tissues Review** **- Word Sort** **- 20 min.** Students work together in small groups to sort basic cell and tissue structures by size or relationship. https://docs.google.com/document/d/1nUx2dvjkt-jVtMu0N2objE0xRSXxn9K5ivGhM34BIO0/edit?usp=sharing - **Introduction to Cellular Differentiation/Stem Cells** - **Lecture** - **20 min.** Introduce basic biology of cellular differentiation and its uses. Discuss the controversy of stem cell use.	**- Embryonic, Adult, & iPS Stem Cells** **- Game** **- 40 min.** Students work independently to complete a cell characteristic chart of embryonic, adult and iPS cells using the articles and electronic resources available to them. https://docs.google.com/document/d/19FTM0yfaq20GuIYkzJEsh3j6Bc9jmdIQ7zhtOEv0wds/edit?usp=sharing	**- Embryonic, Adult, & iPS Stem Cells** **- Game** **- 40 min.** Have students compile answers with others until their cell chart is complete. Select students to fill the roles of “Mystery Cells” and “Detective” and begin game play.	**- Game Play vs. Reality** **- Video Chat** **- 40 min.** Video chat with a scientist from the Wisconsin Institute of Discovery to compare game play with real life regenerative medicine. Have students prepare thoughtful questions prior to the chat, and complete a Venn Diagram comparing and contrasting Progenitor-X with actual restorative procedures after.
Math	**- Introduction to Pentominoes** **- Mini Lesson / Experiment** **- 20 min.** Teacher will explain what a pentomino is and students	**- Progenitor-X** **- Game Play (Part II)** **- 20 min.** Students should begin and complete Mission 2: Henderson, NV. Within 20 minutes of game play,	**- Pentominoes** **- Discussion/Puzzle Experiment** **- 30 min.** Teacher leads a discussion on area and perimeter of the 5 tile	**- Progenitor-X** **- Game Play (Part III)** **- 20 min.** Students should begin and complete Mission 3: La Jolla, CA. Within 20 minutes of game play,	

	work independently in small groups to draw a complete a set of 12 pentominoes.	students will use the “Rapid Adaptive Tissue Matrix” to build restorative tissues using pentomino-like shapes.	pieces and students work together in partners to complete pentomino puzzles.	students will use continue building restorative tissues in the form of pentomino-like shapes and repairing organs.	
Social Studies		**- Ethics Debate** **- Class Divided** **- 40 min.** Students will study ethics and debate in preparation for a class divide around the controversial topic of stem cells. Begin with the focus question: *Is destroying a single embryo to save countless lives justifiable?* Give students a few minutes to journal. https://docs.google.com/document/d/1Zdc7nLOgZat5-jeFwdii-luskU8CmP41smqGfOOH11g/edit?usp=sharing	**- Ethics Debate** **- Class Divided** **- 40 min.** Pass out persuasive articles presenting both sides. Prep students for the informal debate by practicing the art of discussion, as well as articulating ideas, making justifications, and clarifying their positions on the issue.	**- Ethics Debate** **- Class Divided** **- 40 min.** Explain the guidelines of the class divide and interfere with the debate as little as possible. Conduct the divide until the entire class has chosen a position.	
Reading		**- Assessing Sources** **- Lesson** **- 30 min.** Students will be doing independent research from a variety of sources. They should know how to assess the reliability of such sources and learn to view text through a critical lense. Provide students with reliable and unreliable print and digital sources for them to critique.	- **Close Reading Non-Fiction Texts** - **Shared Reading** - **20 min.** Conduct a mini review lesson on reading non-fiction texts, such as analyzing non-fiction features and note taking strategies. - **Research/Non-Fiction Texts** - **Shared reading** - **20 min.** In continuity with science and social studies, have	- **Research/Non-Fiction Texts** - **Shared reading** - **40 min.** In continuity with science and social studies, have students read independently another article on stem cells practicing close reading strategies, and then add new information to their cell charts and persuasive arguments.	**- Shared Reading** **- Authors’ Celebration** **- 40 min.** In continuity with language arts, celebrate the students’ completed essays with an authors’ celebration. Have students read their writing aloud or swap stories for a shared reading exercise.

			students partner read another article on stem cells practicing close reading strategies, and then add new information to their cell charts and persuasive arguments.		
Language Arts	**- Mentor Text** **- Read Aloud** **- 30 min.** Reduce writers block amongst students with a gripping mentor's text to get them excited to begin writing their own stories. Possible texts may include: - *The Walking Dead*, Book One, Robert Kirkman - *World War Z*, Max Brooks - *I Am Legend*, Richard Matheson	**- Free Write** **- Rough Draft** **- 40 min.** Ask students to combine their creative writing skills with their knowledge of stem cells and tissues during a free write based off a provided prompt. https://docs.google.com/document/d/1PHy0pIi0rXQAOvm9JwFyd1GI76yEM1ESiE4JHrHD7P4/edit?usp=sharing	**- Free Write** **- Revisions/Edits** **- 40 min.** Have students complete their rough drafts if needed. Students can revise and edit their work independently while the teacher conferences with individuals as needed. Consider having students switch with a partner for peer editing.	**- Free Write** **- Final Draft** **- 40 min.** If available, use computers to have students type up their final copies.	**- Progenitor-X** **- Game Play (Part IV)** **- 15 min.** Students should begin and complete Mission 4: Austin, TX. Within 15 minutes of game play, students will continue building restorative tissues and repairing organs. At the end of the game students will finally encounter the infamous zombies!

	Unit Objectives:
Science:	● Students will be able to correctly identify embryonic, adult, and iPS stem cells through their knowledge gained in research and through deductive reasoning. ● Students will be able to show their understanding of the three types of cells of regenerative medicine, their relationships with the human body, and their similarities and differences. ● Students will be able to locate tissues within the five levels of body organization, as well as cells, organs, and systems. ● Students will be able to order the levels of body organization from smallest to largest in a variety of examples.
Math:	● Students will be able to draw a set of geometric shapes made from 5 squares under specific constraints. ● Students will be able to calculate perimeter and area of pentominoes and figure out which pentomino is the most efficient (most area with the least perimeter). ● Students will be able to construct a polygon from pentomino pieces.
Social Studies:	● Students will be able to analyze both sides of a presented argument. ● Students will be able to defend their position based on their researched findings and the arguments of their classmates.

	• Students will be able to analyze primary and secondary sources through critical lenses.
Reading:	• Students will be able to read scientific information from print and/or multimedia texts. • Students will be able to decipher what information from their research is relevant and summarize their findings in a chart.
Language Arts:	• Students will be able to incorporate the required elements into an appropriate writing sample. • Students will be able to work cooperatively during the editing and sharing phases of creative writing.

	Common Core Educational Standards:
Science:	• **(MS-LS1-1.)** Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. • **(MS-LS1-2.)** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. • **(MS-LS1-3.)** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. • **(MS-LS4-5.)** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms
Math:	• **(7.G.A.1)** Solve problems involving scale drawings of geometric figures including computing actual lengths and areas from a scale drawing at a different scale. • **(7.G.A.2.)** Draw geometric shapes with given conditions. • **(8.G.A.4.)** Understand that two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations.
Social Studies:	• **(RH.6-8.1)** Cite specific textual evidence to support analysis of primary and secondary sources. • **(RH.6-8.6)** Identify aspects of a text that reveal an author's point of view or purpose. • **(RH.6-8.8)** Distinguish among fact, opinion, and reasoned judgement in a text.
Literacy:	• **(Literacy.RI.6.7)** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. • **(Literacy.RI.9-10.4)** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings • **(Literacy.WHST.9-10.5)** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. • **(W.11-12.1)** Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • **(SL.11-12.4)** Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed. • **(RST.6-8.10)** By the end of grade 8, read and comprehend science/technological texts in the grades 6-8 text complexity band

	independently and proficiently.