Title: Life Simulation

Project Idea: Summary of the issue, challenge, investigation, scenario, or problem:

Students will look at using multiple data types in a programming language to model a real world structure. In this case, we will look at making simple abstractions of predatory and prey species (and dynamic equilibrium) by making simple cell models.

Driving Question:

Can we model life-like behavior with Python?

Essential Question:

How can we apply our expanded understanding of data types and storage?

Content and Skills:

ELA	Math	CS	SUNY
• WHST.11-12.5 • WHST.11-12.1 • L.11-12.1b • WHST.11-12.2a • RST.11-12.3	• AI-F.IF.2 • AI-F.IF.8	• 9-12.CT.4 • 9-12.CT.5 • 9-12.CT.7 • 9-12.CT.8 • 9-12.CT.9 • 9-12.CT.10	• Algorithms • Reasoning about control flow in a program • Linear data structs • maps

21st Century Skills to be explicitly *taught and assessed* (T+A) or that will be *encouraged* (E) by project work, but not taught or assessed:

	T+A	E		T+A	E
Collaboration	T/A	E	Critical Thinking	A	E
Communication/Presenting		E	Creativity/Innovation	T/A	E

Culminating Product(s):

Assessments					
Individual			Team		
Learning Targets	Benchmarks	Scaffolds	Learning Targets	Benchmarks	Scaffolds
See above	Segment check ins, code comments, time tracking	Grouping for skill or emotional support	See above	See Calendar, code checks	Instructor guidance, cross group support, code help

Entry Event to launch inquiry and engage students:

Review a little bit of the work we have been doing with objects & inheritance & polymorphism Review of previous scaffolded project and prior trivia project. Talk about the life game, give out the rubric and the explanation sheet, talk about some of the larger details.

Assessments/Benchmarks:

Formative (quizzes, journal prompts, outlines, prototypes, etc) :	Summative (written product, presentation, performance (with rubric)) :
Daily: check on progress.	Working code checks every large point
Daily: check submissions to classroom	
MWF: Progress deep review & extension consideration	Classroom upload checks for workflow evaluation

Resources:

People	**Students: <insert demograph here>, Teacher: <insert teacher here>**
Equipment	**Computers, Discord, et al.**
Materials	**Paper, White boards,**
Online	**G2G, StackOverflow, W3Schools, other sources as needed, student progress documents, student copies of calendar, GDB**

Calendar

Project Week 1

Project Launch, discussion & group formation. Determine fxn & struc motif, Data entry	**Check any group administrata setup. 2d/3d array construction/use**	**Finish up formative work. Work on prey move logic**	**Work on logic, expand from yesterday, work on prey breeding logic**	**Continue to work on prey logic**

Project Week 2

Wrap up single cell logic,test, work on game loop	**Game loop functionalization, start pred logic**	**Continue pred logic**	**Finish pred logic, Clean up, user presentation clean up, refactoring**	**Finishing touches, evaluation**

Project Teaching and Learning Guide (Scaffolding Map)

Knowledge and Skills Needed by Students	How you will support learning: Activity / Lesson / Research / Guided Inquiry / Materials
Error throwing and catching	Introduce after a group has a bug they can not find.
Looping	Review as needed with groups as they encounter problems if there is need to rt
Recursion(maybe?)	Research, structured research
Conditionals	Review as needed with groups as they encounter problems if there is need to rt
Proper type use & logic use	Look at student plans for representation of questions and truthyness
Version Control	Enforce daily code pushes to classroom starting 3 Dec
Larger Complexity	Drill in planning (day 1) & small item build up
Commenting/Good group work	Individual accountability per rubric
Use of dictionaries	Help with the heavy lifting, make sure students have a good grasp before we dig into the assignment
nDimesional arrays/vectors	Pause group work if needed to walk through examples, teacher as a resource, help students work though outlines of them.