



# *Python Playtime!*

## STEAM Challenge

**Due: April 7, 2023**

**Designed for Middle and High School Students**

*[This Meridian Stories Challenge was developed by Kyle Dube, a student at Colby College.]*

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## The Challenge

They engage children all the time, ...and teens and adults. What are we talking about? Video games. But what are the original gaming models that set this industry in motion? Which games launched this invaluable and culturally seismic industry that has infiltrated the global psyche of humanity? *That* is what we are going to explore in *Python Playtime!*

In this Challenge, you are going to a) choose a game from the early days of gaming and research some of its history of origin; b) recreate the programming of that game (or as much as you can); and then c) tell us the story of both the game itself and your experience re-creating it through code. *Python Playtime* is a documentary intended to tell the story of the history of your select game, as informed by your experience re-creating the code that made that game spectacularly popular. You and your team are both on the outside looking in (the historical research) and on the inside looking out (the coders and game re-creators).

**Deliverables** include:

- The documentary (this is the only Meridian Stories deliverable)
- Research Outline (at teacher's discretion)
- Your game Pseudocode (at teacher's discretion)
- Documentary Storyboard (at teacher's discretion)

## Assumptions and Logistics

Time Frame - We recommend that this digital storytelling project takes place inside of a three to four-week time frame.

Length - All Meridian Stories submissions should be under 4 minutes in length, unless otherwise specified.

Slate - All digital storytelling projects must begin with a slate that provides:

- a) the title of the piece;
- b) the name of the school submitting;
- c) the wording 'Permission Granted' which gives Meridian Stories the right to a) publicly display the submission in question on, as linked from, related to or in support of Meridian Stories digital media; and b) use or reference it for educational purposes only, in any and all media; and
- d) We strongly recommend that students do **not** put their last names on the piece either at the start or finish, during the credits.

Submissions - Keep in mind that each school can only submit three submissions per Competition (so while the entire class can participate in any given Challenge, only three can be submitted to Meridian Stories for Mentor review and scoring).

Teacher Reviews - All reviews by the teacher are at the discretion of the teacher and all suggested paper deliverables are due only to the teacher. The only deliverable to Meridian Stories is the digital storytelling project.

Teacher's Role and Technology Integrator - While it is helpful to have a Technology Integrator involved, they are not usually necessary: the students already know how to produce the digital storytelling project. And if they don't, part of their challenge is to figure it out. They will! *The teacher's primary function in these Challenges is to guide the students as they engage with the content.* You don't need to know editing, sound design, shooting or storyboarding; you just need to know your content area, while assisting them with time management issues. See the [Teachers Role](#) section of the site for further ideas about classroom guidance.

Digital Rules/Literacy - We strongly recommend that all students follow the rules of Digital Citizenry in their proper usage and/or citation of images, music and text taken from other sources. This recommendation includes producing a citations page at the end of your entry, if applicable. See the [Digital Rules](#) area in the [Meridian Stories Digital Resource Center](#) section of the site for guidance.

Location – Try not to shoot in a classroom at your school. The classroom, no matter how you dress it up, looks like a classroom and can negatively impact the digital story you are trying to tell.

Collaboration - We strongly recommend that students work in teams of 3-4: part of the educational value is around building collaborative skill sets. But students may work individually.

## Process

Below is a suggested breakdown for the students' work.

### During Phase I student teams will:

- Decide on a video game and investigate the game making process for that game.
  - A good place to start is by looking into your favorite games or ones that have had an important historical impact such as Snake, Space Invaders, Pong, or Minesweeper. That is just a starter list. An 8-bit or retro type game would be perfect for this project.
- Research the history of your select game from two perspectives.
  - First, using primary sources, explore the records from the original game creators. These records will help you understand what these creators were thinking about, aiming for, struggling with, and hoping for upon launch into the world.
  - Second, using secondary sources, explore the impact of the game societally from when it first was launched to the present day. Two starter questions might be: 1) how did this game affect the evolution of the gaming industry; and 2) what new gaming or programming ideas did this game introduce into the lexicon of video game development and experience?
- Create a two-page outline of your ideas from both research sources. This will give you a bird's eye view of the main ideas that will inform your final digital story.
  - ***Teacher's Option: Historical Summary*** – The teacher may require teams to hand in their two-page summary of the video game's history and development for review and feedback.
- Research what it takes to program a small game and choose a programming language (we recommend Python).

- For those new to coding, MIT’s Scratch is a graphical coding interface that will get you up and running quickly, with an easy-to-use interface that creates graphical output and a wealth of help online if you get stuck.
- For those with experience using Python, PyGame is a tool that allows you to quickly get started with functionality that’s necessary for a game, like visual and audio output.
- If your team already has a different language with which you are familiar, you can look for a tool in your language to help you make your game. Just make sure you can get a visual output. Some possibilities include Love2D for Lua, CSS animations in Javascript, or Processing for Java or Python.
- Before actual coding begins, consider digitally recording as much of this process as possible. This is a partially a documentary of your experience re-creating this game, so catching this early footage of getting started is important.
- Two more things to keep in mind. First, it may not be practical to code the whole game. Please place boundaries on what you can accomplish to demonstrate the basic fundamentals of how the game is played. That is the goal: to demonstrate the game’s basic operations and game play and include that game play in the documentary. And second, if there are innovations that you want to add onto the original model – ideas that update or alter the game playing experience in small ways – please do.

### **During Phase II (as simultaneous with Phase III) student teams will:**

- Create your videogame with your chosen programming language. It’s recommended you break the project down into pieces, so you can check things that get completed along the way.
- Make your code **modular** and **general**.
  - Modular code doesn’t just function as a whole but is composed of a series of smaller parts that could also function independently. Designing code like this makes it reusable, which is a hallmark of good code. Planning out your approach before you begin is a good way to make your code modular and save time later because of the ability to change it.
  - By making your code *modular* and *general*, you are taking advantage of the unique opportunities that the medium of programming provides. With other methods, like video or image editing software, each additional object added to the scene takes equal effort. With programming, once you have written one piece of code it is easy to scale it up and reuse it.

- Remember to be accurate and consistent with your coding. Make sure to follow the rules for formatting in your programming language so you can have an easier time constructing your project and to make it easy for others to understand your code. It's also good to break your code into sections with comments and clearly label 'what does what' so you can reference back to it later, and not be confused.
  - **Teacher's Option: Pseudocode** – A common practice in programming is to outline a solution to a program in 'pseudocode' before actually programming the implementation. This pseudocode is similar to a real program, with 'if' statements and the like, but is closer to plain English and lacks the complex syntax of programming languages. Teachers may require student teams to hand in their pseudocodes for review and feedback.

### **During Phase III (as simultaneous with Phase II) student teams will:**

- Continue coding your game and recording your processes of making decisions, working through obstacles and frustrations, and celebrating small successes.
- But simultaneous to the coding work, to the degree possible, your team should begin to look at the overall digital story that you are going to tell. Here are a few ideas to consider:
  - What is the balance between the game's historical story and your story of coding a modern-day replica? How are these two stories in dialogue with each other? This is a good time to go back to your two-page historical outline and see what ideas from that document you want to include in your final story. Looking at that document now with the experience of coding that very game, does your story change? Has your perspective altered from the start of this project? Are there some historical moments from your original research that you want to investigate further?
  - Consider the voice: who is telling the story? You and your team? Or a character such as a video game creator or the head at a video game company? Seemingly straight forward stories can be more engaging when looked at through the eyes of an invented character.
    - Regarding this interplay of stories, is there an opportunity to work in interviews with teachers or community members about their history with video games, and your game in particular? (If you are interviewing, your interviewees may need to sign a Release Form giving you permission to record, edit and post this discussion online. Research generic and simple Release Forms online to find the right language for you.)

- What are your ideas for the sound design of your digital story? Are you interested in using sound from the original game to underscore your documentary? Are there specific, signature sound effects from your game that you can use strategically to enhance your story? Or might you turn to other external sources to create an alternative soundscape to illuminate the new game that you are creating as based on the original?
- At what point in this documentary are you demonstrating the new game that you have coded?
  - Please keep this in mind: your coding may not work perfectly. **That is fine.** This is a story about your process of crafting the underlying code that propels this game as well as the role this game played in the social history of gaming. This is *not* a story about re-creating the game successfully.
- Draft a script and, as your team feels necessary, storyboard your documentary.
  - **Teacher's Option: First Draft Script and Storyboard** – The teacher may require teams to hand in a script and storyboard, with proposed voice over and/or interview candidates, that details the rough skeleton and narrative arc of their documentary, for review and feedback.
- Finalize your documentary script and image research for the historical portion of the narrative, and, at this point, play the game, re-edit the coding as necessary, and play again.

### **During Phase IV student teams will:**

- Shoot the remaining video.
- Record the voice-over or narration, as necessary.
- Edit the video, adding stills and graphics as desired.
- Post-produce the video, adding music, sound effects, and your video game itself.

## **Meridian Support Resources**

*Meridian Stories* provides two forms of support for the student teams:

1. Meridian Innovators and Artists – This is a series of three to four-minute videos featuring artists and innovative professionals who offer important advice, specifically for Meridian Stories, in the areas of creativity and production.

2. Media Resource Collection – These are short documents that offer student teams key tips in the areas of creativity, production, game design and digital citizenry.

Recommended review, as a team, for this Challenge include:

Meridian Innovators and Artists	Media Resource Collection
<i>The Importance of Character in Storytelling</i> – Scott Nash	<b>Creating Storyboards, Framing a Shot</b>
<i>Documentary Films</i> – Sarah Childress	<b>Producing – Time Management</b>
<i>Interviewing Techniques</i> – Tom Pierce	<b>Creating a Short Documentary</b>
<i>Making Documentaries</i> – Margaret Heffernan	<b>Six Principles of Documentary Film Making</b>

## Presentation of Learning

Meridian Stories is a proud partner of the non-profit *Share Your Learning*, which is spearheading the movement of over **five million** students to publicly share their work as a meaningful part of their educational experience.

The workforce considers Presentational Skills to be a key asset and we encourage you to allow students to practice this skill set as often as possible. These digital storytelling projects provide a great opportunity for kids to practice their public presentational skills. *This can be achieved in a remote learning environment by inviting parents to a Zoom/Google/Skype screening of the student’s digital stories.*

According to *Share Your Learning*, Presentations of Learning (POL) promote...

- **Student Ownership, Responsibility & Engagement.** POLs can serve as a powerful *rite of passage* at the end of [a project]. By reflecting on their growth over time in relation to academic and character goals, grounded in evidence from their work, students are encouraged to take ownership of their learning. Just as an artist wants their portfolio to represent their best work, POLs encourage students to care deeply about the work they will share.
- **Community Pride & Involvement.** When peers, teachers and community members come together to engage with student work and provide authentic feedback, they become invested in students’ growth and serve as active contributors to the school community.
- **Equity.** POLs ensure that all students are seen and provide insight into what learning experiences students find most meaningful and relevant to their lives.

For more information, please write to [brett@meridianstories.org](mailto:brett@meridianstories.org) or go to the website [www.meridianstories.org](http://www.meridianstories.org)

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Meridian Stories’ own research indicates this to be a really useful exercise for one additional reason: Students actually learn from their peers’ presentations – it is useful to hear a perspective that is not just the teacher’s.

It is with this in mind that we encourage you to plan an event – it could be just an end-of-the-week class or an event where parents, teachers and student peers are invited – to allow the students to showcase their Meridian Stories’ digital storytelling projects. For more free resources that will support this planning, visit [Share Your Learning](#).

## Evaluation Rubric – *Python Playtime*

<b>CONTENT COMMAND</b>	
<b>Criteria</b>	<b>1-10</b>
<b>Modular Code</b>	Code is written in a purposeful manner, with many separate functional components working together towards the end goal, displaying an understanding of the chosen programming language
<b>Code Cleanliness</b>	Code is properly formatted, and there are comments when necessary to explain confusing code
<b>Game Recreation</b>	The team clearly demonstrated hard and committed work in their efforts to replicate and reinvent the video game
<b>Video Game History</b>	The story of the game since its inception is thought-provoking, enlightening and sociologically interesting
<b>STORYTELLING COMMAND</b>	
<b>Criteria</b>	<b>1-10</b>
<b>Narrative Clarity</b>	The documentary has a clear and consistent tone that is well organized, lively, and delivers an engaging narrative
<b>Integration of Documentary and Computer Programming</b>	The two stories – the history and your coding process that yields your re-created game – are well integrated into a cohesive whole that elucidates depths of information about your video game
<b>Audio Creative Choices</b>	Your creative choices around voice, character and/or interviews to anchor the storytelling are compelling
<b>MEDIA COMMAND</b>	
<b>Criteria</b>	<b>1-10</b>
<b>Use of Mixed Visual Media</b>	The use of video, stills, animation, graphics, and/or text was creative, visually interesting, and relevant to the topic

<b>Editing</b>	The documentary is edited cleanly and effectively, resulting in an engaging viewing experience whose pace matches the content
<b>Sound Design</b>	The mix of music, sound and voice create a soundscape that enhances our connection with the documentary
<b>HUMAN SKILLS COMMAND (teachers only)</b>	
<b>Criteria</b>	<b>1-10</b>
<b>Collaborative Thinking</b>	The group demonstrated flexibility in making compromises and valued the contributions of each group member
<b>Creativity and Innovation</b>	The group brainstormed many inventive ideas and was able to evaluate, refine and implement them effectively
<b>Initiative and Self-Direction</b>	The group set attainable goals, worked independently and managed their time effectively, demonstrating a disciplined commitment to the project

## Essential Questions

1. What is the role of video games in the evolution of computer science and what is the story behind one select game in this larger evolution?
2. How can one use technical programming skills as a means to realize a creative vision?
3. How does someone design code that is reusable?
  - a. How can code be formatted to be passed on from person to person?
4. How is information gathered from primary sources different from information gathered from secondary sources?
5. How has immersion in the creation of original content and the production of digital media—exercising one’s creativity, critical thinking and digital literacy skills—deepened the overall educational experience?
6. How has working on a team—practicing one’s collaborative skills—changed the learning experience?

## Student Proficiencies

1. The student will research key facts and context behind the creation of an iconic video game and learn to infer causality linking together historic events.
2. The student will learn how a developed technical skillset can be an instrument to communicate a creative vision.
3. The student will learn how to design code in a modular way that allows for the code to be interpreted by other individuals, and properly format code.

4. The student will learn to use primary and secondary sources to analyze how sources close chronologically to an event differ from those more temporally removed.
5. The student will utilize key Human Skills, with a focus on creativity, critical thinking and digital literacy, in their process of translating scientific content into a new narrative format.
6. The student will have an increased awareness of the challenges and rewards of team collaboration. Collaboration – the ability to work with others – is considered one of the most important 21<sup>st</sup> century skills to develop in students as they prepare for life after secondary school.

## Curricular Correlations (CSTA, NGSS and CC)

The *Python Playtime* Challenge addresses a range of curricular objectives that have been articulated by three nationally recognized sources:

1. The **Computer Science Teachers’ Association**;
2. The **Next Generation Science Standards**;
3. The **Common Core Curricular Standards – Mathematics**; and
4. The **Common Core Curricular Standards – English Language Arts & History/Social Studies**.

Below please find the standards that are being addressed, either wholly or in part.

<b>Computer Science Teachers’ Association</b>	
<b>2-AP-12</b>	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals
<b>3A-AP-13</b>	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
<b>3A-AP-14</b>	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

<b>Next Generation Science Standards</b>	
<b>HS-ETS1-2</b>	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

<b>Common Core – Mathematics</b>	
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<b>CCSS.MATH.Content.HSF.BF.A.1</b>	Write a function that describes a relationship between two quantities
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<b>Common Core – English Language Arts &amp; History/Social Studies</b>	
<b>W3</b> <b>WRITING</b> <b>Text Types and Purposes</b>	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
<b>W4</b> <b>WRITING</b> <b>Production and Distribution of Writing</b>	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
<b>SL1</b> <b>SPEAKING AND LISTENING</b> <b>Comprehension and Collaboration</b>	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 8–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.
<b>SL5</b> <b>SPEAKING AND LISTENING</b> <b>Presentation of Knowledge and Ideas</b>	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
<b>RH9</b> <b>HISTORY/SOCIAL STUDIES</b> <b>Integration of Knowledge and Ideas</b>	Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.