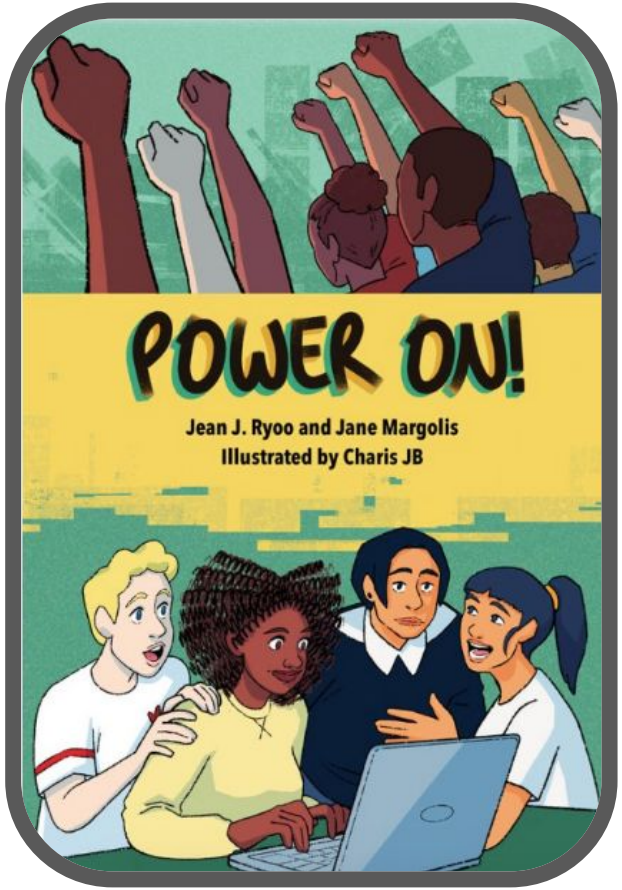
Power On!

Elementary Teachers Companion

By: Ashley Ufret & Théa Williams



Motivation for Mini-Unit

- This unit will offer elementary students explicit access to the social justice issue of inequitable representation of minorities in computer science fields.
- We hope that by creating elementary level resources that are available educators will help make the Power On graphic novel and CS integration accessible to more elementary classrooms.
- The graphic novel format and ELA integration will serve as an entry point to helping students understand these sophisticated topics and concepts.
- The goal is to leverage the format in presenting real-world issues to empower student voice and shape change-makers/social justice activists.

General Overview

- **Grades:** 2-5
- **When:** Can be integrated during SEL period (periods of time dedicated to social-emotional learning), Science/Computer Science period and ELA(reading/writing) periods.
- **Duration:** Total length: 10 lessons Appx 10 Weeks (depending on the number of days integrated)

General Overview

The Power On book will be read aloud to students in chunks of one chapter at a time. Teachers will revisit the lessons to teach reading strategies and have students discuss the text. Topics will be connected and incorporated into writing unit prompts and SEL discussions. CS mini projects throughout the text will provide introductory CS skills and concepts. The unit culminates in Student's choosing an equity theme from the text they connect with to create a CS Social Justice project.

- Power On! Themes Explored in Mini-unit
  - The Vocabulary and Terms of CS & Equity
  - Identity and Culture
  - Underrepresentation and Bias in Tech
  - CS Pioneers and representation
  - Inequities in CS education
  - Student advocacy and social justice work

Standards Referenced

2-3.IC.1 Identify and analyze how computing technology has changed the way people live and work. 4-6.IC.1 Describe computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.

2-3.IC.3 Discuss and explain how computing technology can be used in society and the world. 4-6.IC.3 Explain current events that involve computing technologies.

2-3.IC.6 Identify and discuss factors that make a computing device or software application easier or more difficult to use. 4-6.IC.6 Identify and explain ways to improve the accessibility and usability of a computing device or software application for the diverse needs and wants of users.

2-3.IC.7 Identify a diverse range of roles and skills in computer science. 4-6.IC.7 Identify a diverse range of role models in computer science.

2-3.CT.10 Develop and document a plan that outlines specific steps taken to complete a project. 4-6.CT.10 Describe the steps taken and choices made to design and develop a solution using an iterative design process.

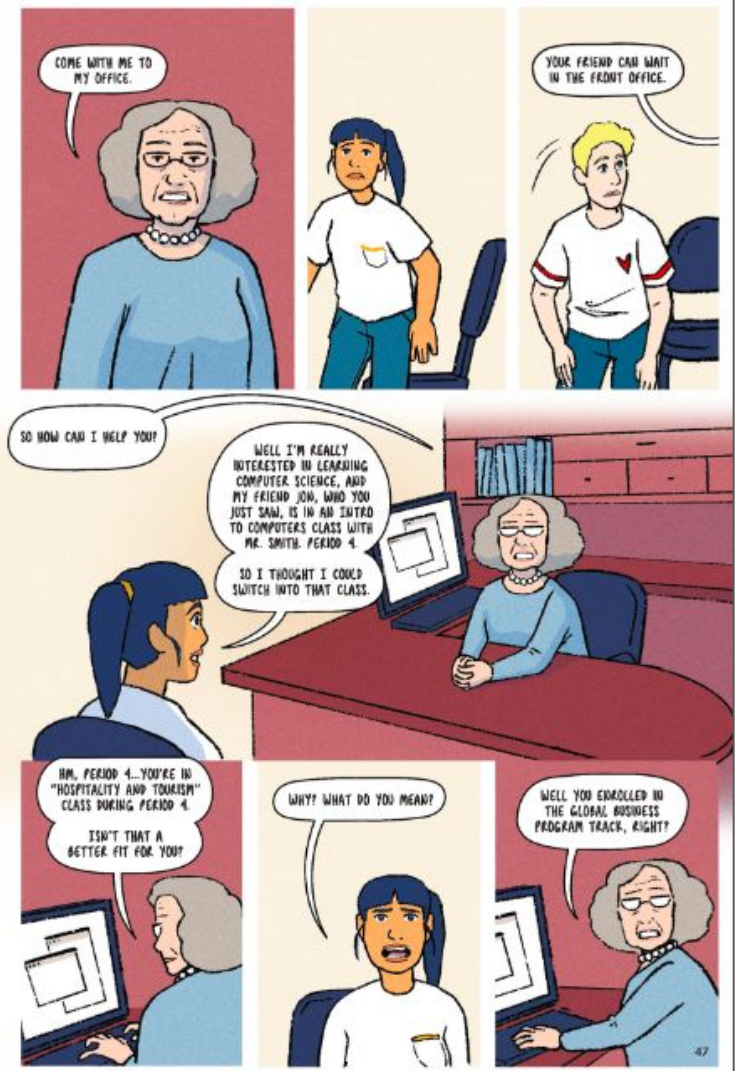
2-3.DL.2 Communicate and work with others using digital tools to share knowledge and convey ideas. 4-6.DL.2 Select appropriate digital tools to communicate and collaborate while learning with others.

2-3.DL.4 Use a variety of digital tools and resources to create digital artifacts. 4-6.DL.4 Use a variety of digital tools and resources to create and revise digital artifacts.

Racism can be on purpose,
like calling a person of color a mean name
because of their skin color.

Racism can be by mistake,
like if the same friend always
has to play the bad guy.


NEXT WEEK AT CHRISTINE AND JON'S SCHOOL
COME WITH ME TO THE FRONT OFFICE? I NEED MORAL SUPPORT.
HI! MY NAME IS CHRISTINE HERNANDEZ. I HEARD WE CAN CHANGE CLASSES FOR ANOTHER WEEK STILL.
CAN I SWITCH INTO A COMPUTER CLASS?
OKAY, M'HIJA*. YOU NEED TO TALK TO THE COUNSELOR. WHAT'S YOUR NAME AGAIN?
CHRISTINE. HERNANDEZ.
OKAY, LET ME SEE IF MS. TEMPLE IS AVAILABLE.
*m'hija means "my daughter" in Spanish and is often used in an affectionate/friendly way between people who are not related to one another.
CHRISTINE HERNANDEZ?
YES! THAT'S ME!
46


COME WITH ME TO MY OFFICE.
YOUR FRIEND CAN WAIT IN THE FRONT OFFICE.
SO HOW CAN I HELP YOU?
WELL I'M REALLY INTERESTED IN LEARNING COMPUTER SCIENCE, AND MY FRIEND JON, WHO YOU JUST SAW, IS IN AN INTRO TO COMPUTERS CLASS WITH MR. SMITH. PERIOD 4.
SO I THOUGHT I COULD SWITCH INTO THAT CLASS.
HM, PERIOD 4...YOU'RE IN "HOSPITALITY AND TOURISM" CLASS DURING PERIOD 4.
ISN'T THAT A BETTER FIT FOR YOU?
WHY? WHAT DO YOU MEAN?
WELL YOU ENROLLED IN THE GLOBAL BUSINESS PROGRAM TRACK, RIGHT?
47

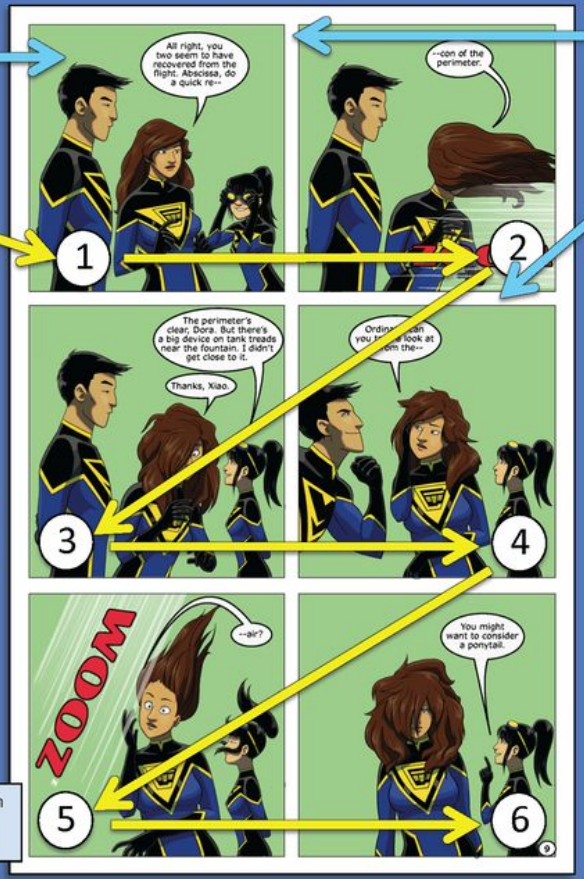
Christine's experience with her counselor is based on the real experiences of a female high school student in a very overcrowded school who wanted to learn computer programming but was told by her counselor that the Programming class was filled and that she should take Floristry instead. She did not want to take Floristry, but was told that it filled the Technical Arts requirement (the same requirement filled by Computer Science at the school). This is described in *Stuck in the Shallow End: Education, Race, and Computing.*[1]

How to Read a Graphic Novel

Panels are frames that each contain one segment of the action.

Read the panels from left to right, top to bottom.

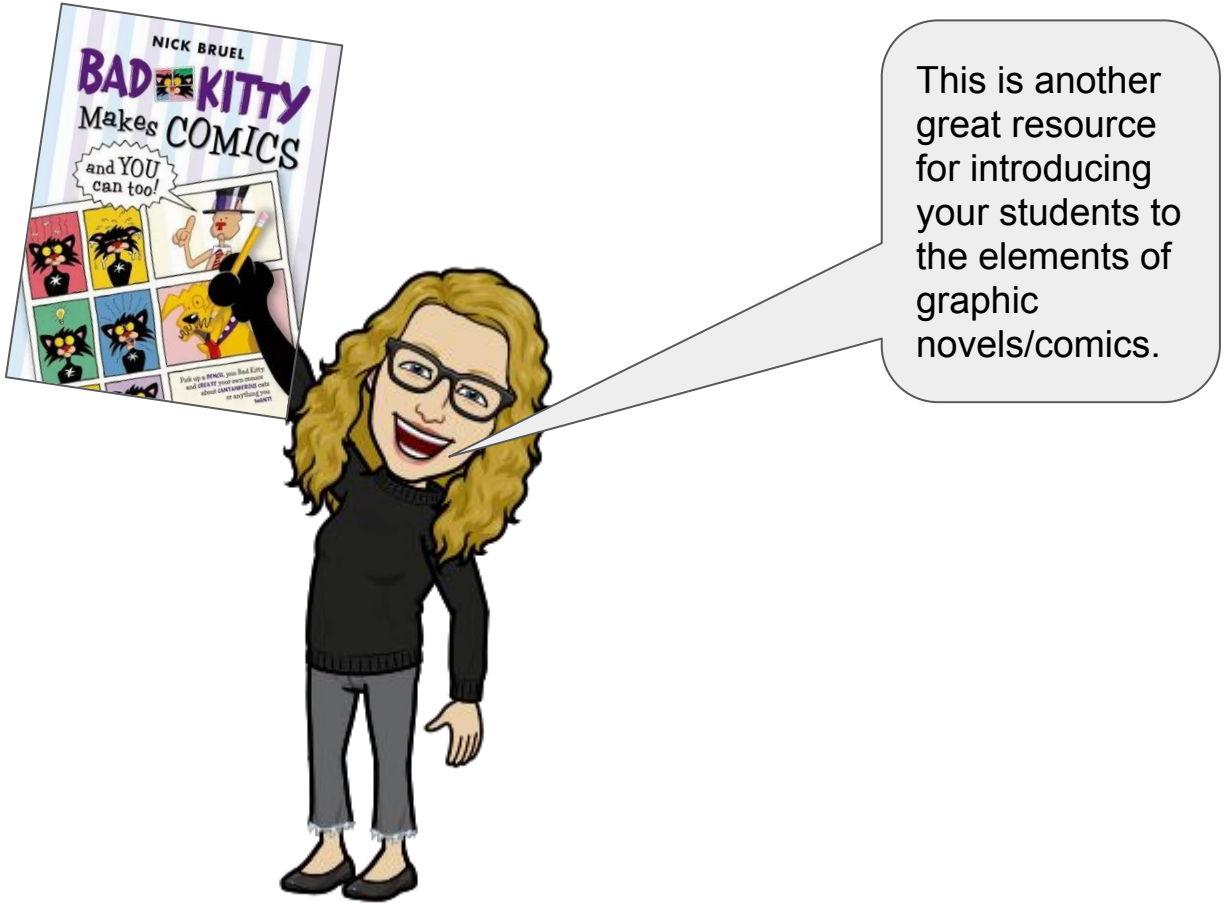
Slow down! Read both the text and the pictures. Think about what is happening between the panels. Reread and think about how the words and pictures go together.



Gutters are the spaces between panels. This is where the reader must imagine the action from panel to panel.

Panels can be any shape or size. Read left to right and top to bottom within each panel, as well as panel to panel.

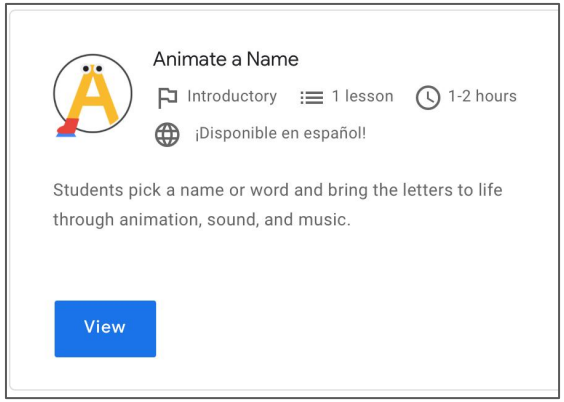
Solution Squad by Jim McClain & Rose McClain
www.solutionsquad.net

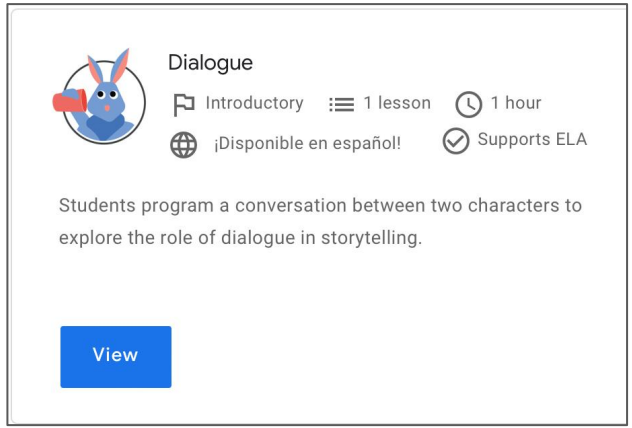

NICK BRUEL
BAD KITTY
Makes COMICS
and YOU can too!
This is another great resource for introducing your students to the elements of graphic novels/comics.

Lessons

Lessons with main topic(s)

1. Intro to Power On! Lingo & CS
2. The lingo in Equity & Computer Science
3. Identity, Culture & Character Analysis
4. Underrepresentation and Discrimination in CS (Dialogue)
5. Why do we need Computer science?
6. CS Pioneers (Introduction to CS Pioneer Calendar & Scavenger Hunt)





Lessons

Lessons with main topic(s) continued:

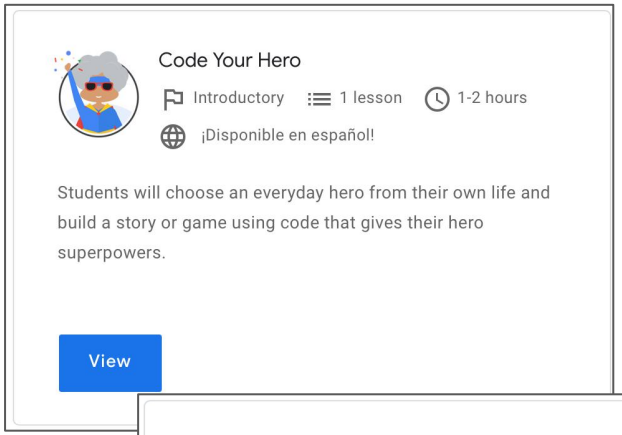
7: This CS Hero Looks Like Me (Rolemodes/Representation in CS)

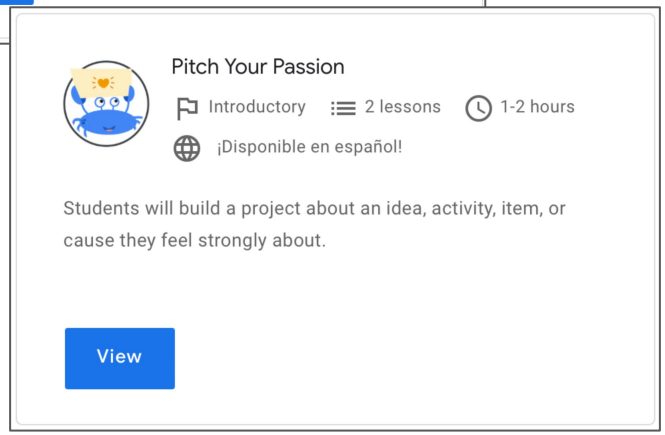
8: I Am an Ally!

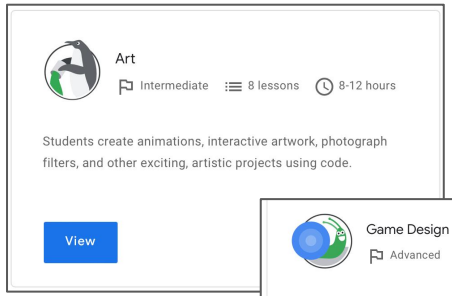
9: How Can I Be A Changemaker? (Brainstorming final project)

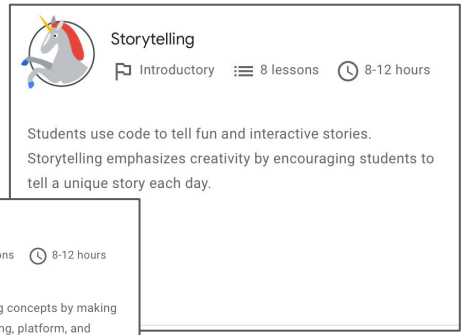
10: My Impact to CS (students work on programming project - duration varies)

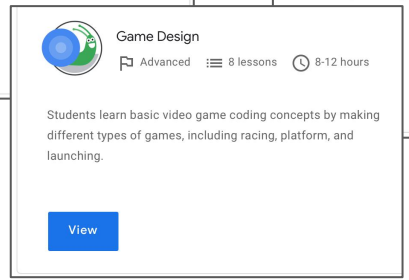
11: From Allies to Activists! (Class showcase)











Tools Used

- **Google CS First** - will be used to build up CS skill set for students to apply to their final project
- **Google CS First** OR **Scratch** can be used to create the CS & Social Justice final project (app, game, story, or animated poster to raise awareness)
- **Plickers** will be used to capture data check for understanding and identify the need for small group support/conferencing (depending on misconception/misunderstanding and # of students with the same need) (note: the educator can choose to substitute CS First with Code.org for CS building blocks)

Final Project

Students will create computer science PSA projects in Scratch or CS First to spread awareness about CS representation, using an equity theme, from the text they connect with, as guideline for their project. They will choose platform (CS First or Scratch) and delivery system (poster(art), game, app, animated story).

Students should include CS Concepts that we have learned throughout the unit such as: Input and Output, Variable, Function, Conditional, Loops

Note: Time for the final project to be completed will vary by student and project, you may consider having students work with a partner or small group for this section.

Class showcase: students share their project with the class and get feedback - this can be done on flipgrid with students presentation video and screen recording of project.

Art

Intermediate | 8 lessons | 8-12 hours

Students create animations, interactive artwork, photograph filters, and other exciting, artistic projects using code.

View

Game Design

Advanced | 8 lessons | 8-12 hours

Students learn basic video game coding concepts by making different types of games, including racing, platform, and launching.

View

Storytelling

Introductory | 8 lessons | 8-12 hours

Students use code to tell fun and interactive stories. Storytelling emphasizes creativity by encouraging students to tell a unique story each day.

View

7. Quest Game

Learn how to use storytelling in video game design while building an RPG style Quest Game.

Start

1. Activity 7 Survey
2. Introduction to the Quest Game
3. Places to Go
4. Add an Exit
5. Hide the Object
6. Add Storytelling Elements
7. Add-Ons
8. Reflection
9. Wrap-Up: Quest Game
10. Wrap-Up: Next Steps

5. Escape Game

Create an escape game in which a player must avoid other sprites that move randomly.

Start

1. Escape Games and Randomness
2. The Chase Is On!
3. Programming the Player Sprite
4. Keeping Score
5. Add-Ons
6. Reflection
7. Wrap-Up: Escape Game
8. Wrap-Up: Next Steps

Assessments

(List of summative and/or formative assessments)

- Rubric for final project
- Observation rubric for teacher to record check for understanding for ELA and CS standards during lessons throughout the unit (from tiered questioning, group/partner discussions, participation etc.)
- CS projects completed on CS first will be assessments for mastery of ELA standards but evaluated as progress monitoring for CS standards with mastery of CS standards determined based on their performance by the end of the unit with the final project.

Resources

- **Power On! book** https://www.poweronbook.com/
- **Kristi's High School** Power On Microunit (with classroom resources linked)
- **Google CS First**