

Design Based Learning

Workshop
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Translated to Deutsch Version:



Design-Based Learning: by David Cameron

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- 20+ years teaching science, Chemistry
- 7+ DBL
- Taught Python programming, Applied Sciences, Art History, History
- Southern California

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Objectives:

- Introduce DBL and carry out two Design Challenges
 - Show the power of experience in learning
- Learn how to apply what you already teach to student created designs.
- Gather tools and ideas to help execute, analyze, and support implementation of the Backwards Thinking, Design-Based Learning methodology

Norms for the workshop:

- Be open, try it out and communicate ideas.
 - All ideas are good ones. Be respectful.
 - Use technology at certain points
 - Think with two perspectives:
 - 1 perspective your own.
 - 1 perspective who you teach.
- *Embrace the awkwardness.*

What is a Criteria List?

- A design tool, presenting the requirements for designing and building
- A to-do list
- A guide for the students

What is “Never-Before-Seen?”

- A way to state things to avoid already produced solutions
- A way to intentionally promote creativity and problem solving
- A remix

Problem: We need a way to introduce and represent ourselves to be remembered.

Essential Questions: How can we be seen and heard? How can we listen and appreciate others' interests as well as expressing our own? How can we actively take an interest in the unique qualities of each other?

Design-Based Learning: Design Challenge #1
Design A Never-Before-Seen
Avatar

Criteria List:

Don't Want	Needs
Already Been Seen (ABS) 2-Dimensional Messy or falls apart Drawing/labels/ink Origami Trademarks No cell phone, (shapes or interest) Inappropriate content Too big, Too small Robots	Never Before Seen (NBS) 3-Dimensional ≥1 sense(s) Clarification: How/where will the Avatar, see, hear, taste, smell, touch, move, etc. in the design? (Think hands, nose...etc) Design component that represents you and/or your interest(s) Fit in your hand Name your Avatar

Build it! (20 min.)

Baue es!

- Use 20 minutes to construct your Avatar to represent you and your interest.
- Refer to the criteria list for guidance.
- Find “happy trash” ~ clean material for building.
 - Examples:
 - Recyclable materials that can't be used again

Other things to consider:

- Hot melt glue
- Tape/adhesives

Interview an Avatar: You must ask four of the questions!

2) What is your most attractive feature? (What part of the way you look makes you stand out?)

3) Where do you live?

4) When and where were you born?

5) How old are you?

6) What is your function? (What were you born to do?)

7) Who is your family? (Who are your relatives?)

8) Who are your ancestors?

9) Who makes the rules and laws that govern you?

10) Who changes these rules?

11) Who benefits and who is hurt by these rules?

12) What is your social class and economic status? (Are you rich, middle class, or poor?)

14) What do you need?

15) What is your favorite activity?

16) Who is your best friend? Who are your friends?

17) Who are your enemies?

18) What do you like? What do you dislike?

19) What is your favorite part of yourself?

20) What are your dreams?

21) What do you daydream about?

22) What is your vision of the future?

23) What are some other families or parts that you could adopt?

24) What makes you laugh or cry?

25) What do you feel power over?

26) What are you intimidated by? (What are you afraid of?)

27) How do you see yourself?

28) Who should remind us of?

Interview an Avatar: You must ask four of the questions!

Fragen an Avatar

1 Wie heißt du? Zählt nicht.

2 Was ist Ihr attraktivstes Merkmal? (Welcher Teil Ihres Aussehens zeichnet Sie aus?)

3 Wo wohnst du?

4 Wann und wo wurden Sie geboren?

5 Wie alt bist du?

6 Was ist Ihre Funktion? (Wozu wurdest du geboren?)

7 Wer ist deine Familie? (Wer sind deine Verwandten?)

8 Wer sind deine Vorfahren?

9 Wer macht die Regeln und Gesetze, die Sie regieren?

10 Wer ändert diese Regeln?

11 Wer profitiert und wer leidet durch diese Regeln?

12 Welche soziale Stellung und welchen wirtschaftlichen Status haben Sie? (Sind Sie reich, Mittelschicht oder arm?)

13 Was kannst du gut?

14 Was brauchen Sie?

15 Was ist deine Lieblingsbeschäftigung?

16 Wer ist dein bester Freund? Wer sind deine Freunde?

17 Wer sind deine Feinde?

18 Was magst du? Was gefällt dir nicht?

19 Was gefällt dir an dir am besten?

20 Was sind deine Träume?

21 Wovon träumen Sie?

22 Was ist Ihre Zukunftsvision?

23 Welche anderen Familien oder Teile könnten Sie adoptieren?

24 Was bringt dich zum Lachen oder Weinen?

25 Worüber haben Sie das Gefühl, Macht zu haben?

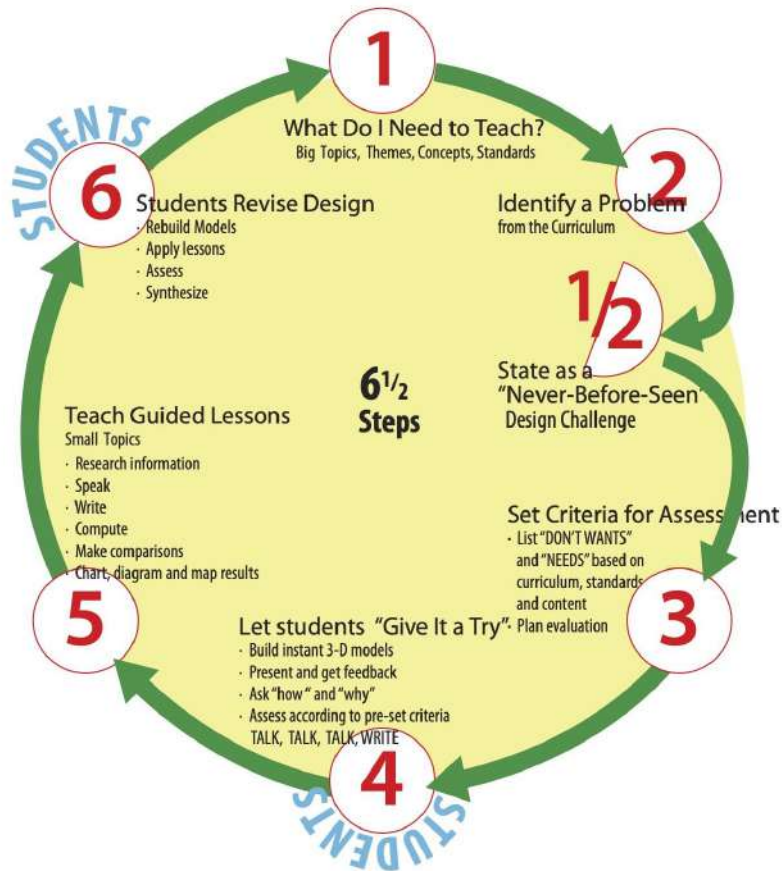
26 Was schüchtert Sie ein? (Wovor hast du Angst?)

27 Wie sehen Sie sich selbst?

28 An wen sollten wir uns erinnern?

The 6 ½ Steps of Backwards Thinking

by Doreen Nelson



What do you do next with an Avatar?

Technology	Art	Science
- Digitize the answers to the interview questions. Use AI with some specific answers to the questions and create your Avatar chatbot. - Create a Never-Before-Seen webpage linking your Avatar to interest	Pixelate your Avatar Turn your picture into a synth. - Render your Avatar digitally then use it as a character. 3d print it! Make a toy! - Paint it! - Give your Avatar a voice.	Spec Sheet - Measure and collect the data - Mass, length, width, height - Take the temperature - Scale elements in humans to your Avatar

How would you use it?

Go to:



Avatar Next Steps: Teaching & Practicing Guided Lessons

- The Avatar now becomes a context to apply standards-based guided lessons in the classroom.

Here are a few quick lessons students can jump right into:

Language Arts	Math	Science	Social Studies	Civics
Write a list of interview questions and interview classmates' Avatars.	Create a pie chart of the Avatars' personality traits; syllables in name; colors in designs.	Compare/contrast the Avatar's habitat to other animals learned about.	Create and share 3 rules for your Avatar; justify thinking.	Collaborate to write a class constitution.

Student Creations (Avatar)

Python (turtle):

<https://codehs.com/sandbox/camerononandon/initials-capitalized-2022>

Progress Check for the Avatar Design Challenge:

- Did we accomplish our goals, (Problem on the criteria list) and follow norms?
- Did we answer the Essential Question(s) on the criteria list?

Problem: We need a way to introduce and represent ourselves to be remembered.

Essential Questions: How can we be seen and heard? How can we listen and appreciate others' interests as well as expressing our own? How can we actively take an interest in the unique qualities of each other?

History of DBL: 1968-Present

- Started in Venice California by Doreen Gehry-Nelson (School Teacher and Professor)
 - She was not engaging her learners.
 - Her students were from broken homes, social unrest (Vietnam War) and drugs contributed to the disengagement for her students. (**Dogtown Z-boys**, film, gives an idea of student mentality of the times).
 - Her students did not see education as important or applicable to their lives.
 - Her brother, Frank Gehry, the Architect, said “**Why don’t they build a city?**”

Initial grant was given by Charles and Ray Eames

- Doreen has gone on to train, teach, and mentor 1000s of Educators around the world.



Partner Share:

How could you improve or reimagine the community around Frizzforum

What problems do you have in your home community?



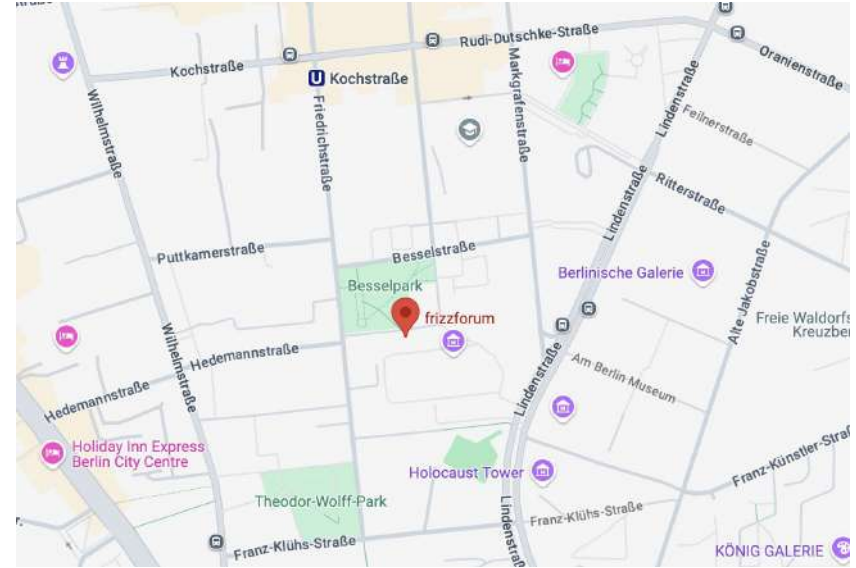
Never-Before-Seen Starter City:

Problem: Humans need a place to share ideas, resources, and solutions to thrive.

Essential Question: How can a city reflect everyone's needs?

Design Challenge:

Design-A-Never-Before-Seen Starter City



Never Before Seen (NBS) is the umbrella that holds the POSSIBILITIES.

Paint/mark then scale the map:

Paint	Scale
● Paint/Marker only roads and train routes ● Estimate as close as possible. ● A projector is helpful to make it as close as possible to the scale.	● Find two streets on the map in google maps. ● Use the measuring tool to find the distance between the two streets. ● Measure the same distance on the created map.

$$\text{Scale} = \frac{\text{google dist (m)}}{\text{Map dist (cm)}}$$

$$1 \text{ cm} = X \text{ m}$$

A Way to Start...

- The future is uncertain. We know for sure that we will live in cities.
- We know that there are a lot of problems in the world.
- Today we will project ourselves into that unknown future to imagine what you want a city of the future to look like.

DON'T WANT	NEED
2D	3D (free standing and attached to the map)
ALREADY-BEFORE-SEEN (ABS)	NEVER-BEFORE-SEEN (NBS), each part built needs to have a function
PAINTING/COLORING/LABELS	SMALL ENVIRONMENTAL FOOTPRINT, Accessible
UNFAIR LAWS	PLACES TO LIVE
CRIME/VIOLENCE	PLACES TO EAT
OVERCROWDING	PLACES TO MAKE A LIVING/ BUY, SELL, TRADE
POLLUTION/ WASTE	PLACES TO MEET AND SHARE INFORMATION
BUILDING ON ROADS	PLACES TO LEARN
ORIGAMI DESIGNS	PLACES TO BE SICK, HEAL, BORN, DIE

Time to Build: 25 mins

Baue

es!

- Look over the criteria list. Decide what you think would make a good addition to our new community.
- Analyze your materials
- Build it using the “happy trash”
- Scale

Paper Building Techniques:



Present your build to the group!

- Explain your build.
- Explain why you think it is good for the community.
- Keep track of what is created on the [spreadsheet](#) according to your grid designation.
- Take a photo and place it here:



Assembling the City

- Locate your tile designation. Top right corner or beneath your tile.
- This City is gridded Vertically: A-F and Horizontally: 1-8.
- Begin to fit the tiles in order on the tables.

What do you do next with the starter city?

Technology	Art	Science
• Digitize or render your city in 3 dimensions. • Build your landform in Minecraft or Roblox. • Make a web presence for your place in the city. • Use the spreadsheet data to make a simple travel guide for your new city.	• Create a monument to place in the city reflective of its residents. • Paint/draw an image reflecting the city structure or parts. • Create the “sounds of the city.” Original music compositions. • Make a rap.	• Spec Sheet • Measure and collect the data • Mass, length, width, height • Take the temperature • Scale elements in humans to your Avatar

Starter City Next Steps: Teaching & Practicing Guided Lessons

- The City now becomes a context to apply guided lessons in the classroom.

Here are a few quick lessons students can jump right into:

Life Science	Math	Chemistry	Physics	Earth and Space Science
Describe native plant life in your community by utilizing observations within your own.	Find the scale of your community. Measure your building length, width, and height.	List the materials used to construct your model in real life.	Calculate how long it takes sound and light to travel across your community.	Label the sunrise and sunset on the edges of your community for the equinox and solstices.

[City Life in 24 hours](#) a graphing assignment remixed from the Exploratorium SF and UCLA Center X Science Project.

Guided Lessons: Math [+Art, +Engineering, +Tech]

Ratio and proportion and linear equations:

- Use ratio and proportion and/or direct variation to create 2-D drawing of the structure, enlarged to show detail from different viewpoints
- Use direct variation and classroom/outdoors space to evaluate structure size in real life
- Create a polyhedra net for the surface area of the Structure

Geometry:

- Examine how different structures fit/don't fit together and apply mathematical reasoning to why they do or don't



Analyze the City

- What problems do you see already with the city?
 - Is there any problems you see already?
 - What is this starter city lacking?
- Why does the starter city have problems?

Progress Check for the Starter City Design Challenge:

- Did we accomplish our goals, (Problem on the criteria list) and follow norms?
- Did we answer the Essential Question(s) on the criteria list?

Problem: Humans need a place to share ideas, resources, and solutions to thrive.

Essential Question: How can a city reflect everyone's needs?

Design Challenge: Design-A-Never-Before-Seen Starter City

The City Never Sleeps: Create the problems



Why Design-Based Learning ?



- When we use students' 3-D designs to teach content, **they own it.**
- The Design Challenges **drive** student curiosity and motivation.
- Design-Based Learning **enhances student engagement** by creating a space for new and unique connections.
- The student-built City creates **context for learning required subject matter and 21st century skills.**

Returning to the Avatars:

- 1) Grab your Avatar.**
- 2) Think of the leadership qualities that are exemplified by your Avatar.**
- 3) Line-up by the strongest leading Avatars to the least leading Avatars.**

Criteria List for a Mayor

Don't Want	Needs
Lack of Participation	Message or vision

Campaign Time:

- 1) Find your candidate by number
- 2) Create supports for your candidate:
 - a) You must write a speech. < 1 min. Exemplifies your vision.
 - b) Posters/fliers/print materials (marketing)
 - c) What other elements can you design and provide to support your candidate?

Candidate 1	Candidate 2	Candidate 3

Vote for your candidate!

Creating Classroom Community Through Classroom Committees



Class Committee Application

Please circle two committees that you want to serve on. The choices are:

Movement



Organization



Environment



Goods and Services



Energy



Health and Safety



1st Choice _____ 2nd Choice _____

What skills do you have that make you qualified for the job?

Movement



- *Line up class up
- *Make sure we are respectfully moving in school hallways
- *Walk in front and back of line
- *Choose walking masters for caught Being Good rewards

Organization



- *Take care of Library Books
- *Move book boxes
- *Keep classroom organized
- *Keep classroom supplies organized
- *Counting the days

Environment



- *Close/open classroom doors
- *Pass out Privacy Boards
- *Help with Library Books
- *Keep our environment comfortable
- *Help with room temperature

Goods and Services



- *Lead us in Flag Salute
- *Read Lunch Menu to class
- *Pass out papers
- *Pass out supplies

Energy



- *Turn on and Off Lights
- *Chromebook Helper
- *iPad Helper
- *Computer Helper
- *Activeboard Helper
- *Sharpen Pencils

Health and Safety



- *Responsible for water bottles
- *Keep us safe in the classroom
- *Keep us safe on playground
- *Help hurt friends
- *Help walk students to office or nurse
- *Keep backpacks out of hall for safety
- *Help with PE equipment

1st Class/City Meeting (Socratic Seminar):

Problem: Our Starter City is lacking Identity.

Essential Question: How does a City form an Identity?

(Part 1: First Consensus)

City Challenge #1: Community members must come to consensus to name the city.

City Name Challenge

Choose a city names using alliteration and 2 academic tone words.

Alliteration: Repetition of the same sound at the beginning of words

Example:

- Jovial Jubilant Ville
- Caring Choleric Municipality

City Synonyms



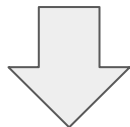
- **Metropolis**
- **Country**
- **Town**
- **County**
- **Ville**
- **Island**
- **World**
- **Community**

- **Borough**
- **District**
- **Township**
- **Municipality**
- **Providence**
- **Megalopolis**
- **Megacity**
- **Suburb**

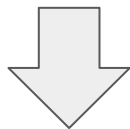
Academic Tone
Word List

My DBL Journey: Chemistry

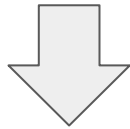
NBS Intro Dot (**Periodic Table**, Observations, Measurements)



NBS Creature/Avatar (Elements in the body, Properties of Elements)



NBS Shelter (Atomic Structure)



NBS City

Possible Never Before Seen Design Challenges:

Energy system

Water system (solutions, acids, and bases)

Food system (reactions and stoichiometry)

Movement system (stoichiometry, human impacts)

DBL Challenge

NBS Invention

- **Essential Question:** How can we use our imagination to make new ideas? What responsibility do we have over what we make?
- **Problem:** Our NBS Creatures need new inventions to make life better
- **Challenge:** Plan and create an NBS Invention based on a current problem

[Sample Lesson](#)

[Student Sample Sway](#)
[Articles](#)

What is **ONE WORD** to describe how you feel at the end of Day?

Skies and DBL at UCLA and Beyond!!!

- 1) Starting a partnership with skies to help support teachers using DBL around the world.
- 2) Collect data.
- 3) Make content and new uses available to all.
- 4) Check it out here: <https://skieslearn.com/go/11zk8t5>
- 5) Looking for interested teachers to become coaches.

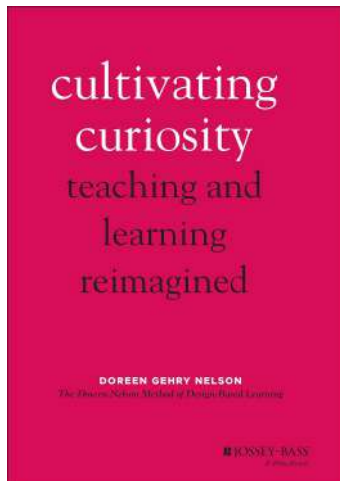
Email: camerond@sgusd.net

Instagram: dbldcameron

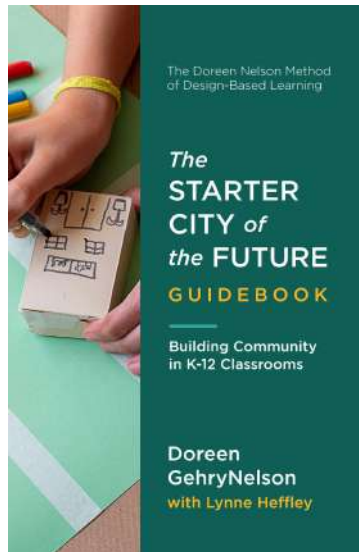


More Resources:

History and stories from teachers across the curriculum using the methodology in their classrooms. ([Amazon](#))



A deep guide to executing a city in the classroom, [Starter City of the Future Guidebook](#). Free link.

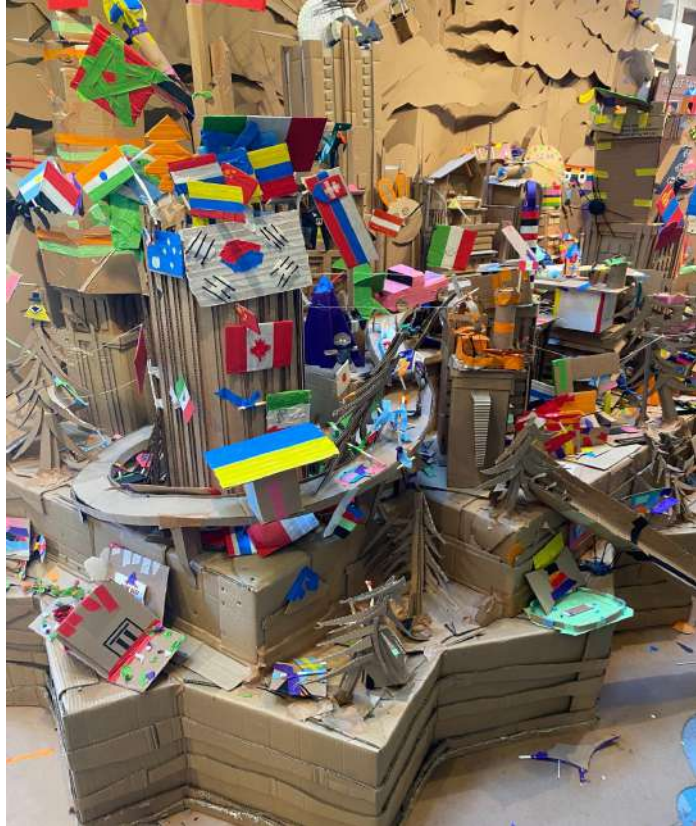


A brief op-ed I wrote for the Hechinger Report coming out of the Pandemic.

[TEACHER VOICE: With hands-on activities, my chemistry students are building cities of the future](#)



Cardboard City: San Francisco Discovery Museum







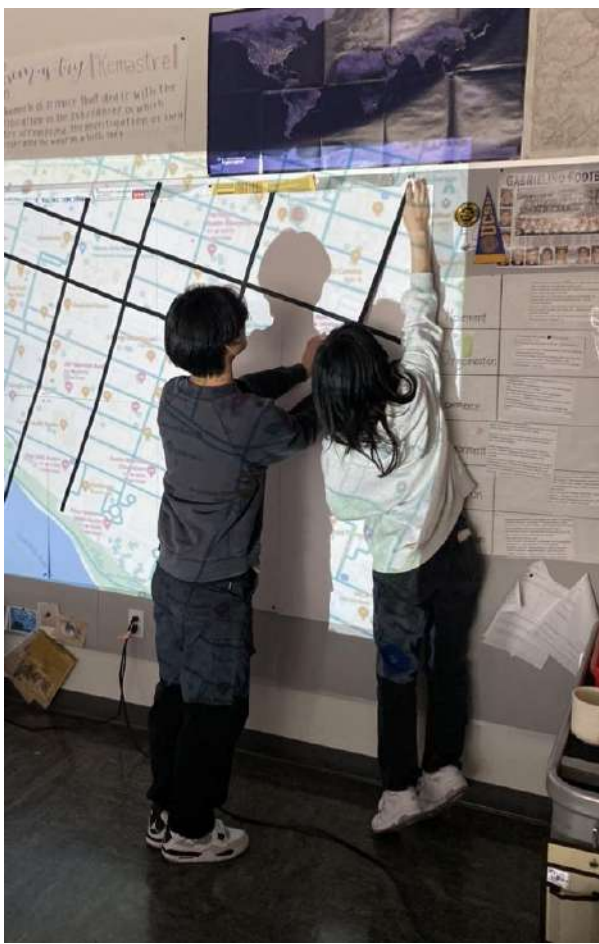
Angelina Chung, Period 6



Above is a picture of Carbon Hill, my groups city artifact. One fun fact about Carbon Hill is that we are sustainable and have a population of 112.



This is a picture of a recent lab we did. We put our test tubes that contained copper (II) sulfate and sodium hydroxide, into the hot water bath.



Once Unwrapped: The City Never Sleeps





UCLA

Center X

Building Confidence While Collaborating



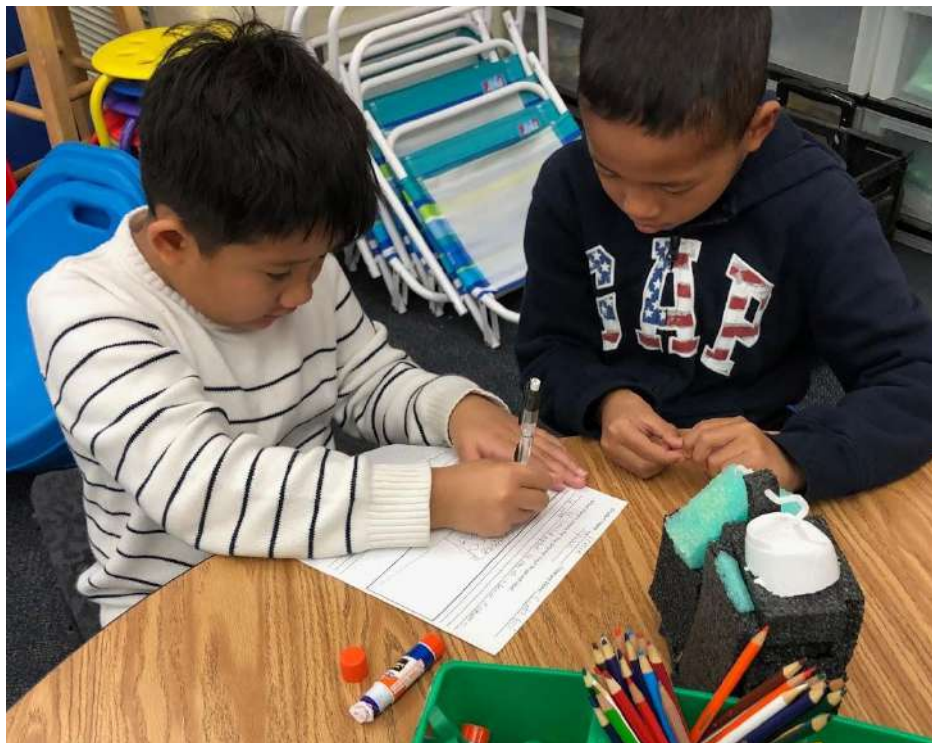
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Fires from my classroom (2019)

