
Are YOU Next ?
ADP-MAST ACADEMY PRESENTS
BE A STEM SURVIVOR
SOCORRO HIGH SCHOOL
SUMMER CAMP 2025
The University of Texas at El Paso | 500 W. University Ave., Carl Hertzog Room 101
Phone: (915) 747 – 8469 Email: MaSTAcademy@utep.edu

ADP MaST Academy

Summer Camp: Lesson Plans

Table of Contents

ADP MaST Academy

Summer Camp: Lesson Plans

Area of Composite Two-Dimensional Figures

Learning (TEKS) Objective:

G(11) Two-dimensional and three-dimensional figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to: (B) determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure

Student Outcome: *Students will be able to… apply formulas to determine the area of composite two-dimensional figures, including triangles, parallelograms, trapezoids, and kites, using appropriate units of measure.*

Total Length of Lesson: 90 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- **Graphing paper**
- **Pencil**
- **Handout**
- **Cardboard**
- **Tape**
- **Die**

Technology Required (put video, website, etc. links here):

- **No technology**

What needs to be prepared/set up ahead of time:

- **Print out student handout**
- **Print out Area of a shape per team**

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- **Visuals**
- **Modeling**

Task 1: Review Areas of a shape **Duration: 10 minutes**	**Notes to Teacher:**
• Display the areas of a shape and have scholars discuss to see if they have seen these formulas before	These formulas were taught in middle school. Trigger prior knowledge.

Task 2: Notes **Duration: 15 minutes** • Scholars will be shown how we find the area of a composite model.	Read the Scenario in the Printout activity.
Task 3: Instructions **Duration: 5 minutes** • All team members must collaborate. Scholars will draw shapes in the graphing paper, given the geometric shapes assigned by the die. They will then connect the shapes to create a 3D Bunker. Once the bunker is done the scholars will measure each side of the bunker and find the composite area.	Have scholars explain the instructions back.
Task 4: Create Bunker **Duration: 40 minutes** • Students will follow the steps to create a bunker and its composite area.	Make sure that they add the areas until the end for the composite are to be more accurate.
Closing: How will you end/summarize the lesson? 10 minutes	
Have the scholars present their composite figure and explain why they created their bunker using those shapes.	

Candy DNA & DNA Recipe

Learning (TEKS) Objective:

7(A) Identify components of DNA, explain how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA.

Student Outcome: *Students will be able to…*

- Identify the components of DNA and understand its structure.
- Explain how the nucleotide sequence determines an organism's traits.

Total Length of Lesson: 60 to 70 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Marshmallows or gummies (10 of 4 different colors)
- Twizzlers' (2)
- Toothpicks (6)
- Paper towels

- Paper
- Colored paper
- Pens/ markers

Technology Required (put video, website, etc. links here):

- https://youtu.be/EVyDWbsucRA?si=ICehGiWwuo-Kdh1U The Last of Us teaser
- https://youtu.be/6368Y-OfU9U?si=AZiXNex5O_BgsEay DNA notes
- https://youtu.be/dC9uuHolgXk?si=dE5RG-ZvAGvjT1cV Candy DNA Instructions

What needs to be prepared/set up ahead of time:

- Make sure the links work
- Have all the materials ready

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- It would be ideal if a person could say the instructions/topics in English and then another person could repeat them in Spanish.
- Check in with them using both languages

Task 1: Intro **Duration: 5 minutes**	**Notes to Teacher:**

• You can start with a video about the end of the world, here is the teaser of the show "The Last of Us" https://youtu.be/EVyDWbsucRA?si=ICehGiWwuo-Kdh1U you can start with this to set the mood.
• Or you can start with the prompt "A global catastrophe has wiped out most life on Earth. A small group of humans and animals survive. DNA is the key to rebuilding life, but mutations and evolution will shape the future of Earth. What does survival look like?"
• Ask the following questions:
  ○ If only there were a few humans, how would the future humans look like?
  ○ How does DNA predict how we look like?
  ○ Why is DNA so important for survival?
	This is the hook to the lesson, try to make it fun and mysterious while incorporating the content. The video and the prompt can also be changed if you think something else fits better, what we want is for the students to have fun during the camp.

Task 2: Notes **Duration: Around 10 minutes**	If you don't want to create guided notes, like even just talking about it and then having a poster with the main concepts that would help too. But like since DNA can be very complex to learn at first it would be great that they have a
• Go over the DNA components and its structure • DNA Components : Sugar, phosphate, nitrogen bases (A, T, C, G). • Base-Pairing Rules: A-T, C-G, and how this sequence determines traits.	

• Students should have guided notes where they can write down how the bases pair together or it can also be different color paper in pieces that they can connect to see A-T and C-G. • This video is for reference of what you can show them to better understand DNA. https://youtu.be/6368Y-OfU9U?si=AZiXNex5O_BgsEay	visual guided all the time, especially with the bases and their pairs.
Task 3: Candy DNA Duration: 20 minutes	I think this activity would be more beneficial to be done individually but if due to resources or big classes then done in pairs is great as well. This is basically independent/group work you just need to make sure they are pairing the bases correctly and making the model correctly. If also due to anything it cannot be done with food, it can be done with colored paper, following the same steps but instead of food with paper, glue, and scissors.

• The students would create a 3-D DNA strand model made from candy.
• This can be done as individual work or in pairs.
• Materials:
  ○ Either marshmallows or gummies, but there must be four of them to represent the bases: (pink/red= Adenine, yellow= thymine, green= cytosine, & blue= guanine) Around 10 of each color per student/group
  ○ Twizzlers or similar rope-like candy, we need 2 per student/group
  ○ Toothpicks (6 per student/group)
  ○ Paper
  ○ Colored pens or markers
• The gummies/marshmallows represent the bases
• Toothpicks the hydrogen bonds
• Twizzlers the sugar-phosphate backbones
• **Here are the instructions in more detail https://youtu.be/dC9uuHolgXk?si=dE5RG-ZvAGvjT1cV**	

Task 4: DNA Recipe Duration: 40 minutes	You can alter the traits or create more traits.
• This activity would be in groups, with 2 to 4 students per group. • Each group would represent like a group of the last humans, each group has a special ability but what they want to see is how future generations would look like, they are going to use DNA to predict this change. • 1. Each group gets a "DNA Recipe" which is a sequence of nucleotides.	

○ A 9-letter DNA sequence ○ The sequence should match some kind of traits that determine the survivor's characteristics. ○ AUGACAUAG= Fast Runner ○ AUGGCAUAA= Extra Thick Skin ○ AUGCGCUAA= Can Hold Breath Longer ○ AUGUGUUAA= Mind Reading ○ You can create more DNA sequences and survivor traits ● 2. Roll a dice to see if their DNA could change or stay the same ○ 1 -3 they would have no mutation, so they stay the same ○ 4-5 They change only one letter of the DNA sequence (if they get 4-5, they have to roll again to see what type of letter they would change if rolled 1-3they change C to G and if they rolled a 4-6 then they change T to A) ▪ If they change C to G= disease immunity ▪ If they change T to A= their immune system is low ○ 6 means that they must change two letters (if they get 6, they will have to roll again two times. If they get 1-3 they change C to G and A to T. If they get 4-6they change T to A and the G to C) ▪ Rolling 1-3= original trait is doesn't work anymore and they gain the trait of being able to breath under water ▪ Rolling 4-6= their system is able to eat radioactive food. ○ If the mutation helps the survivor, then they keep it. ○ If it doesn't help the survivor, they would have to brainstorm how the survivor would have to adapt to survive. ● 3. In a poster paper students would have their original DNA strand and their mutated DNA strand. Write down the original special trait and then with which traits they ended up with. ○ Present your survivor to the class and then as a class decide which survivor has the best chance to survive in an apocalyptic world.	**REMIND STUDENTS NOT TO CHANGE START OR END CODON JUST THE MIDDLE 3**

Closing: How will you end/summarize the lesson? 7 minutes
● Create a scenario of where many years have passed after the end of the world event, ask the following question: ○ Could a new form of life be formed with a different genetic code? ○ How would this "new life" look like? ● Have a class discussion

Adding/Subtracting Polynomials

Name of Lesson: Deciphering Bunker Code
Learning (TEKS) Objective: (10) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to: (A) add and subtract polynomials of degree one and degree two
Student Outcome: *Students will be able to… apply algebraic methods to add and subtract polynomials of degree one and degree two.*
Total Length of Lesson: 75 minutes
Materials (per student), include copies of handouts, paper for foldable, etc.:
● Student hand out ● Pencil ● 4 function calculator/Phone calculator (OPTIONAL) ● Scratch Paper
Technology Required (put video, website, etc. links here):
● No technology
What needs to be prepared/set up ahead of time:
● Print out student hand out ● Go over problems
How to accommodate lesson for students who are English Language Learners or have trouble focusing
● Visuals ● Sentence Stems

• Modeling	
Task 1: Adding Common Like Terms Duration: 7 minutes	**Notes to Teacher:**
• Scholars will work on adding and subtracting like terms independently, and in the last 2 minutes, they will discuss their work with their neighbors.	Present this problem to the scholars and have them practice adding/subtracting like terms.
Task 2: Notes Duration: 18 minutes	Scholars tend to forget to distribute the negative to all terms.
• Show scholars how to add and subtract like terms.	
Task 3: Instructions Duration: 5 minutes	Read the scenario to the scholars in the scholar's handout.
• Scholars will work in teams to decipher the code. All scholars must participate.	
Task 4: Decipher Code Duration: 40 minutes	Instructions are in the handout.
• Scholars will solve problem to decipher the code.	

Linear Functions, Equations, and Inequalities

Learning (TEKS) Objective: 3A- Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:

> (A) Determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y = m(x - x)$

Student Outcome: *Students will be able to... Define points on a graph and determine the slope of those points*

Day of the Week and Time: TBA

Total Length of Lesson: 60min

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Copies of "The Last Equation: A City in Ruins" (story provided)
- Graph paper or printed coordinate grid maps

- Rulers and pencils
- Whiteboard and markers
- Projector (optional, for digital maps)
- A set of pre-made coordinate pairs for city landmarks
- Student worksheets with practice problems on slope calculations
- Role cards for different factions/obstacles in the city (optional for group activity)

What needs to be prepared/set up ahead of time:

- **Story**

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- **Make the points different colors**

Task 1: **Duration:**	**Notes to Teacher:**
1. Introduction • Begin by reading "The Last Equation: A City in Ruins" aloud or have students read independently. • Ask students: *What patterns did you notice in the locations of destruction?* Introduce the idea that Elliot discovered a mathematical pattern in the city's destruction. • Explain that today's lesson will focus on using slope and coordinates to map out a survival plan.	**Story is already made.**
Task 2: **Duration:**	
Slope and Coordinate Plane Review • Review the coordinate plane: x-axis, y-axis, and plotting points. • Discuss slope using the formula: • Work through an example using two points from the story (e.g., The Cracked Bridge (10, 50) and The Flooded Park (8, 40)) to calculate slope. • Have students complete a few practice problems using different locations from the story.	
Task 3: **Duration:**	

Mapping the City • Distribute coordinate grid maps. • Assign students to small groups and provide them with a list of city landmarks and their coordinates. • Task: Plot the key locations (e.g., School, Grocery Store, Gas Station, Hospital) on the grid. • Students must analyze the locations and determine the best survival route to reach the abandoned factory (0,60) using their knowledge of slope. • Have students draw their path and justify their choice by explaining their route and the slope between locations.	
Task 4: **Duration:**	
Survival Strategy Discussion • Groups will present their maps and survival plans. • Discuss: *Which locations were the safest? Which were the most dangerous? How did slope help determine the route?* • Optional: Introduce random challenges (e.g., "The Grocery Store is blocked! Find a new route.") to adjust plans.	
Closing: How will you end/summarize the lesson?	
Exit Ticket & Reflection • Have students answer: *How does understanding slope and coordinates help in real-life decision-making?* • Collect and review student maps and slope calculations.	

Evolutionary Creature

Learning (TEKS) Objective:

(10) Science concepts--biological evolution. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple mechanisms. The student is expected to:

(A) analyze and evaluate how natural selection produces change in populations and not in individuals;

(B) analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

(C) analyze and evaluate how natural selection may lead to speciation; and

(D) analyze evolutionary mechanisms other than natural selection, including genetic drift, gene flow, mutation, and genetic recombination, and their effect on the gene pool of a population.

Student Outcome: *Students will be able to...*

Understand how evolutionary processes work and explain why they're important

Total Length of Lesson: 80 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Air Dry Clay (3 color blocks per student)
- Paper (1 per pair)
- Pencils (1 per pair)

Technology Required (put video, website, etc. links here):

https://youtu.be/BgqVPFiMhA0?si=TM08Rs2hYNWMKKpG

Quick explanation about evolution for background.

https://www.youtube.com/watch?v=vq_YRoegokY&t=42s

- Show clip of the video.

From 0.20 secs- 0.49 sec (the 100 video, can give background to the show if you need to)

What needs to be prepared/set up ahead of time:

- Presentation

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Show visual examples, and translate if necessary.

Task 1: Duration: 10-15 minutes	**Notes to Teacher:**
• Introduce the topic for the students using the power point, introduce video and explain what it means briefly. Try to include examples of evolution (natural selection) if the environment was involved. Lastly, to relate to the summer	Ask questions and make sure students are on board with information.

<table>
<tr><td>camp theme: end of the world, show the second video on the designated time.</td><td></td></tr>
<tr><td>Task 2: Duration: 5-8 minutes</td><td rowspan="2">Ask probing questions:
- Why do you think the animal evolved that way over 100 yrs?
- Why does your creature look that way in a post apocalyptic world?
- Does the environment have to do with anything?
- Do they look like that because they need to hunt differently?</td></tr>
<tr><td>● Instruct students are their activity,
“You will create a story line and a 3D model about an animal creature of your choice BUT we will give you the animal TYPE. We will pair you up, and when creating your creature you will use the clay to show what it would look like after generations of evolving, and you will work together to create a story line of what happened through generations, you will write down and present this! You will also explain why the environment would affect them to be different than now considering the end of the world. Give your creature a new name!”
● Then put your students in pairs, assign them an animal type from the list below and have them work together in pairs.

Animal Types:
● Mammal
● Birds
● Fish
● Reptiles
● Insects
● Plants</td></tr>
<tr><td>Task 3: Duration: 50 minutes</td><td rowspan="2">If students are stuck on what creature to pick have them go off of their favorite animal.</td></tr>
<tr><td>● Create a creature using designated materials, have students work together to create a story on the environment and how it changed its creature to potentially evolve to what it looks like. Make sure everyone is doing a part/ working together!
●</td></tr>
<tr><td>Task 4: Duration: 10-20 minutes</td><td rowspan="2"></td></tr>
<tr><td>● Present their creature, story they created, and clean up.</td></tr>
<tr><td colspan="2">Closing: How will you end/summarize the lesson?</td></tr>
<tr><td colspan="2">How does the food web change based off of how the animal evolved?</td></tr>
</table>

ADP MaST Academy

Summer Camp: Lesson Plans

Factoring using Greatest Common Factor

Learning (TEKS) Objective:

(7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to: (D) determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods (i) determine the linear factors of a polynomial function of degree three using algebraic methods.

Student Outcome: *Students will be able to… collaborate in pairs to factor polynomials using the greatest common factor.*

Total Length of Lesson: 60 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Scholar Worksheet (Supplies/Food Run)
- Pencil

What needs to be prepared/set up ahead of time:

- Print out cards
- Print out scholar worksheets (laminate if desired)

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Partners Support
- Visuals
- Modeling

Task 1: KWL Chart **Duration: 7 minutes**	**Notes to Teacher:**
• KWL Chart: What scholars know about factoring using greatest common factor. What scholars what to know about factoring using greatest common factor. • In the worksheet that scholars are given they will use the KWL chart to answer K and W. The teacher will then ask some scholars what they wrote.	Recommended teacher instruction in print out package.
Task 2: Introduction lesson (Notes) Duration: 15 minutes	
• The teacher will introduce factoring polynomial expressions using greatest common factor and having the scholars take notes on 2 problems.	

Task 3: Instruction to Activity **Duration: 5 minutes**	Have the scholars repeat the instruction back to you.
• Instructions and expectations included in Print out package.	
Task 4: Stations **Duration:**	More details are included in print-out package
• ○ Each team will select one member to be the "Runner." This person will go to the table to retrieve the cards. ○ Each scholar will receive an initial problem based on their team-assigned number. ○ Every team member must solve all their problems before the Runner can pick up a cards or get a new ones. ○ Repeat this process until all the cards are gone.	
Closing: How will you end/summarize the lesson?	
The scholars will finish the KWL chart (L) and let the teacher know what they have learned. The teachers will then ask for volunteers to share what they wrote. During this part if the scholars did not finish any problem or could not figure out a problem, they will automatically be infected (plot twist).	

Ecosystems, Flow of Matter & Energy

Learning (TEKS) Objective:

(13.B) Analyze how ecosystem stability is affected by disruptions to the cycle of matter and energy flow through the trophic levels using models.

Student Outcome: *Students will be able to…*

- Students will use models to represent ecosystems and illustrate how energy and matter move through trophic levels, identifying key factors that affect these processes.
- Students will evaluate the consequences of disruptions to the flow of energy and cycling of matter, such as the removal of species or changes in the environmental conditions on the stability of the ecosystem.
- Students will describe the cycling matter and flow of energy affecting the ecosystem stability.

Total Length of Lesson: 45 to 50 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Pencils

- Colors and markers
- Copy paper
- Poster paper, it doesn't have to be a big one

Technology Required (put video, website, etc. links here):

https://youtu.be/4ygKsG59tqY?si=mCennJ5hmOAFwIr5 video of the end of the dinosaurs.

https://youtu.be/-oVavgmveyY?si=o_xlHOA9GmqC-F_7

https://youtube.com/shorts/iky6QAm_0JQ?si=gj6rvMHWLyqamjXf

What needs to be prepared/set up ahead of time:

- Making sure that the video links are working.
- That students have all the materials.
- You should have guided notes or energy pyramid notes.

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- It would be ideal if a person could say the instructions/topics in English and then another person could repeat them in Spanish.
- For students who have trouble focusing, constant check-ins and since it is a long period and if you see them overstimulated or unfocused then they can have a brain break.

Task 1: Introduction **Duration: 5 minutes**	**Notes to Teacher:**
Start with a quick discussion, use the following questions. • What happens to plants/animals when their food sources are disrupted? • Can you give an example of a situation where the food sources were disrupted? Then play the end of the dinosaur's video and ask the following question. https://youtu.be/4ygKsG59tqY?si=mCennJ5hmOAFwIr5 • When the dinosaurs became extinct what messed up their food sources was the dust covering the sun, compared to today what can mess up our food sources?	This is mainly the introduction part, so it would mostly be a discussion to get the students to think about the way a disturbance can affect the food source and how that can affect the food web.
Task 2: Defined important terms/topics **Duration: 10**	Go over the main topics and terms, the have a short discussion for them to understand.
Define key terms such as ecosystem, trophic levels, cycling of matter, 10% rule, and flow of energy. https://youtu.be/-oVavgmveyY?si=o_xlHOA9GmqC-F_7	

Talk about what are disruptions and ecosystem collapse. Ask for students to give examples. https://youtube.com/shorts/iky6QAm_0JQ?si=gj6rvMHWLyqamjXf	
Task 3: Practiced food web/ apex predator Duration: 10 minutes ● Have them create a practice food web. You can give them the organisms and their task would be to create the food web in the correct order. Around 5 minutes. They don't have to draw the organisms. (Individual work) ○ Producers: grass ○ Primary consumers: rabbits and grasshoppers ○ Secondary consumers: frog and snake ○ Tertiary consumers: hawk ● Introduce the theme into the topic with something like "Due to the devastating conditions of the world, the environment has taken a turn for the worse. The animals aren't the same anymore! Due to the radioactive activities in the environment, we have noticed a new and innovative creature that has been causing an imbalance." (Students should be paired) ● A new, mutated creature is causing an imbalance in the food web. They can be as creative as they want with creating their apex predator. (This creature they would already have it created from Sarah's evolution lesson)	The practice food web is so that the students get the concept of what it is to create a food web. It should not take them that long, especially because they don't have to draw or color this food web. Then for their creature, that one they already have from Sarah's lesson.
Task 4: Poster Food Web Duration: Around 25 minutes ● Once they have their creature (Sarah's lesson), they would need to create a food web in a world that has undergone many disturbances. Their creature should be in the correct trophic level and depending on their creature they need to see where other organism follow in.(Students should stay in their pairs to create the food web) ● The guidelines that they must follow in creating their food web: ○ Have their mutated creature in the correct trophic level. ○ Remind them that due to the end of the world, the levels of primary consumers have decreased. ○ Due to this new mutated creature, the organisms from the food web have suffered an imbalance, and make sure all the organisms in the food web are in the correct place. ○ Color and draw the organisms	The idea is for them to create a food web in a world that has ended, that's why they have new guidelines and their new apex predator. They can create this food web on a poster paper and let them be creative to show what a food web would look like at the end of the world with radioactive animals and low diversity. This should be also kind of an "art project" where it is visually interesting to

	see.

Closing: How will you end/summarize the lesson? Around 5 minutes

- Have a gallery walk around the classroom where students can see other groups of apex predator and their food web.
- Ask the following question
  - If due to something that disrupts the ecosystems of the world and causes collapses, what would be the consequences for humans?

Photosynthesis & Cellular Respiration

Learning (TEKS) Objective:

(11)(A) Explain how matter is conserved, and energy is transferred during photosynthesis and cellular respiration using models, including the chemical equations for these processes.

Student Outcome: *Students will be able to…*

- Describe how matter is conserved and energy is transferred in photosynthesis and cellular respiration.
- Analyze the chemical equations for both processes.
- Apply their understanding of these biological processes to a post-apocalyptic survival scenario.

Total Length of Lesson: 90 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Pencils
- Colors and markers
- Copy paper (if you decide on any models or guided notes)
- Poster paper
- Play crops (it would be nice if the students had some crops to act out their little play, but not necessary)
- Then if you decide to create the mini greenhouse and plant the seed:
  - Clear gallon or liter-sized plastic jugs or bottles (other clear containers, such as clamshell take-out containers, can work, too)
  - Sharp scissors
  - Thumbtack
  - Small containers for planting, such as paper cups, clean yogurt cups or cardboard egg crates

- Seeds, such as for green beans, radishes or herbs
- Potting soil
- Ruler
- Spray bottle with water

Technology Required (put video, website, etc. links here):

- Video explaining photosynthesis: https://youtu.be/D1Ymc311XS8?si=ALZK1IX7G82K82-o
- Mini Greenhouse (optional): Make a Mini-Greenhouse | Crafts for Kids | PBS KIDS for Parents

What needs to be prepared/set up ahead of time:

- That the links work and that all the materials are ready, especially if you do decided to do the mini greenhouse model.

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- The notes will be a copy in Spanish and a copy in English, so students have the choice to fill in whichever language they feel more comfortable with.
- It would be ideal if a person could say the instructions/topics in English and then another person could repeat them in Spanish.
- **For students who have trouble focusing, constant check-ins and since it is a long period and if you see them overstimulated or unfocused then they can have a brain break.**

Task 1: Notes/Introduction **Duration: 5 minutes**	**Notes to Teacher:**
• **Introduced the process of photosynthesis with a short video, take a few more minutes to discuss how photosynthesis works.** **https://youtu.be/D1Ymc311XS8?si=ALZK1IX7G82K82-o** • **Also go over the equations for each, ideally I would like these two equations to be on a poster where they can see them, the equation for photosynthesis and the equation for cellular respiration.**	I would like if these could also have guided notes but since it is something that they have always seemed it isn't essential for the notes but just have a good discussion about how photosynthesis works and cellular respiration, more than anything so that they have background knowledge for the activities.

Task 2: Photosynthesis Play **Duration: 30 minutes (it can be less time, as you see fit)**	This should be a fun activity, where they let their creativity run and have fun while they are learning. Monitor that they are on task and that their play reflects the process of photosynthesis. Ask questions such as "How is matter conserved in this process?" and "How is energy transferred from one to another?".

• Students would be in -groups and then they would create a script explaining how photosynthesis works. Each member of the team should represent of component of how photosynthesis works.
  ○ Member 1: Sun
  ○ Member 2: Water
  ○ Member 3: Glucose
  ○ Member 4: Oxygen
  ○ Member 5: Carbon Dioxide
  ○ Member 6: Plant (essentially the group only needs 5 members but there are more students than one student can be the plant, but the play would be fine if only 5 members)
• They could be as creative as they want in creating their play, as long that they can demonstrate how photosynthesis works.
• Give them time to plan/practice their play and then have them present their play.	

Task 3: Futuristic Greenhouse **Duration: 40 minutes**	Walk around and ask probing questions, monitor their creations, and guide them if there are any misconceptions. Let them be creative about what they are doing and have fun creating their futuristic greenhouse. If you want and if there are materials available, the link to how to create the mini greenhouse is in the lesson plan. It would be ideal that if you do decide to plant the seed to do it at the beginning of
• **Now that the students get the concept of how plants give us oxygen and food, how much we depend on the plants. Bring in the theme of the end of the world, "In a collapsing world where our resources are perishing, we must act if we want to survive! Oxygen and food are our main objectives to conserve if we want to survive in this collapsing world! Now you the last scientist survivors need to come up with a solution to save the last people on earth. Quick came up with ways that we can create a greenhouse where we can conserve oxygen and food. Good luck, remember the fate of the world depends on you!"** • **Students would be given the task of creating a futuristic greenhouse in a world that has collapsed, where they need to find ways to conserve plants. Remember they are creating a greenhouse in a world where they have limited sunlight and limited water resources. (Is a group project, they can stay in the same group as their play but at least 3 to 4 students in each group)** • **Guidelines for the Greenhouse:** ○ **Explain how the plants would survive in their greenhouse and how they would perform photosynthesis.**	

○ **How would humans use the plants?** ○ **Consider the factors of limited sun, water, and artificial fertilizer. How would they replace, create, or fix those missing factors?** ○ **Is the greenhouse sustainable in a collapsing world?** ● **The Greenhouse project should be created on poster paper, where they can present their ideas and draw out the way that their futuristic greenhouse should look, this poster they would present to the world leaders.** ****It would be nice if the students could create their mini greenhouse model along with their poster, where they can plant a seed. Here is the link where you can find the materials and the steps of how they can create their own mini greenhouse. Make a Mini-Greenhouse | Crafts for Kids | PBS KIDS for Parents****	the camp so if something grows students can see it.
Task 4: Present to the world leaders **Duration: 10 to 15 minutes** ● Once they are done with their greenhouse, they would have to present to the last world leaders (the teachers) their project. It is kind of presenting their ideas and convincing the leaders (teachers) to invest in their project because it is a step closer to saving humanity. ● In the end the world leaders (teachers) and the last survivors (students) would decide which project would save humanity.	Give constructive feedback about their project.
Closing: How will you end/summarize the lesson?	
End the class with a few questions that can be used in a class discussion. ● "If photosynthesis suddenly stopped, how far would humanity go? Do we have other sources of energy? Would we have food and for how long?"	

Linear Inequalities in Two Variables

Learning (TEKS) Objective: A.2H: Write linear inequalities in two variables given a table of values, a graph, and a verbal description

Student Outcome: Students will be able to write linear inequalities in two variables and analyze real-world scenarios to create and interpret linear Inequalities.

Total Length of Lesson: 1 hour

ADP MaST Academy

Summer Camp: Lesson Plans

Materials (per student), include copies of handouts, paper for foldables, etc.:

- Yarn
- Butcher Paper
- Tape
- Printed Scenarios (shown in presentation)
- Printed Challenge Scenarios (shown in presentation)
- Graphing Calculators (as needed)
- Mini whiteboards (as needed)

Technology Required (put video, website, etc. links here):

- Teacher Presentation: https://www.canva.com/design/DAGhZXKjePE/GQGCWO37E2M5BPhrJBP8ew/edit?utm_content=DAGhZXKjePE&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

What needs to be prepared/set up ahead of time:

- Have the desks arranged in a U Shape/Horseshoe
- Use masking tape to make 4-5 coordinate planes (depending on the # of students) on the floor

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Provide sentence stems for presentations ("The shaded region means that...)
- Use visual aids for graphing inequalities
- Extra time
- Provide key vocabulary with visuals
- Peer support
- Have the scenarios written in Spanish

Task 1: Hook - Discussion/Review **Duration:** 15 min	**Notes to Teacher:**
• Prompt: The world has ended, and you are leading a group of survivors. What are the most important resources you need to manage? • Write student responses on the whiteboard (water, food, medicine, fuel, etc) • Discussion: How can we set rules (inequalities) to make sure everyone survives? • Teacher will mention how students will use inequalities to manage resources and create a survival rule. • Before getting started, the teacher will review how to write and graph an inequality	• Give students time (30 seconds – 1 minute) to discuss each question as a group to maximize student responses. • Presentation will contain practice examples of writing and graphing inequalities
Task 2: Activity – Survival Scenario **Duration:** 15 min	

• Scenario: Your bunker has limited resources. You need to set up survival rules using inequalities. • Students will form into groups of 3-4 • Each group will choose one resource (water, food, medicine, fuel, firewood, batteries) and receive a printed scenario based on the resources. • Each group will create an inequality based on the printed scenario. They may use mini whiteboards for scratch work and graphing calculator to assist with calculations if needed Example of a Printed Scenario: We have 60 total gallons of water. Adults need 4 gallons of water, and children need 2 gallons. What is your survival rule? Inequality: $4x + 2y \leq 60$, where x is the number of adults and y is the number of children • Each group will then graph their inequality using the masked tape coordinate places from the floor. Yarn will be given to represent the graphed equation, and butcher paper will be used to represent the shaded region.	• Provide students with printed scenarios, whiteboards, yarn, butcher paper, tape • Remind them in the last 5 minutes to prepare their presentation
Task 3: Presentation and Interpretation **Duration:** 10 min	
• Groups will present their graph to the class and answer the questions "What is your inequality, and how did you graph it? What does the shaded region represent? What is your survival rule?" Ex: "Our inequality was $4x + 2y \leq 60$ and we graphed it plotting the x and y intercepts. The shaded region represents all possible combinations of adults and children that can survive with 60 gallons of water or less. Any point in this region ensures that there is enough water for survival. A point outside the region means there are too many people and the water will run out."	
Task 4: Challenge **Duration:** 15 min	• Provide students with new printed scenarios
• Teacher will give students a challenge • New Prompt: A disaster is approaching, and you must adjust your survival plan! • Each group will receive a new printed scenario and must modify their graph and inequality (supplies are running low, new survivors arrive, etc) • Each group will present their updated inequality and explain how it impacted their survival rule	
Closing: How will you end/summarize the lesson?	
• Students will reflect on the following questions and answer as a group 1) How do inequalities help in survival planning? 2) What was one challenge you faced when creating the inequality?	

3) Can you think of another real-life scenario (besides survival planning) where inequalities would be helpful?

Biomolecules & Cell Types

Learning (TEKS) Objective:

(5) Science concepts--biological structures, functions, and processes. The student knows that biological structures at multiple levels of organization perform specific functions and processes that affect life. The student is expected to:

(A) relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, to the structure and function of a cell;

(B) compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;

(C) investigate homeostasis through the cellular transport of molecules; and

(D) compare the structures of viruses to cells and explain how viruses spread and cause disease.

Student Outcome: *Students will be able to...*

Explain how viruses are spread and understand the processes in which they go through to cause infections from human to human.

Total Length of Lesson: 50-60 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Clear Cups (1 per student)
- Water
- Sharpie
- Phenolphthalein (it's a pH indicator that turns pink when activated)
- Baking Soda
- Pencils (1 per student)
- Dry Erase Markers

Technology Required (put video, website, etc. links here):

- https://youtu.be/7KXHwhTghWI?si=DtUTy4U2XtCthMIN
- https://youtu.be/67idUQCzmMs?si=EscofB-iQTmoO1R4

- https://youtu.be/Oz7OLFTzr20?si=3kG0flpRyd_YcDFk

What needs to be prepared/set up ahead of time:

- Before lesson starts, teacher has to have cups with water prepared and know which student it going to receive patient zeros cup. Set up the classroom so there are tables for PAIRS the tables and chairs will be facing each other.

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- **Use visuals to explain and show the processes. I will translate if necessary.**

Task 1: **Duration: 10-15 minutes**	**Notes to Teacher:**
• Introduce the topic for the students, talk about viral reproduction, and the process of getting infected. Show videos about viral transfer. After this explain how this falls within the timeline of the theme	**When showing videos make sure to ask questions and see if everyone is on the same page.**
Task 2: **Duration: 5-7 minutes**	**Remind them to label their papers!**
• Start instructions for students. Assign students a number when handing them paper and slips, they will write down the number they received and their name on the page given to them, this page is where they will document who they talked to, and as well the slips are to be given to one another when they talk. • Explain what they will be doing. "Considering what we now know about viruses and how they are transferred, you will be working together as a class to try and find out who patient zero is, only the teacher knows who patient zero is and you all have to use critical thinking to narrow it down to at least 3 people and at the end figure out who out of the 3 had the virus first!" • REMEMBER to also state that they can only talk to 3 other people in order to keep track of who they talked to. (number can vary based on classroom size) During the time they are talking they will have to exchange their slips AFTER they read and ANSWERED with the question on it, the questions will vary, but everyone will have to ask one of the 3 (or less.. depends) questions given. • LASTLY! They will transfer water into each others cup! BOTH need to do this to track patient zero. Once they finish their 1st round they will rotate to another table that is not the same person.	

• Once you emphasize the rules, give out the cups, the cups should also be numbered and students should receive the cup with the number you gave in the beginning, REMEMBER who you give the patient zeros cup to. • Once they're done, they will work together to find out who patient zero is by talking about it in a group discussion that will be lead by the teacher! (who started the pandemic)	
Task 3: Duration: 30 minutes	**Guide students if they are lost, as probing questions.**
• Students will walk around and talk to 3 different people in the span 2 minutes (45 sec increments for each person). Once they are done, activate every ones cup, if they were infected their cup should turn a pink-purple color. Everyone needs to work together on the board (with guidance of the teacher) and see who talked to who, and narrow down a common person aka patient zero. Help them narrow it down to 3 people, make sure they write their guesses on their papers.	
Task 4: Duration: 5-10 minutes	
• Clean-up for next activity and answer the exit ticket.	
Closing: How will you end/summarize the lesson?	
I will ask students what they would have done differently, end with a open discussion.	

Probabilistic & Statistical Reasoning

Learning (TEKS) Objective: (4) Probabilistic and statistical reasoning. The student uses the process standards in mathematics to generate new understandings of probability and statistics. The student analyzes statistical information and evaluates risk and return to connect mathematical ideas and make informed decisions. The student applies a problem-solving model and statistical methods to design and conduct a study that addresses one or more particular question(s). The student uses multiple representations to communicate effectively the results of student-generated statistical studies and the critical analysis of published statistical studies. The student is expected to:

(B) use the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, in mathematical and real-world problems;

Student Outcome: *Students will be able to…*

Students will be able to calculate the probability of 2 events happening

Total Length of Lesson: 1 hour

ADP MaST Academy

Summer Camp: Lesson Plans

Materials (per student), include copies of handouts, paper for foldable, etc.:	
• Probability Notes • Pencil • Chances of Survival Worksheet • Index Cards	
Technology Required (put video, website, etc. links here):	
https://www.youtube.com/watch?v=QE2uR6Z-NcU&t=523s	
What needs to be prepared/set up ahead of time:	
• Video Needs to be prepared • Chairs need to be in a circle	
How to accommodate lesson for students who are English Language Learners or have trouble focusing	
• Have sentence stems ready for the quick write • Be sure that when students choose a quality make sure to use language where students can understand	
Task 1: 12 min Duration: Probability Addition Rule Review	**Notes to Teacher:**
• The teacher will project the video and have students fill out the handout pausing several times to explain it and go over the examples. In addition, students would try one of the video examples on their own.	
Task 2: 30 min Duration: Probability of survival	Make sure qualities are age-appropriate Make sure students are calculating the probability after choosing the qualities
• Teacher explains that a small percentage of the population may be immune to the radiation if they possess specific qualities • Have one student be at the center of the circle and choose a quality that people may share. If a student in the circle possesses the quality have them stand up. Have students take note of how many stand up. The student to their right will choose another quality. Students will then calculate the probability of people surviving if they possess quality A or B. This will repeat until time has passed	
Task 3: 11 min Duration: Scenario Write	Make sure students explain how
• Choose one of the scenarios given in the probability of survival. Have students write a what if the scenario was happening. They must explain how they found what is the probability of survival (5 min)	

• Then have students complete an idea shuffle where they will trade index cards with at least 3 people and have a new index card (1 min) • Then the students will pair up and share the scenario they received (5 min)	

Closing: How will you end/summarize the lesson?

Have three to four students share the quick write to the class and what they found the most interesting or what they learned about the lesson

Linear Equations Given One Point & Slope

Learning (TEKS) Objective:

A.2B: Write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points.

7(D) determine the distance between two points on a coordinate plane using the Pythagorean Theorem.

Student Outcome: Students will be able to create linear equations from two points and apply the distance formula or Pythagorean Theorem to calculate the total distance traveled between two coordinate points on a graph.

Total Length of Lesson: 1hr

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Giant sticky notes
- (Laminated) image of the coordinate plane map with obstacles (for each group to have)
- Dry erase boards or graphing paper (for side work)
- Calculator
- Ruler
- Markers (expo/crayola)

Technology Required (put video, website, etc. links here):

- Teacher Presentation: https://www.canva.com/design/DAGhYTencyc/JDtvzzEiHW7XNfWPbGW00Q/edit?utm_content=DAGhYTencyc&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

- Coordinate Plane Map
  https://www.canva.com/design/DAGhYsHsMpY/GS_-gOvY-RTbehTigChgAQ/edit?utm_content=DAGhYsHsMpY&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

What needs to be prepared/set up ahead of time:

- Have all the materials available

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Provide visual aids (labeled map, step-by-step-visuals)
- Color coding
- Peer support
- Provide sentence starters for the presentation

  "Our starting point is ____, and our first route is represented by the equation __."

  "To find the shortest route, we used _____ to calculate the distance."

  "We chose this path because _____."

Task 1: Hook/Discussion **Duration: 10 minutes**	**Notes to Teacher:**
• Prompt: "Imagine you're stranded in a dangerous world. Supplies are running low, and the only known safe bunker is at (7,9). Other survivors are also racing to get there. The challenge? The terrain is rough, obstacles are everywhere, and you need to plan the most efficient path before anyone else beats you to it!" • Teacher will show the map from their presentation • In their groups, students will discuss the following questions and then share aloud -If you were in this survival situation and had to reach the bunker, what factors would you consider when choosing your path? -What type of math would you use when planning your route from the map? -If two survivors start at different locations but both reach the bunker, how can we tell who took the more efficient route? • Teacher will introduce the activity Mission: Race to the Bunker! Your team must create a path to the bunker at **(7,9)** while avoiding obstacles and finding the most efficient route. You will write linear equations for your paths	• During the discussion, guide the student's responses for them to see that equations can be used to represent the paths and to use distance calculations to figure out which route is the most efficient • Teacher will mention how they will assign each group a location (coordinate point) in Quadrant 3 away

and calculate the total distance traveled to see which team reaches the bunker first! -Create at least 4 paths (4 linear equations) to reach the bunker -Each path must be written in slope-intercept form (y = mx + b) -Calculate the distance of each path -Calculate the total distance traveled -Be ready to present at the end of class	from the safe bunker (using a number generator)
Task 2: Review **Duration: 15 min**	• Some examples will be shown in the presentation • Provide students with white boards/graphing paper and calculator to demonstrate work
• Before the class starts the activity, the teacher will review how to find a linear equation from two points and how to use Pythagorean Theorem or distance formula to determine distance between two points • Students will do some quick examples of -writing linear equations in slope intercept form from two points -finding distance between two points using Pythagorean Theorem -using the distance formula to find the distance between two points	
Task 3: Activity **Duration: 25 min**	• Provide each group with a giant sticky note with a laminated map for them to draw their paths with expo markers • When using the number generator, make sure the coordinate point does not land on the Contaminated River or Ruined Highways. Adjust the point as needed.
• Students will get into groups start the activity and make their presentation (depends on the number of students) • Teacher will use a number generator (-10 through -1) to generate 2 numbers that will represent the Quadrant 3 coordinate point each group will start at (each group will have a different coordinate point) (adjust the coordinate as needed to avoid it landing on an obstacle) • The activity can be organized with the following times to help keep them on track -(10 min) Draw/Write the equations -(10 min) Calculate the distances -(5 min) Prepare for the presentation	
Task 4: Presentation **Duration: 10 min**	• By the end of the

• Students will present their paths to the class • In their giant sticky note presentation, they will share their chosen paths/equations, their distance calculations (work shown), and their strategy of why they picked their paths. • As part of their presentation, they will also show their paths on the laminated map • After each presentation, the teacher will write down each group's total distance and have the class compare to see who reached the bunker first.	presentation, there will be a winner. Shortest total distance wins

Closing: How will you end/summarize the lesson?

- Students will reflect on the following questions
  -How did creating linear equations help you navigate the map?
  -How did distance calculations impact your decisions?

Cell Transport and Homeostasis

Learning (TEKS) Objective: investigate homeostasis through the cellular transport of molecules

Student Outcome: *Students will be able to… Identify the different types of diffusions and how different solutions have different reactions on the cell membrane.*

Total Length of Lesson: 1 hour 15min

Materials (per student), include copies of handouts, paper for foldables, etc.:

- Grapes, grape juice, water, corn syrup, salt, beakers, measuring tape, scale, notebook, balloons, flavor extracts, pipette

Technology Required (put video, website, etc. links here):

- Scale, The Grape Lab , d38c19c446cc40d9b52270ae3187e268 https://c8.alamy.com/comp/2KG2PY5/osmosis-in-animal-and-plant-cells-2KG2PY5.jpg
- https://thumbs.dreamstime.com/z/active-vs-passive-transport-molecules-movement-cell-membrane-transport-diffusion-facilitated-diffusion-active-transport-289169044.jpg

What needs to be prepared/set up ahead of time:

- Solutions should be prepared ahead of time. Balloons need to be blown up with different scents ahead of time.

ADP MaST Academy

Summer Camp: Lesson Plans

How to accommodate lesson for students who are English Language Learners or have trouble focusing	
• Pictures of hypertonic, hypotonic and isotonic cells	
Task 1: Pre Lab Duration: 20 minutes	**Notes to Teacher:**
• Tell them we will be investigating diffusion in infected cells. The grapes represent the infected cells and the solutions represent the environment around them. Have them start by weighing and measuring the grapes. Document the measurements in their notebook. • https://docs.google.com/document/d/1L1jUTcR_Cakc_E_x2ATRg8XZSuBdkKQsPqGFQRhmN7E/edit?usp=sharing	Have students drop a grape in each solution after they finish documenting weight and size. Make sure each grape is fully submerged. Leave grapes to soak while we do smelly balloon.
Task 2: Notes on Osmosis and Diffusion Duration: 15 minutes	Introduce the vocabulary and have them write down the definitions. Have students write down their predictions
• Students take notes on the different types of osmosis and diffusion. • Students now can make predictions as to what will happen to the cells when they are left in the solutions.	
Task 3: Balloon Diffusion Duration: 20 minutes	Tell kids to be gentle with balloons and not to pop them. Discuss semipermeable membranes.
• Have students pass around the different smelly balloons. The students will record which odors are coming from which balloons. The students should make observations about what they are smelling and compare them. • Ask probing questions about how the smell is getting out of the balloon. Have them think about tea bags. • Reveal to them the different balloon scents and ask them to justify their hypothesis and compare results.	
Task 4: Grape Results Duration: 20 minutes	Students measure and weigh the final results in their notebook.
• Measure and find the final results for the grapes. Have students answer closing questions.	
Closing: How will you end/summarize the lesson?	
• Discuss what happened to the grapes and identify which solutions were hypotonic, hypertonic and isotonic. Explain how the grape represents the cell's semipermeable membrane and allows for certain molecules in and out of the cell. Connect to balloon demonstration. Have students connect how someone can spread the virus through a cough and the virus penetrate your smell membrane.	

- How can we protect our cells from contracting the virus?
- What are some adaptations we have to help us stop the virus from attaching?

Genetic Mutations & Evolution

Learning (TEKS) Objective: analyze evolutionary mechanisms other than natural selection, including genetic drift, gene flow, mutation, and genetic recombination, and their effect on the gene pool of a population.

Student Outcome: *Students will be able to... identify which type of mutations are happening by analyzing how our anatomy is changing.*

Total Length of Lesson: 45 minutes

Materials (per student), include copies of handouts, paper for foldables, etc.:

- Paper, color pencils, markers, crayons, pencil, notebooks

Technology Required (put video, website, etc. links here):

- Timer

What needs to be prepared/set up ahead of time:

- Picture of human before the mutations

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Have images of insertion, deletion, and substitution.

Task 1: Notes **Duration: 10 min**	**Notes to Teacher:**
• Mutations in DNA • Play video of mutations	Emphasize which one is frameshift and which one is point mutations. Address that mutations are random.
Task 2: Telephone Game Duration: 5 mins	Only one kid, who starts the game, is allowed to see the starting anatomy.
• **Students have to use the game to relay the messages of what the person looks like by describing all the traits in detail.**	
Task 3: Drawing **Duration: 20 mins**	Have students secretly write down their description that they heard
• Draw and color the infected person that got described to you. Do not copy from other students' drawings. • https://docs.google.com/document/d/1JU76c_DP8ZB4UUG0HwEJHy08dTbtVQhdgTn3xzeJhyw/edit?usp=sharing	

• Two drawings going at the same time, counterclockwise	
Task 4: Gallery Walk **Duration: 10 minutes**	Display each human drawing in the order of the telephone game
• Hang up the infected pictures and take note of how the human changed throughout the game.	
Closing: How will you end/summarize the lesson?	
Discuss throughout the gallery walk, what type of mutations we can observe. Have students present their drawings and analyze the mutations and identify them in each drawing. As a class, talk about what could have happened in the environment that caused mutation.	

.

Ratios and Proportional Relationships

Learning (TEKS) Objective: 8.4(B): Solve real-world problems involving proportional relationships.

8.5(D): Use mathematical models, including tables and graphs, to solve problems involving ratios.

Student Outcome: *Students will be able to… Define what a ratio is and how it is used to compare two quantities.*

Total Length of Lesson: 60

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Whiteboard and markers
- Survival Item Card
- Calculator
- Images

Technology Required (put video, website, etc. links here):

Images

What needs to be prepared/set up ahead of time:

- Images and cards

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Pictures

Task 1: **Duration:**	**Notes to Teacher:**

• *Warm-up (10 minutes) - Setting the Scene*
• Objective: Activate prior knowledge about survival needs and introduce the concept of ratios.
• Tools Needed: Whiteboard, markers
  ○ Process:
  ▪ Start by asking the class: *What do people need to survive if stranded somewhere dangerous?*
  ▪ Write their responses on the board: water, food, shelter, energy, etc.
  ▪ Briefly discuss the basic needs of the characters in *The 100* and how the survivors must ration resources.
  ▪ Explain that ratios are used to compare these quantities (e.g., 3 water bottles to 5 food rations).	

Task 2: **Duration:**	

Direct Instruction (15 minutes) - Understanding Ratios
● Objective: Teach students how to understand and simplify ratios.
● Tools Needed: Whiteboard, survival item cards (or chart on the board)
  ○ Process:
  1. Define ratio: *A comparison of two numbers or quantities.* Use simple ratios as examples (e.g., 2:3, 1:4).
  2. Display the survival item cards on the board. For example:
  ■ *The survivors have 50 food packs and 25 water bottles. What is the ratio of food to water?* (50:25 → simplified to 2:1).
  ■ *If 40 people have weapons and 60 people don't, what is the ratio of armed to unarmed?* (40:60 → simplified to 2:3).
  3. Make sure to explain how to simplify ratios if needed.	

Task 3: **Duration:**	
Guided Practice (15 minutes) - Survival Ratios	

- Objective: Help students practice applying ratios to real-world survival scenarios in pairs or small groups.
- Tools Needed: Survival item cards, worksheet, whiteboard for group work
  - Process:
    1. Present the following challenges (write them on the board or distribute them as scenarios on cards):
       - Water Crisis: *There are 80 gallons of water left for 40 survivors. What is the ratio of water to people?* (80:40 → 2:1)
       - Energy Distribution: *You have 30 energy cells and 10 devices that need power. What is the ratio of energy cells to devices?* (30:10 → 3:1)
       - Food Rationing: *5 food packs need to feed 20 people. What is the ratio of food to people?* (5:20 → 1:4)
    2. Have students solve these problems individually or in pairs, using the survival item cards for reference.

Task 4: **Duration:**

Create & Solve Survival Ratios (15 minutes)

- Objective: Allow students to create their own survival scenarios and solve their peer's problems.
- Tools Needed: Worksheet, survival item cards, calculator (optional)
  - Process:
    1. Have students write at least 3 of their own ratio problems based on survival items (e.g., if they are rationing water, food, and energy).
    2. Example: *If there are 100 food rations and 50 people, what is the ratio of food to people?* (100:50 → 2:1)
    3. Once students create their problems, they will exchange them with a partner to solve each other's problems.

Closing: How will you end/summarize the lesson?

Wrap-up & Reflection (5 minutes)

- **Objective:** Reflect on the importance of ratios in survival situations.
- **Tools Needed:** Worksheet, whiteboard
  - **Process:**
    1. Ask students to discuss why ratios are important when managing limited resources in survival situations.

2. Collect the students' exit tickets. *Write one real-world situation where ratios are useful outside of survival settings.*
3. Wrap up the lesson with a brief discussion about how understanding ratios helps in making better decisions in real life (e.g., budgeting, cooking, distributing resources).

Calculating Lateral and Total Surface Area

Learning (TEKS) Objective:

7.9D: Solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net.

7.9C: Determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles.

Student Outcome: Students will be able to apply surface area calculations to design and construct a model rocket using a combination of 2D and 3D shapes, and explain how surface area is used in real-world engineering applications.

Total Length of Lesson: 1hr 20min

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Construction paper
- Rulers
- Tape
- Scissors
- Glue
- Formula sheet for 2D and 3D shapes
- Paper
- Pencil
- Calculator
- Markers
- Giant Sticky Notes

Technology Required (put video, website, etc. links here):

- Teacher Presentation: https://www.canva.com/design/DAGhX6Y6gH4/rVs3601ZZluaO1kMevumaA/edit?utm_content=DAGhX6Y6gH4&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

ADP MaST Academy

Summer Camp: Lesson Plans

What needs to be prepared/set up ahead of time:	
• Have all the materials available	
How to accommodate lesson for students who are English Language Learners or have trouble focusing	
• Provide visuals of shapes and formulas • Peer support • Provide sentence starters for the presentation	
Task 1: Discussion Duration: 10 minutes	**Notes to Teacher:**
• Show images of rockets on presentation • Have students discuss in their group what kind of shapes they see. They will share aloud. • Students will also discuss in their group: "What kind of math can engineers use to ensure their designs stay within material limit? Each group will share their answer. • Teacher will reveal today's challenge "After spending 100 years in space, it is time to go back to Earth to see if its inhabitable. Today, you will design, build, and present a rocket using only 120 square inches of material" • Teacher will provide the rules of the challenge Your rocket needs to -contain at least 5 geometric shapes (2D and 3D) -have a maximum surface area of 120 square inches. Design it to be as close to this limit as possible without exceeding it Your presentation (poster) will include -the shapes you used (drawing) -the dimensions of each shape -the calculations of each shape's surface area -the total surface area of the rocket • Teacher will briefly go over the surface area formulas of 3D shapes and area formulas of 2D shapes • Students will get into 4-6 groups for the activity (depends on the number the number of students)	• Provide multiple pictures of rockets in the presentation • Give groups about 30 seconds – 1 minute to discuss each question • When teaching surface area, include the following shapes (cylinder, cone, rectangular prism, triangular prism, circle, triangle, rectangle) and show the nets and formulas
Task 2: Brainstorming Duration: 20 min	

• Teacher will give students a certain amount of time for each task. Students may move on to the next task if they finish early. (5 min) Students will decide which shapes they will use (15 min) Students will determine the dimensions of each shape	• The purpose of the times is to keep the students on task. • Provide paper, pencil, calculator, and reference paper for this duration
Task 3: Building the Rocket Duration: 40 min	• The purpose of the times is to keep the students on task. • Provide the students with construction paper, scissors, rulers, tape, glue, markers, and giant sticky notes
• Teacher will give students a certain amount of time for each task. Students may move on to the next task if they finish early. (15 min) Draw and measure the nets of each shape (20 min) Construct the rocket from the nets (5 min) Create the poster and be ready to present	
Task 4: Presentation Duration: 10 min	• Remind students to pay attention and subconsciously compare the design and dimensions of their rockets to other group's rocket
• Students will present their rocket and poster to the class • In their presentation, they will explain what shapes they used, the dimensions of each shape, the area of each shape, and the total surface area of their rocket.	
Closing: How will you end/summarize the lesson?	
• Students will reflect on the following questions as a group -What were some similarities and differences you noticed between each rocket? -What would you change in your design if you were given more material? Less? -In what other real-life situations can understanding surface area be important?	

Systems of Equations and Inequalities

Learning (TEKS) Objective:

(3) Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to:

(C) solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation.

Student Outcome: *Students will be able to*

We will… be able to write linear equations and apply their skills into the game.

I will…write an equation to find the perfect temperature for the earth.

Total Length of Lesson: 45 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Print out cards (laminate)
- Print out scholar worksheets
- Number line
- White board
- Markers

Technology Required (put video, website, etc. links here):

- **Canva Presentation.**
  - https://docs.google.com/presentation/d/1HKKv93fxSOv2WOK4rYM5Uyoecd2srrDI/edit?usp=drive_link&ouid=104376110532581851396&rtpof=true&sd=true
  - https://docs.google.com/document/d/e/2PACX-1vQ_ezg-9afgbDvetjsUnnn_K5gI3KyZ7dNX01HtVd5isJZnXkTsYtrmeT0RlSsLk9WdLDbj1hOZStZP/pub
  - https://docs.google.com/document/d/1w_6i2h4DBzt_kaTstGB_-3ulym6DZiVl/edit?usp=drive_link&ouid=104376110532581851396&rtpof=true&sd=true

What needs to be prepared/set up ahead of time:

- Materials for each group.

How to accommodate lesson for students who are English Language Learners or have trouble focusing

<table>
<tr><td colspan="2">

- Scaffolding
- Visuals
- Modeling

</td></tr>
<tr><td>Task 1: Concept map Duration: 5 minutes</td><td>Notes to Teacher:</td></tr>
<tr><td>

- Concept map as a class: (5 min)
  - What scholars remember from previous topics.
  - How scholars can connect all the concepts from day 1 through day 8.
  - Discussion as a class.
  - Clarify misconceptions.

</td><td>Monitor and engage students to participate.</td></tr>
<tr><td>Task 2: Introduction lesson Duration: 10 minutes</td><td rowspan="2"></td></tr>
<tr><td>

- The teacher will introduce the game and set up expectations for the activity game. (Canva 10 min)

</td></tr>
<tr><td>Task 3: Activity Duration: 20 min</td><td rowspan="2">Walking around the classroom to monitor and interview during the game.

More details are included Canva.

Have students keep track of their results using the number line and they can write their results in the mini whiteboards.</td></tr>
<tr><td>

- Students are challenged to find a perfect temperature to save the earth.
- Students are placed in groups of 4-5.
- Pass Out all the materials for the game.
- Each student chooses an earth from the deck of incubation temperature.
- Each student lays the earth's face-up so all the members of the group can see each student's optimum incubation temperature.
- Students must mix all the cards (fire and ice cards).
- Students must have 4 cards (2 ice and 2 fires).
- Students don't show their 4 cards to other students.
- Students will begin the game.

</td></tr>
</table>

• Each student of the group will find the perfect equation to find the temperature to save the earth. • The first student who finds the perfect temperature wins the game	
Task 4: Exit ticket **Duration: 5 min**	Student feedback.
• Students will explain how they found the temperature to save the earth. • Students will share how equations are connected to the game. • Any suggestions to make the game more challenging?	
Closing: How will you end/summarize the lesson?	
Exit ticket, interviewing students.	

Cell and Viral Structures

Learning (TEKS) Objective:

5(D) compare the structures of viruses to cells and explain how viruses **spread and cause disease.**

Student Outcome: *Students will be able to…*

- Identify and describe the basic structures/functions of a cell.
- Create a 3D model of a cell using food items to reinforce learning

Total Length of Lesson: 60 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Materials required for the food cell (you are more than welcome to switch up ingredients if you find something more suitable)
  - Cell membrane: paper plate
  - Cytoplasm: markers (paint the paper plates with markers)
  - Nucleus: large bead
  - Mitochondria: jelly beans or smaller beads
  - Ribosomes: buttons (different colors)
  - ER: yarn
  - Golgi apparatus: pipe cleaners
  - Lysosomes: buttons (different colors)
- Pencils and markers

- If decided to make the cell with clay:
  - Multiple color clay
  - Posters
  - Paper

Technology Required (put video, website, etc. links here):

- **https://youtu.be/8vo59AKzU4Q?si=-DIvHj9Pk5Vrpl_F Human cell notes**
- **https://youtu.be/YS7vsBgWszI?si=Mewj_t3BNCACvbM0 Virus notes**
- **https://youtu.be/B6ixrudpg3s?si=e2LaJx2m1wFQNHSi Reference of the activity for teachers**

What needs to be prepared/set up ahead of time:

- The cell materials
- Videos
- If decided to do with clay, then the clay materials
- Poster with the organelles and their functions

How to accommodate lessons for students who are English Language Learners or have trouble focusing

- It would be ideal if a person could say the instructions/topics in English and then another person could repeat them in Spanish.
- Check in with them using both languages.

Task 1: Hook Duration: Around 3-5 minutes	**Notes to Teacher:**

• Start with something that catches their attention about viruses and the end of the world.
• You can show them this video, https://youtu.be/wnvZMmDT8us?si=2HkYrnhazupDj6Hh the video is an emergency broadcast (fake) talking about some aliens/unidentified objects entering the earth.
• Then you can use this prompt "When the mysterious unidentified objects entered the Earth's atmosphere, they brought with them a mysterious pathogen that has been attacking human cells, causing them to lose control, act odd, and end in unimaginable sickness! The scientists believed that the virus was attacking the cell, more specifically in the mitochondria but they aren't very sure since it's spreading extremely fast!"
• Then ask the following questions
  ○ What part of the cell is most important for survival?
  ○ Can we design a cure and how?
	If you find something else that you would prefer for the starting like a prompt or something like that you are more than welcomed.

Task 2: Main Concepts/notes Duration: Around 5- 10 minutes	

• Go over the main concepts of the human cell and what each does. Show them a video about the cell, https://youtu.be/8vo59AKzU4Q?si=-DlvHj9Pk5Vrpl_F
• Go over the main concepts, cell membrane, mitochondria, ribosomes, nucleus, cytoplasm, lysosomes, endoplasmic reticulum, and the Golgi apparatus.
• You can have guided notes where they write down what each thing does, or maybe you can create a poster where you write down what each thing does, and they can see it.
• After that go over how viruses spread with a video, https://youtu.be/YS7vsBgWszI?si=Mewj_t3BNCACvbM0
• Go over the video and see how viruses spread.
• Ask the following question to connect the concepts to the activity.
  ○ If we could reinforce one organelle from the cell, which one should it be?
  ○ Could we design a 'super cell' that resists the virus?
  ○ You can add any other questions as seen fit.
	It would be better for the students to always have kind of a visual aid when learning the concepts. That's why maybe a poster(can also be a document online, that you can project on the board) with all the organelles and what they do, would be of great help when creating their projects. I recommend doing a lot of questions and connecting the concept with the activity because in general viruses and cell can be a tricky concept to learn. I also would recommend doing this activity before/after the patient zero activity of Sarah, so that the students understand a bit more and they can connect the topic.

Task 3: Create their 'Super Cell' **Duration: 40 - 45 minutes**	Here is a reference to the activity so you can have an idea if you prefer to do it with clay. This is a resource for you, https://youtu.be/g9hal8w6f-
• From groups of 2. • They would have to replicate the human cell in a 3-D model made from craft materials. On the board, an example of the human cell that they must replicate, in a picture format.	

• This human cell needs to be altered to survive the virus that has been destroying the world. They need to brainstorm how they can alter the cell to make it more resistant to the virus and what organelles they should have more of or which ones they should take away.
• Rules for "Survivor Cell"
  ○ Must be a human cell
  ○ Have all the organelles
  ○ Must modify at least one of the organelles
• Craft materials for the organelles (the materials can also be changed to your liking or if you think something else would fit better)
  ○ Cell membrane: paper plate
  ○ Cytoplasm: markers (paint the paper plates with markers)
  ○ Nucleus: large bread
  ○ Mitochondria: jellybeans or smaller beads
  ○ Ribosomes: buttons (different colors)
  ○ ER: yarn
  ○ Golgi apparatus: pipe cleaners
  ○ Lysosomes: buttons (different colors)
	g?si=7oScXJmDLwancmh4 CLAY ACTIVITY

Task 4: Democracy Duration: 15 minutes	
• Each group would present their super cell project, and they must explain why they changed what they did and how that benefits the cell to be more resistant. • After each group has presented their projects then the class will take a vote to see which one of the projects would survive.	
Closing: How will you end/summarize the lesson? 5 minutes	

• Option 1: Have a scenario
  ○ The students have one last chance to broadcast a message to the last human survivors.
  ○ What would the message be? (short paragraph)
  ○ How can humanity be saved? (using what they learn about cells)
• Option 2: Rapid-fire questions
  ○ Ask quick questions about the organelles
  ○ Reward the correct answers
• Option 3: Thumbs Up/Down
  ○ Just ask questions about the lesson and do a thumbs up or thumbs down if they understand the topics.	

ADP MaST Academy

Summer Camp: Lesson Plans

Exponent Laws

Learning (TEKS) Objective:

(11) Number and algebraic methods. The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to: (B) simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents

Student Outcome: *Students will be able to… simplify algebraic expressions using the laws of exponent by applying product, quotient and power of power rules.*

Total Length of Lesson: 75 minutes

Materials (per student), include copies of handouts, paper for foldable, etc.:

- Student handout
- Paper
- Computer
- 1 Post-it Note

Technology Required (put video, website, etc. links here):

- Computer
- Student https://play.blooket.com/play
- Teacher https://www.blooket.com/

What needs to be prepared/set up ahead of time:

- **Teacher needs to create Blooket account and create the activity.**

How to accommodate lesson for students who are English Language Learners or have trouble focusing

- Visuals
- Sentence Stems
- Modeling

Task 1: Bellringer **Duration: 10 minutes**	**Notes to Teacher:**
• Discuss in partners what product, quotient and power are?	Make sure scholars are collaborating.
Task 2: Notes **Duration: 15 minutes**	Answer sheet attached.

• Scholars will fill in the blank as the teacher shows them what goes on the sentence stems and works out the examples.	
Task 3: Instructions **Duration: 5 minutes**	Start by giving the scholars the code needed.
• Teacher will provide scholars instructions	
Task 4: Blooket Game **Duration: 35 minutes**	Have scholars paste posted on parking lot.
• Scholars will practice what they have learned by playing Blooket.	