

Implementing Sheltered Instruction Observation Protocol (SIOP) and Specially Designed Academic Instruction in English (SDAIE)

By
Heather M. Miller
In partial fulfillment of course requirements
of Sessions 8-10 for
ESOL Course Instructional Strategies

Table of Contents

Table of Contents	1
Workbook Assignment:.....	3
Companion Website	4
Workbook Answer	5
Reflection on Lesson Implementation.....	7
Guide to Appendices	8
Appendix A - The Lesson Plan	10
The SIOP LESSON PLAN Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals	10
Purpose of the Unit Plan.....	10
Lesson 1	11
Lesson 2	12
Lessons 3-4	14
Lesson 5	16
Background Information on the STEM Project and SIOP Lesson	17
Academic Citations.....	18
Appendix B - The Student's Unit Lesson Plan Overview, Vocabulary, and Resource Page	19
The Student's Unit Lesson Plan Overview, Vocabulary, and Resource Page Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals	19
Appendix C - The Lesson 1 Page	23
The SIOP LESSON PLAN #1: Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals	23
Appendix D - The Lesson 2 Page.....	24

The SIOP LESSON PLAN #2: <i>formatted for the ESOL Course</i> 5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals.....	24
Appendix E - The Lesson 3-4 Page	27
The SIOP LESSON PLAN #3 and #4: <i>formatted for the ESOL Course</i> 5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals	27
Appendix F - The Lesson 5 Page	29
The SIOP LESSON PLAN #5: <i>formatted for the ESOL Course</i> 5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals.....	29
Appendix G - The Online STEM Notebook	31

Workbook Assignment:

Developing a Sheltered Instruction Unit Plan

Choose a grade level and content area that you are working with now or plan to work with in the future and create a four-five-lesson unit for a class that includes ELLs.

Each lesson must include:

- Content and language objectives for each lesson (sheltered instruction), correlated to Georgia Performance Standards
<http://www.georgiastandards.org> and WIDA ELP Standards
<http://www.wida.us/standards/elp.aspx>
- Strategies and practices to build study skills and to increase language use, interaction, and comprehensibility.
- Modifications for ELLs at varying proficiency levels (pre-production, early production, speech emergence, intermediate fluency)

Implement at least two of the lessons within the timeframe of this course. If possible, ask a certified ESOL teacher or another colleague to observe the lessons or videotape yourself and review the tapes. Then reflect on the lesson implementation and this teacher's feedback. Consider the students' experience of this lesson. Suggest revisions of these lessons for later use.

This assignment is being given early in the course to allow adequate time for completion; it should be developed as the course progresses to incorporate knowledge and strategies presented in each session. This Workbook counts as two of the required three Workbooks and is worth 50 points (rather than the usual 25 points). (TESOL/NCATE 3; InTASC 7; ISTE 6) **Due by the end of Session**

10.

Companion Website



There is a companion website to this written document located at <http://www.industriousteacher.com/5th.html> .

Should I ever move the top level webpage, there are two divisions as well.



Website for students, “The Student’s Unit Lesson Plan Overview, Vocabulary, and Resource Page – Design Oakcliff’s New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals” located at <http://www.industriousteacher.com/5th-siop-vocab.html>



Website for adults and teachers, “The SIOP LESSON PLAN Design Oakcliff’s New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals” located at <http://www.industriousteacher.com/5th-siop-lp-esol-class.html>

Workbook Answer

The students are 5th grade computer lab specials students. There are students who are identified as being Level 1 Entering, Level 2 Emerging, Level 3 Developing, Level 4 Expanding and Level 5 Bridging, and there are those students who have tested out of ESOL support. There are less than 15% of my students who are first language English speakers.

Content : Computer Lab Specials STEM Unit

Languages spoken: 85% ESOL. Majority Spanish. Some Chinese, Korean, and Bengal. Less than 15% are first language English Speakers.

Other relevant information: We are a STEM Theme School. In my computer lab specials class, I try to incorporate a STEM Unit each semester that takes multiple classes, includes research, collaboration, and a build or final design. For this unit, I have included the use of many skills we have been working on individually in class over this school year. Also in my class, I am working towards a blended classroom for differentiation and created the student website to that end. The audio supports and video supports are for my ESOL students who might have trouble reading academic content. Some of it is verbal instruction, and some of it is reading what I wrote on the webpage.

Pre-/post-assessment of content and language: As a pre assessment, every student in ESOL courses has taken ACCESS Tests for this school year but the results are not in. With over 120 5th grade students, I take the position that I am probably teaching “Intro to Computers” to a majority of ESOL students. Because this is a specials class, we do not do formal pre and post assessments, else we would literally have no classes left to teach. The class is exploratory in nature and graded pass/fail. We try to get to the culmination of a unit, but often, due to computer lab access being removed, every group or individual rarely gets to present our final projects in class. If we get one or two presented I consider this a success. I know we are not supposed to make assumptions about our students, but much of what I teach is new content to the majority of the ESOL students.

How your unit will support your ELLs’ needs? I have created a website to go along with this unit. <http://www.industriousteacher.com/5th-siop-vocab.html> . There are individual lesson web pages to support the unit, and help keep the students on track. They can look ahead, explore resources, and repeat anything on the website as often and as much as need be to facilitate learning the language and the math content. I expect it might take more than 5 days for the 5 lessons, since we are in the middle of testing almost always, spring break is coming soon, and we often have some school-wide event that causes us to miss at least one day of 5th grade specials each term. When teaching, I always assume we are starting at a zero knowledge point, because of language, poverty, access, and school-specific tasks. The kids might have seen Microsoft Office Suite programs, but they have probably not used the programs like I am showing them how to use the programs because I integrate their usage. Rarely will I have them do a substitution activity like your

journal that you already handwrote. I will have them type a journal from the air, and add pictures. Or I'll have them start with a visual prompt and tell me everything they see. Then Compare and contrast it to a second picture. Or I'll have them create a graph and write about it, descriptively or persuasively. Usually I focus on the visual story telling to be persuasive or informative. Thus, I use a lot of visuals, hands on demonstrations, and spiral instruction to the group. I use a lot of "tell your neighbor" or "Ask your neighbor" strategies when i am teaching new words, or phrases, or skills. I also allow "helpers" who I have checked are doing the skill properly, and those helpers talk to the other kids in whatever language is comfortable to them to get the skill done. Then I will go around the room to each individual student's computer and see where they are, and give them a boost if they need help, or offer them an enrichment activity if they already mastered the skill. I need to use word walls more adequately. I am working towards making the lessons online, where the kids can repeat my lessons as many times as they need to. This is one reason I put this unit plan on a website. I really want to try to give the student a chance to use the accessibility tools on their computer to read aloud text to them. I am anxious to give this a try.

The lessons included create a logical sequence and development of content knowledge, skills, and language development because this is a cumulative unit based on ISTE standards (technology standards), real world problem solving STEM Units, and 5th grade math standards. The individual computer tasks I am having them do are skills we have worked on individually over the course of this school year. This unit is a STEM Unit based on a real world problem caused by our roof construction contractors ruining our upper grades play area. The students are used to STEM Engineering Design Process from their grade level classes over the last two years. **Lesson 1** calls for a survey and chart making which is a skill students have done in homeroom math classes since second grade. Also in Lesson 1, students are to download and share a file using OneDrive, which the students have done already this year. This will be the second time we are using the Online STEM Notebook (Downloadable in Lesson 1 of the website lesson). I have revamped and streamlined the Online STEM Notebook based on feedback I received from the first use in first semester. **Lesson 2** is online research and screen shots, with copy and pasting. These are skills the students have been doing for the majority of the school year. **Lesson 3 and 4** call for the finding of area, which SHOULD be a math review for them since they have seen area in third, fourth, and fifth grades. We have used Microsoft PAINT, and Microsoft EXCEL several times this year and last year. Excel will be the brand new content for some students. Since I am having them find area using a grid, even if their math skills are weaker, they can still count squares. Further, I am differentiating here because some students will prefer to calculate by the grid overlay, and others will prefer to try the Microsoft Excel method of grid design. Once these grids are done in either place, students can type or talk to justify their choices, and math calculations. Any language needed to justify the size of their choices for playground equipment, soccer fields, and the blacktop can be explained using mathematical terms of art, or visual words that are closer to social language. Because I am having the students compare percentages, I am going to show them how to calculate percentages, and fractions in Microsoft Excel. This is the new content for the lesson. I want them to see it done, and how they too can use Excel to calculate their math. When they compare and

see their percentages are off based on the original desired percentages, I will show them how quickly it is that Microsoft Excel can recalculate with minor input changes. Lesson 5, students are asked to present their projects. Because I am telling them the presentation is coming, I will also remind them that their Online STEM notebook counts as a presentation tool, so it is a good idea to keep it neat. If they so choose, they can also use Microsoft PowerPoint or Microsoft Sway to be more succinct in their final presentation.

The Online STEM Notebook is the main graphic organizer used in this Unit Plan. The student can modify it electronically, and because the document is shared, both or all three of the STEM Team can add and make additions and changes to it in real time. The Website I created to support students is the Task organizer with blended learning opportunities embedded for differentiation, enrichment, and remediation if needed.

I will use digital learning tools that maximize learning because I am a technology teacher. I integrate many software programs above, desktop computers, online drives, ChromeBooks, and blended learning. I endeavor to make the class a blended class and foster collaboration in this real world STEM project. I also endeavor to make the project one which is previously inconceivable without technology. (SAMR Model).

This project addresses (1) oral language development, (2) transitions to print, (3) reading and writing for purpose, and (4) supporting ELLs in content areas. (1) This project supports oral language development because it is a STEM Team project. The STEM Teams are going to engage in verbal communication with each other to decide how to split the workload, plans of attack, and decisions on why this choice is better than that choice. Further, as the students narrow their choices for the project, they will have to justify to each other why the narrowing choices make more sense to use than the discarded choices. (2) This project supports transitions to print because there needs to be captions written for each picture. Persuasive sentences are required to appear in the final presentation, either in spoken form (Entering and Emerging) that is converted by the partner into print, or directly to print, copied or typed by the Emerging, Developing, Expanding, Bridging, or fluent ELL student. (3) This project supports reading and writing for purpose because it is a real world problem and the students are being asked to solve it using independent research on the Internet. This is open-ended research, culled from the real world of companies that are attempting to sell products with their own profits as motive. Students will be handed a list of websites to start, but as Internet searches often do students may go far and wide and must evaluate the text they are reading as to the time spent and quality of what they are looking for gained. (4) Finally, this project supports supporting ELLs in content areas of math. While area is already a well-covered topic by this time in fifth grade, it is a difficult subject for many. The more real world, hands on practice the better. Even for those ELL students who learned area sufficiently, the Microsoft Excel part of the Unit Plan should provide enough enrichment opportunity, if interested.

Reflection on Lesson Implementation

reflect on the lesson implementation and this teacher's feedback. Consider the students' experience of this lesson. Suggest revisions of these lessons for later use.

I have introduced this Unit to three of my four 5th grade classes (Class A, B, and C; D class has not met yet). The fourth 5th grade class was diverted to a school-wide assembly and is a day behind the other classes. Each of the three classes were varying levels of excited about the project. Class A liked the idea of the unit. They were excited to use the aerial pictures of the playground area because they had been outside at recess when our school's STEM teacher was testing out our school's drone. Class B was less enthusiastic about the project, but that is typical of this class, except for a few students who seemed to be excited about the project of leaving a "legacy" playground, like a class gift to the school. Class C was enthusiastic about the play equipment when I told them there was no budget, then corrected it to, "unlimited budget" for this project and that ropes, ziplines, jungle-rope, swings, multiple soccer fields, etc. could be added.

All three classes so far have filled out the general percentage survey, and Class C has completed an "Answer Garden" to describe the playground elements they are excited to play on or provide at our school.

I have one more introduction to Class D, and I expect similar results to Class C, as they are the two most similar classes.

In the future, I need to have an audio or video introduction. There were so many questions so fast, that each class ended up in wildly different directions. I got the main points across but in one class I ran over by two minutes. This wreaks havoc in an elementary school because it throws off a ripple of effected things: lunch, bathrooms, recess, etc. To avoid this, a short introductory video would ensure that all the important topics were covered and then the barrage of questions can begin. Or, better yet, having those questions presented in a "choose your own adventure" type path of explainer videos would allow the fast groups to work faster and the slower groups to ask for teacher help, which is at a premium.

Guide to Appendices

To view the front page of the website created in support of this Unit Lesson Plan, visit <http://www.industriousteacher.com/5th.html>

See Appendix A for a reproduction of **the Lesson Plan** web page or visit it at <http://www.industriousteacher.com/5th-siop-lp-esol-class.html>

See Appendix B for a reproduction of **the Student's Unit Lesson Plan Overview, Vocabulary, and Resource Page** or visit it at <http://www.industriousteacher.com/5th-siop-vocab.html>

See Appendix C for a reproduction of **the Lesson 1 Page** or visit it at <http://www.industriousteacher.com/5th-siop-l1.html>

See Appendix D for a reproduction of **the Lesson 2 Page** or visit it at <http://www.industriousteacher.com/5th-siop-l2.html>

See Appendix E for a reproduction of **the Lesson 3-4 Page** or visit it at <http://www.industriousteacher.com/5th-siop-l34.html>

See Appendix F for a reproduction of **the Lesson 5 Page** or visit it at <http://www.industriousteacher.com/5th-siop-l5.html>

Appendix A - The Lesson Plan

The SIOP LESSON PLAN

Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals

Purpose of the Unit Plan

To include SIOP in a Computer Lab Lesson Plan using Microsoft Excel Online, Microsoft Sway Online, TinkerCAD, Snipping Tool, and student chosen research tools to complete a STEM Design and Virtual Build.

Unit Standards

CTAE - Technology Content Standards: [Computer Lab uses International Society for Technology in Education \(ISTE\) standards for Students. This SIOP integrated unit will focus on:](#)

ISTE 3 Knowledge Constructor - "Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

- ISTE 3a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
- ISTE 3c. Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
- ISTE 3d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

ISTE 4 Innovative Designer - "Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions" (Citation: <https://www.iste.org/standards/for-students>).

- ISTE 4a. Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
- ISTE 4b. Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
- ISTE 4c. Students develop, test and refine prototypes as part of a cyclical design process.
- ISTE 4d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

Math Standards (link):www.georgiastandards.org/Georgia-Standards/Frameworks/5th-Math-Curriculum-Map.pdf

Adding, Subtracting, Multiplying, and Dividing Fractions MGSE.5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem

WIDA Standards

<https://wida.wisc.edu/teach/standards/eld>

Standard 1 – Social and Instructional Language

English language learners communicate for social and instructional purposes within the school setting.

Standard 3 – Language of Mathematics

English language learners communicate information, ideas and concepts necessary for academic success in the content area of mathematics.

Lesson 1

Lesson Objectives

Content Objective:

ISTE 3a, 3c, 3d, 4a, 4b, 4d.

- SWBAT recall the STEM EDP and the Online STEM Notebook,
- SWBAT understand the Ask, Discuss and Plan stages, and begin working with their STEM Team, including sharing the online file.

Language Objective:

- SWBAT discuss with the STEM partner the elements of play for the play space, and jointly develop an internet resource based research plan for pictures of play equipment, play structures, field sizes.

Interactive Activity

Opinion Continuum. Students in class will stand in corners according to their favorite recess activity. Students will count classmates in each group.

Students will create a graph in Excel in later lessons. Student created design should reflect student's preferences in percentages, fractions, or decimals.

Students will read and discuss (think-pair-share) with the class what is being asked of them at the ASK stage of the EDP.

Students will work with their STEM partner to create the shared Online STEM Notebook (Microsoft Word Online) to prepare a place to organize and collect picture ideas of the school's existing space, ideas for play structures, and field spaces.

Group Configurations / Composition

Students self-selected STEM groups of two or three students in January. The STEM groups sit next to their

partner in the computer lab for easy think-pair-share, and "repeat to your neighbor" tasks. At least 85% of the student body is ELL or former ELL student, so almost all groups have at least one ELL.

Academic Language in Activity

Select, count, compare, STEM Engineering Design Process, ask, imagine, plan, create, iteration, cycle, Excel, Google Chrome, Snipping Tool, switch programs, search bar, screenshot, arial, image, photograph, fraction, percent, decimal, graph, overlay, grid, CTRL+C (copy), CTRL+V (paste), save, save as, insert

Ideas for Academic Interaction

Possible sentence frames for different levels of ELL students.

1. I like to play...
2. I prefer to play...
3. At recess, I wish I could play on...
4. In PE, I want to play ____
5. What is the count of the preferred play in this class?
6. I think the neighborhood people come to our play space to play ____.
7. I like to play ____ because ____.
8. Your idea is fun because
9. I might play ____ if ____ were available.
10. Let's research ____ first and ____ next.
11. I want my school's play space to include playground equipment, fields, and ____.
12. I want soccer goals to be movable or stuck in the ground because ____.

Integrated WIDA Strands

Cognitive Function: Students at all levels of English language proficiency APPLY knowledge of the Online STEM Notebook, STEM Processes of ASK, and Constraints to develop a research plan.					
Lesson 1	Level 1 Entering	Level 2 Emerging	Level 3 Developing	Level 4 Expanding	Level 5 Bridging
Reading	Match the Gear Icon to the STEM process being discussed. Talk and point with STEM Team partners. Watch the videos on the support webpage. Read/look at the Vocabulary images	Follow the audio read-aloud accessibility feature or read aloud highlights of the Online STEM Notebook.	After reading the ASK of the Online STEM Notebook, point to pieces that need to be done and discuss with partner.	Find the tutorials on the support website and incorporate working at own pace independently. Notice the steps involved in the Online STEM Notebook.	Draw conclusions about the ASK phase of the project, the percentages the class voted for in play activity, and compare and contrast the variety of websites for the most efficient use of research time.
Speaking & Writing	Walk to the corner of preferred activity on the Opinion Continuum. Share with neighbor favorite recess activity: playground vs soccer	Discuss with peers to see if in the right corners. Share with neighbor favorite recess activity: playground vs soccer & why	Discuss with peers to find place on continuum. Share with neighbor or group favorite recess activity: playground (name activity) vs soccer (name position)	Discuss with STEM Team a plan to do all that is needed for the Unit. Help others by explaining where they are on the continuum. Share with neighbor or group favorite recess activity: playground vs soccer. Categorize activities generally	Help others by explaining where they are and why this person should be another place on the continuum. Categorize continuum into groups based on similar and different qualities.

Level 6 - Reaching

Lesson 2

Lesson Objectives

Content Objective:

ISTE 3a, 3c, 3d, 4a, 4b, 4d.

- SWBAT research ideas in pictures and words using the online STEM Notebook to store images, ideas, and math of fractions, percentages, or decimals.

Language Objective:

- SWBAT search online exploring play structures and equipment focusing on pictures, then the students will read the descriptions of the images they like in conversation with their partner, discussing the benefits of the structure and layout of the elements of play for the play space.
- SWBAT jointly pick the team's favorite 3 to 5 images of play equipment or structures and justify those choices with a short label of each picture.
- SWBAT discuss and then write 1 to 2 sentences on what it is that they like about the images.

Interactive Activity

Formulate-Share-Listen-Create The teacher presents a question:

"If you could design the perfect play space for this school, what would you include for equipment, fields, blacktop markings?"

"What are the space requirements for our STEM team's selection?"

The students formulate an answer individually. Then they share their answers with their STEM partner. They listen carefully to their partner's answer, note the similarities and differences, and they both create a new answer that incorporates the best of both ideas, typing their combined answer into their STEM Notebooks. Later they will share with the rest of the class.

Group Configurations / Composition

Students self-selected STEM groups.

Academic Language in Activity

Select, count, compare, STEM Engineering Design Process, ask, imagine, plan, create, iteration, cycle, Excel, Google Chrome, Snipping Tool, switch programs, search bar, screenshot, arial, image, photograph, fraction, percent, decimal, graph, overlay, grid, CTRL+C (copy), CTRL+V (paste), save, save as, insert

Ideas for Academic Interaction

Possible sentence frames for different levels of ELL students.

1. At recess, I wish I could play ...
2. In PE, I want to play ____
3. I like to play ____ because ____.
4. Your idea is fun because
5. This idea is better because ____
6. I like this part of that idea ____ but I like this part ____ better.
7. I might play ____ if ____ were available.
8. Let's research ____ first and ____ next.
9. How can we have more soccer fields?

10. How could an obstacle course be made safe?
11. I want soccer goals to be movable or stuck in the ground because_____.

Integrated WIDA Strands

Cognitive Function: Students at all levels of English language proficiency APPLY knowledge of percentages and preferred types of play equipment and spaces.						
Lesson 2	Level 1 Entering	Level 2 Emerging	Level 3 Developing	Level 4 Expanding	Level 5 Bridging	Level 6 - Reaching
Reading	Use the links and scroll to find images of preferred playarea play.	Use the mouse to put the cursor where the audio read-aloud. Talk and point with STEM Team partners. Follow along with the STEM Notebook Parts.	Help team decide if certain website is helping the team get the information it needs. Point out the dimensions.	Find the tutorials on the support website to work independently of the class. Notice the steps involved in the Online STEM Notebook.	Draw conclusions about the ASK phase of the project, the percentages the class voted for in play activity, and compare and contrast the variety of websites for the most efficient use of research time.	
Speaking & Writing	Talk in single words, point with STEM Team partners about preferred activity and how this picture shows it. Copy & Paste the image into the STEM Notebook.	Talk in phrases, point as needed with STEM Team partners about preferred activity and how this picture shows it. Copy & Paste the image into the STEM Notebook.	Use comparing words to explain how this preferred activity matches this picture . Copy & Paste the image into the STEM Notebook and include a 2-3 written description of the picture.	Use comparing and contrasting words to explain how this preferred activity matches this picture . Copy & Paste the image into the STEM Notebook and include a 2-3 written description of the picture	Compare and contrast the pictures with STEM Team partners about preferred activity and type persuasive words showing how this picture matches the percentages of play better or worse than the other pictures. Copy & Paste the image into the STEM Notebook.	

Lessons 3-4

Lesson Objectives

Content Objective:

ISTE 3a, 3c, 3d, 4a, 4b, 4c, 4d.

- SWBAT use fractions, decimals, or percents to design the playground space using MS Excel as a design grid,
- SWBAT display the math as charts and graphs using Excel as a calculation tool.

Language Objective:

- SWBAT read the descriptions of the play equipment's size and space requirements, and transfer the dimensions onto the scaled grid created in Excel, using the picture with the grid overlay for reference.
- SWBAT argue the benefits of their plan's allotment of percentage/fraction/decimal of space allotted to each play activity.

Interactive Activity

Formulate-Share-Listen-Create The teacher presents a question:

"Using the school's aerial picture with the grid overlay, how can your STEM team calculate the

percentage, fraction, or decimal math to show how much space your design covers?"

The students formulate an answer individually. Then they share their answers with their STEM partner. They listen carefully to their partner's answer, note the similarities and differences, and they both create a new answer that incorporates the best of both ideas, typing their combined answer into their STEM Notebooks. Later they will share with the rest of the class.

Group Configurations / Composition

Students self-selected STEM groups.

Academic Language in Activity

calculate, grid overlay, Select, count, compare, STEM Engineering Design Process, ask, imagine, plan, create, iteration, cycle, Excel, Google Chrome, Snipping Tool, switch programs, search bar, screenshot, aerial, image, photograph, fraction, percent, decimal, graph, overlay, grid, CTRL+C (copy), CTRL+V (paste), save, save as, insert

Ideas for Academic Interaction

Possible sentence frames for different levels of ELL students.

1. Where is the grid on the aerial map? Where is the grid on the Microsoft Excel? Which is easier to work with?
2. Looking the aerial map of the school with the grid overlay, how can we use the grid in EXCEL to find the percentage/fraction/decimal of the total play space area that the different play areas cover?
3. How should we present this math data? fractions, percentages, or decimals?
4. Which is the clearest representation of the math, a bar graph, a table, a pie graph?
5. How do we create a chart that turns into a graph in MS Excel?
6. Which graph looks best? Why?
7. How can I use Snipping Tool to collect information into my STEM Notebook?
8. Does our design meet the math of the class's preferred play from day one?

Integrated WIDA Strands

Cognitive Function: Students at all levels of English language proficiency will integrate math language of "square foot," apply this knowledge as drawn squares, discuss preferred play areas and describe how those spaces are drawn onto an aerial grid, and finally, discuss with STEM Team the value of chosen equipment.

Lesson 3 & 4	Level 1 Entering	Level 2 Emerging	Level 3 Developing	Level 4 Expanding	Level 5 Bridging	Level 6 - Reaching
Reading	Point to the dimensions of play areas and structures in online websites, or STEM Notebook entries.	Point to the dimensions of play areas and structures in online websites, or STEM Notebook entries.	Find the dimensions of play areas and structures in online websites, or STEM Notebook entries in whatever form they are presented.	Find the dimensions of play areas and structures in online websites, or STEM Notebook entries in whatever form they are presented.	Find the dimensions of play areas and structures in online websites, or STEM Notebook entries in whatever form they are presented.	
Speaking & Writing	Point to the areas of the Excel Grid or aerial Grid where certain play equipment and spaces should be drawn. Add by copy & paste or typing dimensions of the item in the pictures.	Point to the areas of the Excel Grid or aerial Grid where certain play equipment and spaces should be drawn. Add by copy & paste or typing dimensions of the item in the pictures.	Find the dimensions in whatever form they are in and Copy & paste the dimensions in the STEM Notebook	Copy & paste the dimensions in the STEM Notebook. Try to convert the dimensions to display them in a consistent manner.	Copy & paste the dimensions in the STEM Notebook. Try to convert the dimensions to display them in a consistent manner. Explain to the STEM Team why this is necessary.	

Lesson 5

Lesson Objectives

Content Objective:

ISTE 3a, 3c, 3d, 4a, 4b, 4c, 4d.

- SWBAT put your designed plan together in SWAY using photo stacks, measurements, and your grid plan or use PowerPoint with pictures.

Language Objective:

- SWBAT organize the play structure idea pictures, grid created in Excel, and math calculations from their STEM Notebook using the website platform SWAY, or PowerPoint.
- SWBAT describe the benefits of their plan's allotment of percentage/fraction/decimal of space allotted to each play activity, comparing their math percentages to the preferred activities of the class from lesson 1.

Interactive Activity

Formulate-Share-Listen-Create The teacher presents a question:

"Should your STEM Team use the STEM Notebook or SWAY or PowerPoint to present an organized and persuasive representation of the information in your STEM Notebook? Whichever program you decide to use, be sure to include your Excel Grid, math representations showing how much space your design covers, pictures of equipment, and the original math survey."

The students formulate an answer individually. Then they share their answers with their STEM partner. They listen carefully to their partner's answer, note the similarities and differences, and they both create a new answer that incorporates the best of both ideas, typing their combined answer into their STEM Notebooks, SWAY, or PowerPoint. Later they will share with the rest of the class.

Group Configurations / Composition

Students self-selected STEM groups.

Academic Language in Activity

culminate, calculate, grid overlay, Select, count, compare, STEM Engineering Design Process, ask, imagine, plan, create, iteration, cycle, Excel, Google Chrome, Snipping Tool, switch programs, search bar, screenshot, arial, image, photograph, fraction, percent, decimal, graph, overlay, grid, CTRL+C (copy), CTRL+V (paste), save, save as, insert

Ideas for Academic Interaction

Possible sentence frames for different levels of ELL students.

1. I prefer to use the PowerPoint because ____.
2. I prefer to use the Sway because ____.
3. I prefer to use the STEM Notebook because ____.
4. We should include these 5 images of ____ in our presentation because ____.
5. The way we presented this math data is effective because ____.
6. Did we use the Snipping Tool to collect information into my STEM Notebook?

7. We (did/did not) end with a persuasive argument sentence showing that our design meets the math of the class's preferred play from day one?

Integrated WIDA Strands

Cognitive Function: Students at all levels of English language proficiency will present their final project in writing, words, or a mixture in a student chosen format (PowerPoint, Online STEM Notebook, or Sway).						
Lesson 5	Level 1 Entering	Level 2 Emerging	Level 3 Developing	Level 4 Expanding	Level 5 Bridging	Level 6 - Reaching
Reading	Stand with STEM Team while presentation is taking place. Point to a relevant picture and read aloud (say) at least one word to the group or a smaller group. The word or phrase may be rehearsed.	Stand with STEM Team while presentation is taking place. Point to a relevant picture and read aloud (say) at least one phrase to the group or small group. The phrase may be rehearsed.	Stand with STEM Team while presentation is taking place. Point to a relevant picture and read aloud (say) at least one short sentence to the group or small group. It may be rehearsed.	Stand with STEM Team while presentation is taking place. Point to a relevant picture and read aloud (say) at least one sentence to the group or small group. It may be rehearsed.	Stand with STEM Team while presentation is taking place. Point to a relevant picture and read aloud (say) at least one sentence to the group or small group. Difficult words may be rehearsed.	
Speaking & Writing	Write at least a one word caption. Speaking and Reading go together.	Write at least a one phrase caption. Speaking and Reading go together.	Write at least a one sentence. Speaking and Reading go together.	Write at least two of the four captions using full sentences. Speaking and Reading go together.	Write at least two of the four captions using full sentences, and write a sentence analyzing how your i-pictures meet the requirements of the ASK. Speaking and Reading go together.	

Background Information on the STEM Project and SIOP Lesson

Our school is an AdvancEd STEM Certified elementary school. We are a Dekalb County, Georgia "Choice School." Our official name is Oakcliff Traditional Theme School and our theme is STEM. Parents apply to the lottery for their kids to attend. We are Title I school with 85% or higher of our students speaking a language other than English at home. We have parent volunteer requirements, PTA membership, school uniforms, and nightly reading requirements. We also have many events that celebrate our staff and student body.

Every student attends a Computer Lab specials class once a week on a rotation with the other once-weekly specials classes. I, Heather M. Miller, am the Instructional Technology Teacher in the computer lab. I have special education license, a CTAE K-12 Engineering and Technology Certification, and an endorsement in Gifted Education.

Why was this Unit Plan created? This unit plan was created as partial fulfillment of the Dekalb County ESOL Endorsement program, February 2019 by Heather M. Miller, ESOL Endorsement Candidate. This is a **Sheltered Instruction Unit Plan** for 5th grade students in Computer Lab Class at Oakcliff Elementary. The unit is designed to be completed in 4 to 5 weeks, meeting once a week for 45-minutes.

Academic Citations¹

Center for Applied Linguistics. (2015). The SIOP Interactive Activity Design Template. Retrieved February 10, 2019, from

<http://www.cal.org/siop/pdfs/lesson-plans/cal-siop-activity-interactive-design-template.pdf>

Center for Applied Linguistics. (2016). Combining Opinion Continuum and Jigsaw to Promote Cooperative Learning. Retrieved February 18, 2019, from

<http://www.cal.org/siop/pdfs/opinion-continuum-and-jigsaw-read-activity.pdf>

Center for Applied Linguistics. (2018). SIOP Lesson Plans and Activities. Retrieved February 10, 2019, from

<http://www.cal.org/siop/lesson-plans/index.html>

Govea, I. (2009). Practical Applications of Fractions, Percents, and Decimals SIOP Lesson Plan. Retrieved February 10, 2019, from

<http://www.cal.org/siop/pdfs/playground-math.pdf>

Echevaria, Short and Vogt. (n.d.). Creating Language Objectives (SIOP). Retrieved February 10, 2019, from

http://www.elltoolbox.com/uploads/4/8/1/5/4815221/guide_for_creating_siop_language_objectives.pdf

Echevaria, Short and Vogt. (n.d.). Support and Activities for SIOP Components. Retrieved February 10, 2019, from

http://www.elltoolbox.com/uploads/4/8/1/5/4815221/support_and_activities_for_siop_components.pdf

Marrero-Colón, M. (2014). Using the SIOP Model to Address the Language Demands of the CCSS: Extending Think-Pair-Share. Retrieved February 10, 2019, from

<http://www.cal.org/siop/pdfs/lesson-plans/using-the-siop-model-to-address-the-language-demands-of-the-ccss.pdf>

¹ Academic Citations are listed in this section because I read them all, digested them, and then referenced these works for the creation of much of the content of this Unit Plan. As this is a unit plan, and not a term paper, citations would have been awkward if listed internally in the paper or website version of this Unit Plan. Internal references to websites that were not academic in nature are not cited, but the links may be followed.

Appendix B - The Student's Unit Lesson Plan Overview, Vocabulary, and Resource Page

The Student's Unit Lesson Plan Overview, Vocabulary, and Resource Page

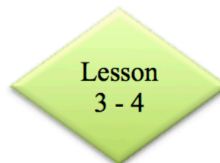
Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop:

A STEM Unit Plan Integrating SIOP Language Goals

You and your STEM Partner will use the STEM Engineering Design Process to research and design a new play space for our upper grade field.

Ask:

During our school's roof renovation, the construction crew destroyed our upper grades playground field. We are going to get a new play space. The PTA and your principal have asked 5th grade to design a "perfect for you" play space for the upper grades playground field area. For now, this is only an "ask, imagine, design" task.



Task Constraints:

1. You and your STEM partner will be a STEM TEAM for the duration of this project. You will work collaboratively and cooperatively to research, and design a play space. The percentage, fraction, or decimal of the space used for this new design is based off of an aerial map of the

space with an overlay grid. Each Lesson will have its own TASK CONSTRAINTS.

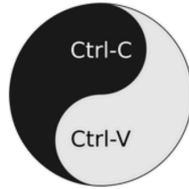
2. **Lesson 1:** One member of your STEM TEAM will download the Online STEM Notebook, and SHARE it with the other team members. All STEM Teams will survey your classmates to see the preferred play activity math. Together with the teacher, All STEM TEAMS will create a table of the results. Independently your STEM TEAM will create several graphs, or charts and pick the most convincing ones for your final presentation in Lesson 3.
3. **Lesson 2:** You will then research play equipment and play structures that match the needs and wishes of the class. Research will be mostly pictures with captions that your STEM TEAM write.
 1. You may use Snipping Tool to copy and paste pictures you find on various research sites.
 2. You may use the Bing Search for Online Images and insert the pictures directly into your Online STEM Notebook.
 3. You will need to know the measurements (size) the equipment needs for safe operation. You will also decide the space for one or more soccer fields, and the goals. You may add picnic tables, bleachers, or other equipment so long as you can explain the use of space.
4. **Lesson 3 and 4:** Your STEM TEAM will create a drawing on a grid you create in Microsoft Excel Online that matches the aerial picture with the grid overlay. Your aerial layout map will have a key or legend. You will support your mathematical calculations using Microsoft Excel Online as a calculating tool. Your teacher will help you with the formulas for calculating percentages, fractions, and/or percents.
5. **Lesson 5:** If your STEM Notebook is not presentable, you will need to Edit it so that it is presentable, or copy and paste the most persuasive parts of your STEM Notebook into a PowerPoint or a Sway presentation. Things you need to have in your final presentation include:
 1. The Original Survey Data,
 2. 1 - 2 Graphs that make that data understandable,
 3. Your Excel map drawing of your play space design with a key or legend.
 4. At least 4 Pictures of play equipment, with a caption that tells what it is used for.
 5. A calculation of the square footage percentage, fraction, or decimal that your design will take up.
 6. The comparison of your design versus the original survey data.

Academic Vocabulary

Academic Vocabulary



This is the Engineering Design Process. The steps make a cycle which is an iteration or a cycle. ASK means the student is to understand the question being asked and the constraints. IMAGINE includes researching the topic and individually creating ideas for solutions. PLAN is developing one idea further than the Imagine Stage.

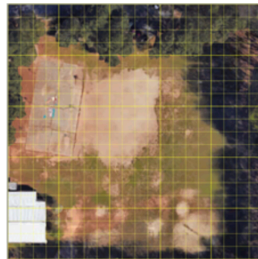


Copy and Paste are opposites of the same action like Yin and Yang. CTRL+C is copy. CTRL+V is paste. You can Copy and Paste text and images. Image source: <https://commons.wikimedia.org/wiki/File:Kopimizm.svg>



ALT+TAB switches between programs quickly. You can have WORD open and switch quickly to EXCEL or Snipping Tool or Google Chrome.

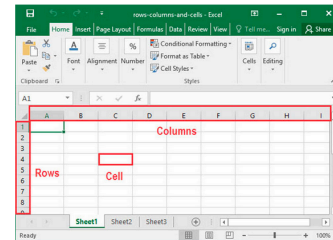
Image Source: https://commons.wikimedia.org/wiki/File:Key_Keyboard_WikiCode.pdf



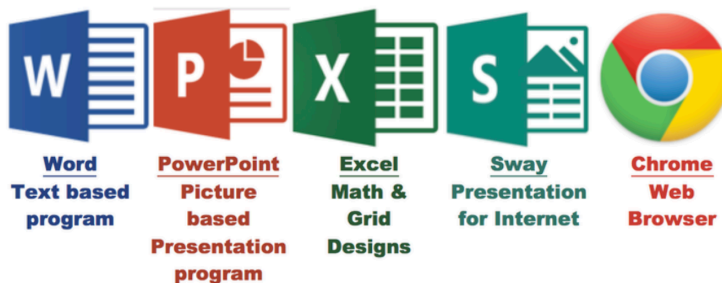
This is the same Google Map aerial image with a grid overlay. The grid overlay allows counting of squares. Each square here is about 25 feet.



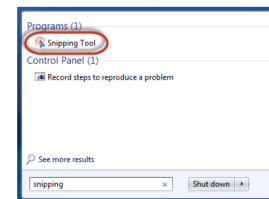
And aerial image is taken from the sky looking down. This is how maps are created. source: <https://www.google.com/maps/>



Rows go side-to-side/horizontal, like you row a boat. Columns go up and down, like a column that holds up a building. Cells are the boxes where a row and column meet. Think of a bee hive cell. Image source is linked.



These are all programs that you can use to complete your project. Programs are software tools. Each tool does certain things. Some tools can do more than one thing. Some tools are more efficient than other tools to do a task.



Snipping Tool is a great image capture tool. It lets you copy and paste images. Screenshots are pics or pictures taken with Snipping Tool. Image source is linked.



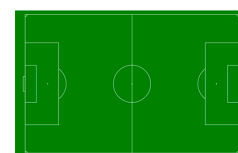
Playground equipment



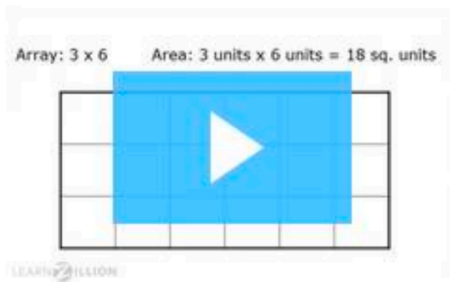
Jungle Gym Equipment



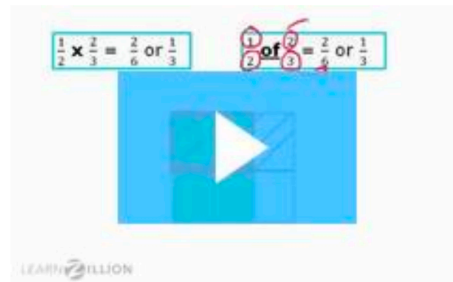
Multiple soccer fields for more than one game at a time. Uses mobile goals.



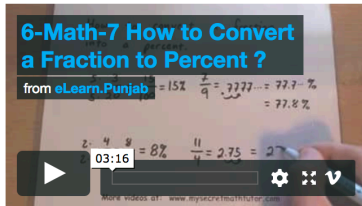
soccer field diagram of lines



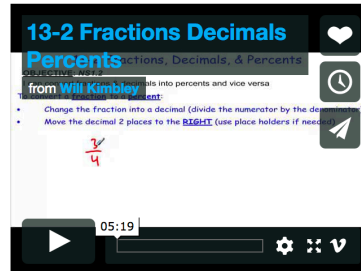
Find the area of a rectangle: using arrays | LearnZillion



Multiply fractions by fractions using an algorithm | LearnZillion



6-Math-7 How to Convert a Fraction to Percent ? from eLearn.Punjab on Vimeo.



13-2 Fractions Decimals Percents from Will Kimbley on Vimeo.

STEM Engineering Design Process - ask, imagine, plan, create, iteration, cycle

General Computer Terms - Select, compare, switch programs, CTRL+C (copy), CTRL+V (paste), save, insert

Word - Online STEM Notebook

Excel - row, column, cell, formula, equal sign, enter

Google Chrome - search bar, website URL, link

PowerPoint - presentation slide shows

Sway - presentations for the web/internet

Images - Snipping Tool, screenshot, photograph, pic, arial image, overlay

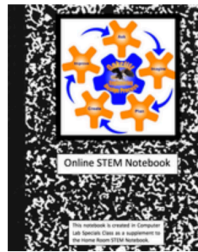
Math terms - count, fraction, percent, decimal, graph, overlay, grid, add, multiply, divide, total, equals, square, equivalent, dimensions

Playground Terms - Play area, play structure, play equipment, slides, monkey bars, swings, fields, soccer fields, goal posts, movable, permanent

Appendix C - The Lesson 1 Page

The SIOP LESSON PLAN #1: Design Oakcliff's New Play Space - Playgrounds, Soccer Fields, and Blacktop: *A STEM Unit Plan Integrating SIOP Language Goals*

Task Constraints for Lesson 1: One member of your STEM TEAM will download the Online STEM Notebook, and SHARE it with the other team members. All STEM Teams will survey your classmates to see the preferred play activity math. Together with the teacher, All STEM TEAMS will create a table of the results. Independently your STEM TEAM will create several graphs, or charts and pick the most convincing ones for your final presentation in Lesson 3.



Click the picture above to Download the Online STEM Notebook to your OneDrive. Share with your STEM Team.

Technology I need to use:

OneDrive – to share my ONLINE STEM Notebook.

Microsoft Word – to create a table/chart of data

Microsoft Excel – to create a graph of the data

At the end of this lesson

- I will be able to recall the STEM EDP and the Online STEM Notebook and download a shared copy with my STEM TEAM,
- I will complete the Ask stage, discuss and Plan stages, and begin working with my STEM TEAM.
- I will be able to work with the whole class to conduct a survey of preferred play activities and enter that data into MS Excel.
- I will be able to discuss with the STEM partner the elements of play for the play space, and jointly develop an internet resource based, research plan for pictures of play equipment, play structures, field sizes.

Collecting the Data – Opinion Continuum

1. Students in class will stand in corners according to their favorite recess activity and discuss if they really want to stay. We will do one switch before finally counting the data.
2. Students will count classmates in each group.
3. Students will create a chart in Excel to record the data. In later lessons, students will create graphs of the data. Student created design should reflect student's preferences in percentages, fractions, or decimals.
4. Students will read and discuss (think-pair-share) with the class what is being asked of them at the ASK stage of the EDP.
5. Students will work with their STEM partner to create the shared Online STEM Notebook (Microsoft Word Online) to prepare a place to organize and collect picture ideas of the school's existing space, ideas for

play structures, and field spaces

Ideas for Academic Interaction

Possible sentence frames...

1. I like to play...
2. At recess, I wish I could play on...
3. What stops me from playing what I want to play at recess?
4. I like to play ____ because ____.
5. Your idea is fun because
6. I might play ____ if it were available.
7. **What is the count of the preferred play in 5th grade?**
8. Let's research ____ first and ____ next.
9. I want my school's play space to include playground equipment, fields, and ____.
10. I want soccer goals to be movable or stuck in the ground because...

Appendix D - The Lesson 2 Page

The SIOP LESSON PLAN #2:

formatted for the ESOL Course

5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A *STEM Unit Plan Integrating SIOP Language Goals*

Task Constraints for Lesson 2:

1. You will **research** play equipment and play structures that match the needs and wishes of the class. Research will be mostly pictures with captions that your STEM TEAM write.

1. You may use Snipping Tool to copy and paste pictures you find on various research sites.

Technology I need to use:

Snipping Tool - to copy the images I find for the play structures

OneDrive & Microsoft Word - paste my images into the ONLINE STEM Notebook.

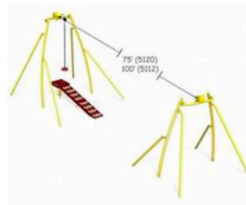
Include the dimensions the thing will take up. This is usually Length times width, and looks like 23 feet x 40 feet.

Microsoft Bing or Google Chrome - to research the sizes of the soccer fields, play structures, etc.

Microsoft PAINT - to download the grid and add color overlays to show the area covered by the different play structures and areas my team chooses.



"Fun Tunnel" like basket ball



Zip Line (near ground)



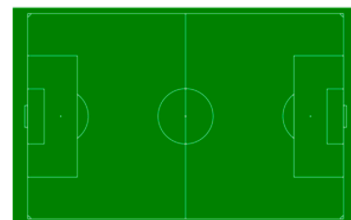
play structures



soccer goals



several soccer goals for multiple games of 5 v



soccer fields

2. You may use the Bing Search for Online Images and insert the pictures directly into your Online STEM Notebook. The Online STEM Notebook has Several Links for your use.
3. You will need to know the measurements (size) the equipment needs for safe operation. You will also decide the space for one or more soccer fields, and the goals. You may add picnic tables, bleachers, or other equipment so long as you can explain the use of space.



Tetherball pole and ball



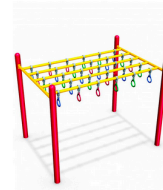
Merry-go-round



swings



Whizzy Dizzy Spinner



monkey bar with rings



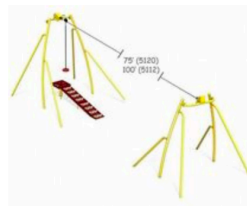
Tables and benches



See Saw or Teeter Totter



"Fun Tunnel" like basket ball



Zip Line (near ground)



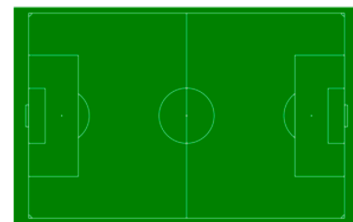
play structures



soccer goals



several soccer goals for multiple games of 5 v



soccer fields

At the end of this lesson

- I will be able to research ideas in pictures and words using the online STEM Notebook to store images, ideas, and math of fractions, percentages, or decimals.
- I will be able to search online exploring play structures and equipment focusing on pictures, then the I will read the descriptions of the images I like in conversation with my partner, discuss the benefits of the structure and layout of the elements of play for the play space.
- I will be able to jointly pick the team's favorite 3 to 5 images of play equipment or structures and justify those choices with a short label of each picture.
- I will be able to discuss and then write 1 to 2 sentences on what it is that I like about the images.

Collecting the Data – Opinion Continuum

1. Students in class will **Formulate-Share-Listen-Create** as the teacher presents a question:

"If you could design the perfect play space for this school, what would you include for equipment, fields, blacktop markings?"

"What are the space requirements for our STEM team's selection?"

2. I will formulate my answer individually. Then I will share my answers with my STEM partner. I will listen carefully to my partner's answer, note the similarities and differences, and both of us will create a new answer that incorporates the best of both ideas, typing their combined answer into the STEM Notebook. Later we will share with the rest of the class.

Ideas for Academic Interaction

Possible sentence frames...

1. At recess, I wish I could play ...
2. In PE, I want to play ____
3. I like to play ____ because ____.
4. Your idea is fun because
5. This idea is better because ____
6. I like this part of that idea ____but I like this part ____ better.
7. I might play ____ if ____ were available.
8. Let's research ____ first and ____ next.
9. How can we have more soccer fields?
10. How could an obstacle course be made safe?
11. I want soccer goals to be movable or stuck in the ground because...

Appendix E - The Lesson 3-4 Page

The SIOP LESSON PLAN #3 and #4:

formatted for the ESOL Course

5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A STEM Unit Plan Integrating SIOP Language Goals

Task Constraints for Lesson 3 and 4:

1. **Draw the outline of the play elements onto the grid.** You can download the aerial view with the grid overlay into Microsoft PAINT and draw your overlays there. But, you will probably find it easier for the math to do this in Microsoft EXCEL. By either method, you and your STEM TEAM will create a drawing on a grid, so that you may calculate the square footage of everything. What you create in Microsoft Excel Online should match the aerial picture with the grid overlay. Your aerial layout map should have a key or legend, for clarity.
2. **Do the math.** Your STEM Team will support your mathematical calculations using Microsoft Excel Online as a calculating tool. Your teacher will help you with the formulas for calculating percentages, fractions, and/or percents.
3. **Compare your percentages** to the graph or percentages from the first Lesson.
4. **Improve your percentages** to more closely match the percentages in Lesson 1. Justify any differences. For example, you might have come up with a brilliant play structure that no one considered earlier.

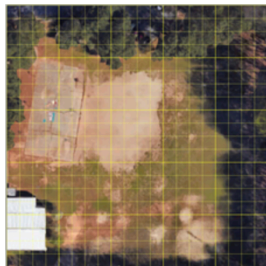
Technology I need to use:

Snipping Tool - to copy the images of the grids I make in PAINT and Microsoft EXCEL.

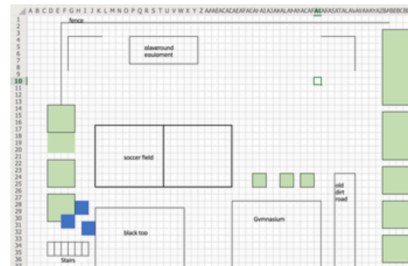
Microsoft EXCEL - Create the Grid equivalent of the Microsoft PAINT grid overlay. (See example below)

Microsoft Bing or Google Chrome - to research the sizes of the soccer fields, play structures, etc.

Microsoft PAINT - to download the grid and add color overlays to show the area covered by the different play structures and areas my team chooses.



Click on the image above to download the image to your computer. Save a copy into your online STEM Notebook. Take the Image into PAINT to put in overlays.



Click on the image above to see a larger view. You will create this grid in Microsoft Excel. Then you'll take a screen shot and insert it in your STEM Notebook.

At the end of this lesson

- I will be able to recall the STEM EDP and the Online STEM Notebook and use it with my STEM TEAM to calculate the area of play space equipment.
- I will be able to display the math as charts and graphs using Excel as a calculation tool, and place into my Online STEM Notebook.
- I will be able to read the descriptions of the play equipment's size and space requirements, and transfer the dimensions onto the scaled grid created in Excel, using the picture with the grid overlay for reference.
- I will be able to argue the benefits of my STEM Team's plan allotment of percentage/fraction /decimal of space allotted to each play activity.

Collecting the Data - Opinion Continuum

1. Formulate-Share-Listen-Create

The teacher presents a question:

"Using the school's aerial picture with the grid overlay, how can your STEM team calculate the percentage, fraction, or decimal math to show how much space your design covers?"

2. The students formulate an answer individually. Then they share their answers with their STEM partner. Partners will listen carefully to their partner's answer, note the similarities and differences, and they both create a new answer that incorporates the best of both ideas, typing their combined answer into their STEM Notebooks. Later they will share with the rest of the class.
3. The aerial picture with the grid overlay will color in squares, using the MS Paint Program, or Draw shapes over the grid to match the "footprint" of the play space items.
4. The STEM Team will make a chart, to represent the square footage of play spaces, percentage, or fraction of the play space of each play feature.
5. The STEM Team will create a graph to show the different areas of play areas in relationship to the whole play space.
6. All of these items will go into the Online STEM Notebook.

Ideas for Academic Interaction

Possible sentence frames...

1. Looking the aerial map of the school with the grid overlay, how can we use the grid in EXCEL to find the percentage/fraction /decimal of the total play space area that the different play areas cover?
2. How should we present this math data?
3. Which is the clearest representation of the math, a bar graph, a table, a pie graph?
4. How do we create a chart that turns into a graph in MS Excel?
5. How can I use Snipping Tool to collect information into my STEM Notebook?
6. Does our design meet the math of the class's preferred play from day one?

Appendix F - The Lesson 5 Page

The SIOP LESSON PLAN #5:

formatted for the ESOL Course

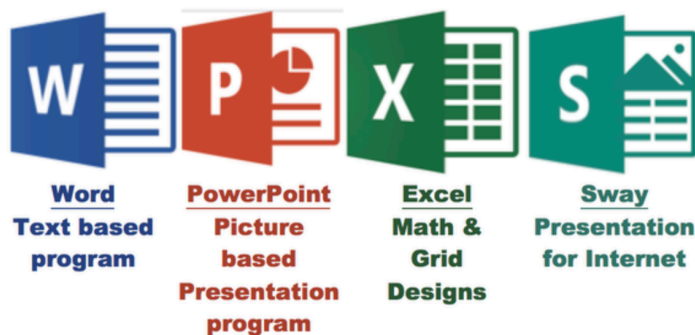
5th Grade Will Design Oakcliff's New Play Space Including Playgrounds, Soccer Fields, and Blacktop: A *STEM Unit Plan Integrating SIOP Language Goals*

Task Constraints for Lesson 5:

PRESENTATION of FINAL PRODUCT. The easiest thing to present would be your Online STEM Notebook. If your STEM Notebook is not presentable, you will need to EDIT it so that it is presentable. You may also create a PowerPoint or SWAY (copy and paste the most persuasive parts of your STEM Notebook).

Things you need to have in your final presentation include:

1. The Original Survey Data, turned into percents, fractions, or decimals of the entire space,
2. 1 to 3 graphs that make understandable the Original Survey Data.
3. Your Excel map drawing of your play space design with a key or legend (or your PAINT overlay).
4. At least 4 Pictures of play equipment, with a caption that tells what it is used for, and the dimensions in square feet.
5. A calculation of the square footage percentage, fraction, or decimal that your design will take up.
6. The comparison of your design percentages versus the original survey data percentages.
7. Typed and spoken statements that are persuasive as to why you chose the play area and equipment.



At the end of this lesson

- I will be able to recall the STEM EDP and the Online STEM Notebook and download a shared copy with my STEM TEAM.
- I will organize for presentation my STEM Teams' designed plan, in one of the following: (1) WORD Online STEM Notebook; or (2) into a SWAY using photo stacks, measurements, and our grid plan; or (3) into a PowerPoint with pictures, or organize for presentation
- I will be able to organize the play structure idea pictures, grid created in Excel, and math calculations from their STEM Notebook using the website platform SWAY, or PowerPoint.
- I will be able to describe (speaking and writing) the benefits of my STEM Team's planned allotment of percentage/fraction/decimal of space allotted to each play activity, comparing their math percentages to the preferred activities of the class from previous lessons.

Collecting the Data - Opinion Continuum

1. **Formulate-Share-Listen-Create**
The teacher presents a question:
2. **"Should your STEM Team use the STEM Notebook or SWAY or PowerPoint to present an organized and persuasive representation of the information in your STEM Notebook?"**
3. **Whichever program you decide to use, think about how to include your Excel Grid, math representations showing how much space your design covers, pictures of equipment, and the original math survey. How could you use screen shots?**
4. The students formulate an answer individually. Then they share their answers with their STEM partner. They listen carefully to their partner's answer, note the similarities and differences, and they both create a new answer that incorporates the best of both ideas, typing their combined answer into their STEM Notebooks, SWAY, or PowerPoint. Later they will share with the rest of the class.

Ideas for Academic Interaction

Possible sentence frames...

1. I prefer to use the STEM Notebook/PowerPoint / Sway because ____.
2. We should include these 5 images of ____ in our presentation because ____.
3. The way we presented this math data is effective because ____.
4. Did we use the Snipping Tool to collect information into my STEM Notebook?
5. Did we end with a persuasive argument sentence showing that our design meets the math of the class's preferred play from day one?

Appendix G - The Online STEM Notebook