

Collecting and Displaying Data Unit

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ISTC 541

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Introduction

This is a third grade math unit on collecting and displaying data that incorporates the use of many different technologies. This unit was modified slightly from Eureka Math (Wortman, 2015), which is used in Montgomery County Public Schools, in order to incorporate technology into the lessons. The objectives for this unit are aligned with the Maryland College and Career Ready Mathematics Content Standards and will be taught by the math teacher. The technologies used in the unit include Kami, Flipgrid, Nearpod, Wheel of Names, Didax Online Manipulatives, and Poll Everywhere.

Technology Product

Section I: Collecting and Displaying Data Unit Plan

Lessons	Objectives	Standards	Assessments	Technology
1	Generate and organize data.	3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.	Exit Ticket	- Poll everywhere - Kami - Flipgrid - Nearpod
2	Rotate tape diagrams vertically.	3.MD.B.3	Exit Ticket	- Nearpod - Kami

3	Create scaled bar graphs.	3.MD.B.3	Exit Ticket	- Nearpod - Kami - Wheel of Names
4	Solve one- and two-step problems involving graphs.	3.MD.B.3	Exit Ticket	- Didax Online Manipulatives - Nearpod - Kami - Wheel of Names
5	Create a ruler with 1-inch, 1/2-inch, and 1/4-inch intervals, and generate measurement data.	3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	Exit Ticket	- Nearpod - Kami - Flipgrid
6	Interpret measurement data from various line plots.	3.MD.B.4	Exit Ticket	- Nearpod - Kami

7	Represent measurement data with line plots.	3.MD.B.4	Exit Ticket	- Nearpod - Kami
8	Represent measurement data with line plots.	3.MD.B.4	Exit Ticket	- Nearpod - Kami
9	Analyze data to problem solve.	3.MD.B.3 3.MD.B.4	Exit Ticket End of Module	- Didax Online Manipulatives - Kami - Nearpod

Part 1. b. - Detailed Unit Lesson Plans

Lesson 1: Generate and organize data

Teacher: Math Teacher
Date: First Day of Unit
Subject /grade level: Math, Grade 3
Materials: Eureka Learn Book, Computer, Class List
Essential Standards and Clarifying Objectives: 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.

Lesson objective: Generate and organize data.

Differentiation strategies to meet diverse learner needs:

Students have multiple ways to express their understanding throughout the lesson such as using **text through Kami or video through Flipgrid**. There are multiple means of engagement such as **polling**, collaborative discussion, and partner talk. As well, the teacher can scaffold the explanation section by having the students set a goal for how many problems they will solve out of all of the problems on the sheet. Students may also use the **text to speech function in Kami** throughout the lesson.

ENGAGEMENT (5-10 Minutes)

Students will begin by practicing their skip counting skills on a vertical number line to practice visually representing information in math. This can be done in either **Kami or in video form on Flipgrid**, the choice is up to the student. Then we will use **Poll Everywhere** to determine our class' favorite color from a list of five. Students will be interested in learning each other's favorite colors and also to know what we will be doing with this information once it's collected.

EXPLORATION (20 Minutes)

After collecting the favorite color data, the teacher will guide the students in making a tally chart, asking guiding questions such as “How might writing each fifth tally mark with a slash help you count your data easily and quickly?” Then the teacher will use that tally chart to record data numerically in a table. Students will then use mental math to determine the total number of students surveyed and turn and talk with a partner to double check that their answer is reasonable. The teacher will then introduce the picture graph in **Kami** and on paper, directing students to look at the graph frame and the key (1 heart equals 1 student) that is already provided. The teacher will ask the students how they would represent 4 students in the given graph. Students will work together to take the data from the table and create a picture graph. Then the teacher will introduce a second graph frame with a different key (1 heart equals 2 students). The teacher will ask students to turn and talk about how they could represent 5 students in this new graph. The teacher will guide students as needed by asking questions such as “What is the value of half of 1 heart?” or giving an example representation of 6 students and asking what they could do to make it into 5 students.

EXPLANATION (10 minutes)

Students will answer questions based on the graphs created in the exploration section, such as “What does each unit represent?” “Show or explain how you could represent 3 students in the graph” “How many more units are there for the favorite color of the class than the least favorite color of the class?” These questions can be answered individually or in partners as needed, and students may set a goal for themselves on the questions they will complete as opposed to completing all of the questions. These questions can be answered using text or drawings in **Kami** or in a video/audio format in **Flipgrid**. The teacher will ask guiding questions of students such as “How do we know how much one unit represents?” “Do we use a whole unit

for this or part of a unit?” and “What was the class’ favorite/least favorite color? How many students chose it?”

ELABORATION(10 minutes)

Students will discuss their understanding of the vocabulary and skills during a debrief session over **Nearpod’s collaborate board feature**. We will debrief such questions as: “What math vocabulary did we use today to talk about recording and gathering information?”, “Compare picture graphs with tally charts. What makes each one useful? What are the limitations of each?” and “Why is it important to use the key to understand the value of a unit in a picture graph?”

EVALUATION (5 minutes)

- Throughout the lesson: The teacher will check in on students’ work throughout the exploration section and the explanation section of the lesson by observing their work in **Kami**.
- End of lesson: Students will answer questions about a premade graph using **Kami for the exit ticket, or take a flipgrid video** of themselves answering the questions verbally.

UDL Checkpoints

- **2.1 - Clarify vocabulary and symbols**
 - Key vocabulary and symbols are discussed throughout the lesson.
- **2.2 - Clarify syntax and structure**
 - There is a review of the different types of graphs done in the engagement section of the lesson, as well as comparing the different types of graphs and their purposes throughout the lesson.
- **2.3 - Support decoding of text, mathematical notation, and symbols**
 - Text to speech is used through Kami, in addition to students being able to voice record their answers rather than writing them.
- **2.5 - Illustrate through multiple media**
 - A variety of graphs, manipulatives, and equations were used throughout the lesson.
- **4.1 - Vary the methods for response and navigation**
 - Students are given a variety of differentiated ways to express their understanding of the graphs and equations.
- **4.2 - Optimize access to tools and assistive technologies**
 - Students have access to the Didax online manipulatives, as well as text to speech and other features in Nearpod, Kami, and Flipgrid.
- **5.1 - Use multiple media for communication**
 - Students may use online manipulatives, Nearpod, and flipgrid to provide their responses, and use a variety of strategies to solve the problems.
- **5.2 - Use multiple tools for construction and composition**

- Students use a variety of online manipulatives to assist in solving the problems.
- **6.1 - Guide appropriate goal-setting**
 - Students are told of the objective for the lesson and what the goal is to achieve by the end of the lesson.
- **7.1 - Optimize individual choice and autonomy**
 - Students have the choice to work independently or with a partner/group, in addition to how they show their work and express their response.
- **7.2 - Optimize relevance, value, and authenticity**
 - Students are asked to create **Poll Everywhere** to determine the class' favorite color from a list of five.
- **8.2 - Vary demands and resources to optimize challenge**
 - The degree of difficulty changes throughout the lesson to challenge students.
- **8.3 - Foster collaboration and community**
 - Students have multiple opportunities to work collaboratively with a group or in whole class discussions.

Lesson 4: Solve one- and two-step problems involving graphs

Teacher: Math Teacher
Date: Fourth Day of Unit
Subject / grade level: Math, grade 3
Materials: Eureka Learn Book, Computer
Essential Standards and Clarifying Objectives: 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems

using information presented in scaled bar graphs.

Lesson objective: Solve one- and two-step problems involving graphs.

Differentiation strategies to meet diverse learner needs:

Students have multiple ways to express their understanding throughout the lesson such as using **text or drawing through Kami, drawing in Nearpod or video through Flipgrid**. There are multiple means of engagement such as **polling**, collaborative discussion, and partner talk. As well, the teacher can scaffold the explanation section by having the students set a goal for how many problems they will solve out of all of the problems on the sheet. Students may also use the **text to speech function in Kami** and the **Didax virtual manipulatives** throughout the lesson.

ENGAGEMENT (5 - 10 Minutes)

Students will play a game of **Time to Climb in Nearpod** (A Kahoot! style game where students must answer the questions quickly and accurately in order to climb the mountain) to practice reading line plots and bar graphs and answering quick questions about them. This will build their fluency in reading graphs and get them interested in the day's lesson on answering questions about graphs.

EXPLORATION (20 Minutes)

The teacher will guide the students through the steps and strategies that can be used to answer word problems using graphs. First the class will create a graph on the speed of bug wing vibrations together as a whole in order to understand the data. Then the teacher will ask the students to work together with a partner to write a number sentence to find the total number of vibrations 2 beetles and 1 honeybee can produce each second. The teacher will suggest strategies such as tape diagrams or number bonds in order to support students in solving these

number sentences. Then the students will work on comparing how many more vibrations a fly and honeybee combined produce than a mosquito. The teacher will circulate the room and guide students as necessary now that there are more steps added to the problem.

EXPLANATION (10 Minutes)

Students will answer questions based on premade graphs such as “How many more magazines did Debbie and Jeff sell than Ben and Rachel?” “How many fewer visitors were there on the least busy day than on the busiest day?” and “How many more visitors attended the carnival on Monday and Tuesday combined than on Thursday and Friday combined?” These questions can be answered individually or in partners as needed, and students may set a goal for themselves on the questions they will complete as opposed to completing all of the questions. Students will be able to use **Didax virtual manipulatives** to help them answer the questions. These questions can be answered using **text or drawings in Kami or in a video/audio format in Flipgrid**. The teacher will ask guiding questions of students such as “How many did each person sell?” and “How many visitors were there on each day?”

ELABORATION(10 Minutes)

The teacher will use the **Wheel of Names** in order to choose 3 students to either share their work or call on another student to share their work from the explanation section. Then, students will discuss their understanding of the vocabulary and skills during a debrief session over **Nearpod’s collaborate board feature**. We will debrief such questions as: “What is the value of each interval in the bar graph in Problem 2? How do you know?” “Explain what you needed to do before answering Problem 2(b).” and “Compare the chart from the Application Problem with the bar graph you made of that same data. How is each representation a useful tool? When might you choose to use each representation?”

EVALUATION(5 Minutes)

- Throughout the lesson: The teacher will check in on students' work throughout the exploration section and the explanation section of the lesson by observing their work in **Nearpod**.
- End of lesson: Students will answer questions about a premade graph using **Kami for the exit ticket, or take a flipgrid video** of themselves answering the questions verbally.

UDL Checkpoints:

- **2.1 - Clarify vocabulary and symbols**
 - Key vocabulary and symbols are discussed throughout the lesson.
- **2.2 - Clarify syntax and structure**
 - There is a review of the different types of graphs done in the engagement section of the lesson, as well as comparing the different types of graphs and their purposes throughout the lesson.
- **2.3 - Support decoding of text, mathematical notation, and symbols**
 - Text to speech is used through Kami, in addition to students being able to voice record their answers rather than writing them.
- **2.5 - Illustrate through multiple media**
 - A variety of graphs, manipulatives, and equations were used throughout the lesson.
- **4.1 - Vary the methods for response and navigation**
 - Students are given a variety of differentiated ways to express their understanding of the graphs and equations.
- **4.2 - Optimize access to tools and assistive technologies**

- Students have access to the Didax online manipulatives, as well as text to speech and other features in Nearpod, Kami, and Flipgrid.
- **5.1 - Use multiple media for communication**
 - Students may use online manipulatives, Nearpod, and flipgrid to provide their responses, and use a variety of strategies to solve the problems.
- **5.2 - Use multiple tools for construction and composition**
 - Students use a variety of online manipulatives to assist in solving the problems.
- **5.3 - Build fluencies with graduated levels of support for practice and performance**
 - The lesson is scaffolded to help students work at thor different levels in order to promote success.
- **6.1 - Guide appropriate goal-setting**
 - Students are told of the objective for the lesson and what the goal is to achieve by the end of the lesson.
- **6.2 - Support planning and strategy development**
 - The teacher facilitates discussion, as well as providing prompts to get students thinking throughout the lesson.
- **7.1 - Optimize individual choice and autonomy**
 - Students have the choice to work independently or with a partner/group, in addition to how they show their work and express their response.
- **8.3 - Foster collaboration and community**
 - Students have multiple opportunities to work collaboratively with a group or in whole class discussions.
- **9.3 - Develop self-assessment and reflection**

- Students will assess their knowledge of the lesson and reflect throughout the lesson and the exit ticket.

Lesson 9: Analyze data to problem solve

Teacher: Math Teacher
Date: Ninth day of unit
Subject/grade level: Math, grade 3
Materials: Eureka Learn Book, Computer, white board
Essential Standards and Clarifying Objectives: 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. 3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
Lesson objective: Analyze data to problem solve.
Differentiation strategies to meet diverse learner needs: Students have multiple ways to express their understanding throughout the lesson such as using text through Kami, drawing in Nearpod, and/or using manipulatives through the Didax online manipulatives website . There are multiple means of engagement such as collaborative discussion, and partner talk. As well, the teacher can scaffold the explanation section by having the students set a goal for how many problems they will solve out of all of the problems on the

sheet. Students may also use the **text to speech function in Kami** and the **Didax virtual manipulatives** throughout the lesson.

ENGAGEMENT (10-15 minutes)

Students will begin with a fluency practice of skip counting by different numbers, and then writing the multiplication and division equations for skip counting. Students can use the **120 Number Board from the Didax online manipulatives** website to assist with following along when skip counting. Students will continue practicing skip counting by multiplying by seven and then halves and fourths. Students can utilize the **120 Number Board from the Didax online manipulatives** if needed for support. After the engagement of skip counting, students should ask themselves “what do I know about multiplication and division to help me skip count more efficiently?”. In addition, students should ask themselves, “how does skip counting relate to multiplication and division?”.

EXPLORATION (20 minutes)

Students will be working on solving two different problems, either with a partner, group, or individually. The first problem involves students working on solving problems with categorical data. Students will be given a bar graph where they are to answer the question, “How much more money was spent on rides than on parking?”. To facilitate discussion, the teacher will ask, “How can you use the graph to help you solve this problem?”, “What strategy will you use to solve?”, “Why do you think more money was spent on rides than on parking?”. The second problem involves students solving problems with measurement data. Again, the teacher will ask questions like “How can you use the line plot to help you solve this problem?” to help facilitate discussions. Students will be able to use **Didax virtual manipulatives** to help them answer the questions.

EXPLANATION (10 minutes)

Students will work, independently or with a group, to solve more problems involving bar graphs and number plots to try and identify the differences between the two types of graphs. While answering questions, the teacher will facilitate discussion by asking students, “Would it make sense for the money spent at the fair data to be switched to a line plot? Explain why or why not. Think about how each representation helps you analyze the data.”. Students will be able to use **Didax virtual manipulatives** to help them answer the questions. These questions can be answered using **text or drawings in Kami or in a video/audio format in Flipgrid**. The teacher will explain that “Bar graphs are used to compare things between different groups, and line plots are used to show frequency of data along a number line.” A chart will be made as a class to list about which graph would be most appropriate for specific data used within the lesson today. The chart can be created, as a class, through **Nearpod**.

ELABORATION (10 minutes)

The teacher will use the **Wheel of Names** in order to choose 3 students to either share their work or call on another student to share their work from the explanation section. Then, students will discuss their understanding of the vocabulary and skills during a debrief session over **Nearpod's collaborate board feature**. We will debrief such questions as: “What scale did you use for Problem 1(b)? Explain to your partner how you chose the scale for the line plot in Problem 3(a). Other than counting the X’s, is there another strategy you can use to find the total number of blades of grass that were measured in Problem 3(b)? Would it make sense to display the number of apples picked data in a line plot? Why or why not? When is it best to show your data as a picture graph? A bar graph? A line plot? What is the difference?”.

EVALUATION (5 minutes)

- Throughout the lesson: The teacher will check in on students' work throughout the exploration section and the explanation section of the lesson by observing their work in **Nearpod**.
- End of lesson: Students will answer questions about a premade graph using **Kami** for **the exit ticket, or take a flipgrid video** of themselves answering the questions verbally.
- A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons.

The questions may be read aloud to the students through **Kami**.

UDL Checkpoints

- **2.2 - Clarify syntax and structure**
 - There is a review of the different types of graphs done in the engagement section of the lesson, as well as comparing the different types of graphs and their purposes throughout the lesson.
- **2.3 - Support decoding of text, mathematical notation, and symbols**
 - Text to speech is used through Kami, in addition to students being able to voice record their answers rather than writing them.
- **2.5 - Illustrate through multiple media**
 - A variety of graphs, manipulatives, and equations were used throughout the lesson.
- **3.1 - Activate or supply background knowledge**

- The engagement part of the lesson involved reviewing how to skip count using a 120 number chart/equations, in addition to using a variety of graphs to display data.
- **3.2 - Highlight patterns, critical features, big ideas, and relationships**
 - During the explanation section, students discuss the relationship between the different types of graphs, in addition to what the purpose and function of each graph is.
- **3.3 - Guide information processing, visualization, and manipulation**
 - The lesson is taught in a sequential order to let students explore with manipulatives and graphs before discussing as a whole group.
- **4.1 - Vary the methods for response and navigation**
 - Students are given a variety of differentiated ways to express their understanding of the graphs and equations.
- **4.2 - Optimize access to tools and assistive technologies**
 - Students have access to the Didax online manipulatives, as well as text to speech and other features in Nearpod, Kami, and Flipgrid.
- **5.1 - Use multiple media for communication**
 - Students may use online manipulatives, Nearpod, and flipgrid to provide their responses, and use a variety of strategies to solve the problems.
- **5.2 - Use multiple tools for construction and composition:**
 - Students use a variety of online manipulatives to assist in solving the problems.
- **6.1 - Guide appropriate goal-setting**

- Students are told of the objective for the lesson and what the goal is to achieve by the end of the lesson.
- **6.2 - Support planning and strategy development**
 - The teacher facilitates discussion, as well as providing prompts to get students thinking throughout the lesson.
- **6.3 - Facilitate managing information and resources**
 - Students are provided their resource book to take notes and view graphs/activities.
- **7.1 - Optimize individual choice and autonomy**
 - Students have the choice to work independently or with a partner/group, in addition to how they show their work and express their response.
- **8.3 - Foster collaboration and community**
 - Students have multiple opportunities to work collaboratively with a group or in whole class discussions.
- **8.4 - Increase mastery-oriented feedback**
 - The teacher provides feedback throughout the lesson while observing students, and students will get feedback from the exit ticket once collected/graded.

Section II: Sample Technology Products

- [Nearpod example lesson](#)
- [Wheel of Names](#) - This is an overview and example of Wheel of Names.
- [Poll Everywhere](#) - This is an overview and example of Poll Everywhere.
- [Didax Online Manipulatives](#)

- [Flipgrid](#) - The class code to join is: istc541
- [Kami link if you have an account](#)
- [Kami link if you don't have an account to view](#)

Written Paper

Planning and Rationale

We designed the unit to integrate technology that would advance the lesson and increase engagement. The technology we integrated was chosen carefully to promote collaboration, discussion, and problem solving. This unit is very rigorous, so we chose tools that would support student understanding and allow for student choice without taking away from or adding to the rigor. Nearpod and Flipgrid specifically support collaboration as students can see each other's work, Poll Everywhere and Wheel of Names work to get all students involved in discussion, and Kami and Didax Virtual Manipulatives support student problem solving as they determine the best way to work through the material presented.

This unit is designed to be appropriate and engaging for third grade students, so we chose online tools that would help the students grow their understanding without the technology itself being a challenge. Nearpod, Kami, and Flipgrid are all ways that third graders can have a say in how they want to engage with the material without taking too many steps. Wheel of Names and Poll Everywhere are tools that take no student set up but can be used easily by the teacher to gain information from the students. Lastly, the Didax online manipulatives have all of the options listed on the same page, requiring students only decide which manipulative would be best suited to solving the problem. As well, the students need time to collaborate with their peers to discuss their understanding. Nearpod and Flipgrid both have options for the teacher to allow the students to see each other's work and responses, so that the students can see how their peers worked through certain problems.

The technology we chose also supports multiple teaching and learning styles. Every student learns differently, whether it be visually, auditory, reading and writing, or kinesthetically (*Learning Styles* n.d.). Students are able to use the method that works best for them throughout

this unit. The students are able to visually see and read the content on their Nearpod screens or in their books, they can hear the content in Kami's text to speech, and they can physically engage with the content using the Didax Virtual Manipulatives. They can also choose to respond visually using text or drawing in Nearpod and Kami or using video on Flipgrid, auditorily using Flipgrid or Kami, or physically again with the Didax Virtual Manipulatives. Poll Everywhere and Wheel of Names support all collaborative teaching and learning styles as they get all students involved in the learning and discussions.

Different technology will be implemented throughout most parts of each lesson in the unit, but most notably in the exploration, explanation and evaluation sections of each lesson. Many times the students will be able to choose the technology that works best for them, such as choosing Nearpod, Kami, or Flipgrid in order to answer the questions in the explanation section of the lessons. This will help students learn which options work best for them. Certain times though, the tools used will be chosen for students ahead of time, such as using Wheel of Names to choose students to share work or using only Kami for the exploration and explanation in Lesson 1. These choices are purposeful, as we want students to have individual choice and autonomy, but do not want the challenge of the technology to distract from the learning (Cast, 2018).

The technology chosen will also be implemented in the assessment of each lesson. Students will be able to choose between using Kami to answer the assessment questions through text or drawing or using Flipgrid to answer the questions using audio or video. Only the student's work will be assessed, not their ability to use the technology. As such, the students will be encouraged to use the technology that they know best and feel most comfortable answering the questions with, so that it does not become an additional challenge.

Collecting and Analyzing Data

Technology has made interpreting and communicating learning easier, better, and organized. Google Classroom allows teachers to create assignments that will all be turned into the place. In our lessons, students turn in an exit ticket everyday through Kami. With the help of Google Classroom, teachers publish the assignment and see the completed work in the same place. Teachers can grade Kamis on Google Classroom and have all of the grades for that assignment in one place. This allows teachers to analyze and interpret data in one place. Teachers can make comments through the Google Classroom comments section to give feedback. With all of the grades and comments in one place, teachers can see what students need enrichment, intervention, and pairings for small groups.

Collaboration

To collaborate with other teachers, every teacher can share assignments and links through Google Slides or email. Google Slides can link Flipgrid, Nearpod, Didax, Wheel of Names, and Poll Everywhere to the teaching slides so all teachers have access when teaching. Google Slides can be shared with other teachers by clicking the share button and adding collaborators emails or by sending a link to the Slides.

Teachers in our lesson will also add all of the assignments, like Kami or Flipgrid, on Google Classroom for students to access. These assignments can also be linked to the Google Slides or emailed for teachers to quickly collaborate.

Diversity

We selected Kami as the application for students to turn in their exit ticket each day because of the many tools the application has. Kami is a web-based tool designed to convert any document into an interactive worksheet to complete online. The software allows users to

annotate using tools like typing, drawing, highlighting, adding shapes, and adding images onto the document. With the many annotating functions, all kinds of learners are able to be successful.

Flipgrid also promotes diversity because it allows students to turn in work that is not just on paper. Students can watch, hear, and read the teachers posted question and the student is able to respond with a video, not just typing a response. Students can also see others' responses, when typically students do not see others work or able to collaborate.

Adaptive and Assistive Technology

Assistive technology is important because it helps and supports all people to meet their needs, originally people who have disabilities. Assistive technologies can help students with disabilities to develop independence in their education. Kami is an assistive technology because it supports all students academic success with the many annotating functions. Kami also reads the text on the page to students. These functions create an inclusive classroom for all learners, but especially for students with learning disabilities or ELL's.

Digital Citizenship

Teachers have an important role to lead their class to have digital citizenship. Teachers should guide students to make sure they are informed about internet safety. Using Flipgrid ensures students' videos are protected through passwords and class codes to be able to post and view others' videos. Using Google Classroom and Google Meets ensures that students are protected by having passwords to have access and join (OSU, 2015).

Google Classroom is organized into topics for students and teachers to navigate and communicate through materials, assignments, announcements and more. Working in Google Classroom meets the requirement of a closed environment because students need a password to log into Google, as well as a code to join different classrooms. The teacher will ensure that

students are the only ones viewing the material by overseeing their work using the integrated Google Meet feature and by observing the assignment to see when students are interacting with the material (OSU, 2015). In addition, classes will be archived after the class is over. This way, students can only have access to materials and assignments for a set amount of time. This will prevent unauthorized transmission of copyrighted materials (ALA, 2019).

Professional Ethics

Professional ethics are important to consider and apply. Teachers have a commitment to the learner to make sure they have the opportunity to participate in the most appropriate education (AECT 2018). With the many technologies integrated into these lessons, every learner will be able to excel with the many options available. Through Nearpod, teachers can see, in real time, misconceptions and what students need help with to provide them with appropriate teaching. Through Wheel of Names, every student will have the opportunity to participate through random selection of names. Through Kami, students are able to answer questions in many different ways like drawing, text, shapes, videos, pictures, and voice. Kami can also read the text on the document, making sure assignments are appropriate in their education.

Teachers also have to be ethical when conducting professional activities and protecting the privacy of the learner (AECT 2018). When students turn in assignments on Google Classroom, other students cannot see peers assignments. A student only has access to what they submitted. This protects the students' privacy because other students do not have access to others' work . Google Classroom protects the privacy of the learner by requiring classroom codes and passwords to access materials, submitted work, discussions, posts, and comments.

Classroom Management and Collaborative Learning

Effective classroom management and collaborative learning enhances and maximizes student learning. Flipgrid maximizes student learning by providing a platform where students can answer questions verbally by posting videos and responding to others. Students are able to collaborate and thoughtful discussions online. Wheel of Names is a great classroom management tool to ensure that every student has a chance to share and participate though its random selection of names.

Supporting Student Learning

Online learning/blended learning, digital content, and collaborative learning networks can be used in many ways to support student learning. Using online tools allows greater access for all students, such as using the text to speech tool in Kami. This tool allows easy access for students who may have difficulty with their vision and for students who receive ESOL services. Students who struggle with their motor skills on tasks like holding a pencil can submit an audio response right into the document with Kami, as can students who simply prefer to talk through a problem instead of type or write it out.

As well, the online tools and learning plans make it easier to use multiple means of engagement and expression. Videos with captions provide more opportunities for both visual and auditory learners to engage with the content, and online manipulatives can be used for more kinesthetic learners to engage. For expression, collaborative learning networks and tools like padlet or the collaboration board in Nearpod can get students discussing their understandings and collaborating to build further understandings. There are also options like video or audio responses that would not be possible without digital tools like flipgrid. These tools and systems support students by meeting many UDL guidelines, making it easier for all students, but

especially those with disabilities, to access, engage with, and express knowledge of materials (CAST, 2018).

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