Lesson Plan

Grade: fifth

Subject: mathematics

Materials: graphing paper, pencil, colored pencils, white board marker

Technology Needed: none

Instructional Strategies:

- € Direct instruction
- € Guided practice
- € Socratic Seminar
- € Learning Centers
- € Lecture
- € Technology integration
- € Other (list)
- € Peer teaching/collaboration/ cooperative learning
- € Visuals/Graphic organizers
- € PBL
- € Discussion/Debate
- € Modeling

Guided Practices and Concrete Application:

- € Large group activity
- € Independent activity
- € Pairing/collaboration
- € Simulations/Scenarios
- € Other (list)
- € Hands-on
- € Technology integration
- € Imitation/Repeat/Mimic

Explain:

Standard(s)

5.G.2. - Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane.

Objective(s)

By the end of the lesson students will have created a graph of meerkat heights. The students will solve the higher of three meerkats and analyze whether they are smaller than average or larger than average.

Bloom's Taxonomy Cognitive Level: analyze, create

Differentiation

Below Proficiency:

- Copy the information that is up on the board to their own graph
- Gain ideas from peers during the turn and talk time
- Be guided from students who finish their graphs before them

Above Proficiency:

- Guide students who are below proficient catch up and complete their graphs
- Help generate ideas for the class discussion
- Graph points on the board

Approaching/Emerging Proficiency:

- Refer to the white board if they need guidance
- Guide students who are below proficient catch up and complete their graphs
- Generate ideas for turn and talks

Modalities/Learning Preferences:

- Visual - looking at the graph on the board, their graph
- Auditory - listening to other students and myself during discussions on graphing and instructions,
- Tactile - working on graph, move the the white board and graph a coordinate for the class

Classroom Management- (grouping(s), movement/transitions, etc.)

- Attention getter
  - (give me ___, hold up ___ amount of fingers)
  - Eyes and ears on me in three, two, one
  - Back to your seats in five, …, one
- Students will be seated at their desks classroom and find a seat by a desk
- Students should have nothing on their desks

Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)

- Students will not blurt out when teacher is talking
- Students must have whole body listening (listening with their eyes and ears)
- Students must not lay their heads on the desk when teacher is talking
- Students must raise their hands when they want to answer a question

○ if they have something on their desks, then I will ask the students if their job is to be listening or to have materials out right now ● Teacher will use the "give me __" method to gain the student's attention back to start cleaning up ● After turn and talks, I will call the students back to me by saving, "eyes on me in 5,.. 1" ● Teacher will share out how many minutes the students have left so they can pace themselves while working through the graphing paper ● When I need to get the students attention back, I will call out "class, class" for them to reply "yes, yes" ○ Repeat if needed	● Students will work independently when they working on graphing the three meerkat's until we do turn and talks ○ During turn and talks, students must participate with their peers ● Students will work independently when they are working on their graphs ○ Students may collaborate on the graphs, but they have to do their own work ● Students must be working, and if they have a question they may ask a neighbor for help or raise their hand so a teacher can help ● Students must come back to their seats and clean up when they are called in by the teacher ● When students are helping their peers, they will be expected to be on task and help guide their classmates to the answers, not just tell them the answers

Minutes	Procedures
	Set-up/Prep: ● Opening video ready for meerkats ● Graphs papers ready ● Heights of Flower, Shakespeare, Tosca made up
	Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) ● Has anyone ever heard of a meerkat? ○ What are they? Where do they live? How did you come to that conclusion? (africa) ● "Today boys and girls, we are going to graph the heights of meerkat's! But first we are going to watch a video on what they are and get to understand our little friends before we graph their heights." ○ Play meerkat youtube video
	Explain: (concepts, procedures, vocabulary, etc.) ● Vocabulary - graph, coordinates, meerkats ● After the video is done playing, pass out the graph paper ● "So we are given some coordinates of an average size meerkat. They give us the age in months and the height in inches. Which way do you think we should place our paper? (horizontal or vertical) Why do you think that?" ● Draw the graph on the white board for all the students to see ● "What size do you think we should put the months on based on the way the numbers are listed in the x and y coordinates? Why? Which size do you think we should place the days on? Why?" ○ Grab out your white boards and write the answer ○ Turn and talk with a partner, share out ○ Label the graph with the help of the students. Get the students to recognize that they can find clues on how to create their graph from the x and y coordinates and their placement in the (x,y) sentence. ● Model the first coordinate for the students ○ "Hmmm I am thinking about how to graph this so I know I have to go zero months to the right because the numbers on the bottom start at zero and then I have to go three up because the meerkat is three inches tall. This now matches my (0,3) coordinate. ● For 10 of the coordinates that we have to graph for the "typical" meerkat's height, have the students raise their hand to have them come up and graph them on the board. If no students are raising their hand, use the name sticks to have students come up and do the graphs. ○ (2,5) (4,6) (6,7) (8,8) (10,9), (12,10), (14,12) (16,12) (18,12) (20,12) ○ Since students have been working on this skill, they should feel comfortable to work with the coordinate plane.

	■ If students are having a hard time, I will model a few more of the coordinates and then have the students try again by raising their hand to write a coordinate up ● After I will draw a line following the graph ○ Ask, "What is the line showing us about the meerkat height" (meerkats stop growing at fourteen months, the talled a meerkat normally gets is around 12 inches, meerkats average adult height is 12 inches) ● Now learners, I am going to allow you to graph the growth lines for Flower, Shakespear, and Tosca (Who are each of these again?)
	Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions) ● Learners will be expected to graph the three other meerkats (Flower, Shakespeare, and Tosca) on their own ● I will ask the students to get out three different colored pencils so each line is a different color for the meerkats to keep track ● The coordinates they have been given are ○ Flower - (0,3) (2,5) (4,6) (6,7) (8,8) (10,9), (12,10), (14,12) (16,12) (18,12) (20,12) ○ Shakespear - (0,3) (2,5) (4,6) (6,7) (8,9) (10,10), (12,12), (14,14) (16,14) (18,14) (20,14) ○ Tosca - (0,3) (2,5) (4,5.5) (6,6) (8,7) (10,8), (12,9), (14,10) (16,10) (18,10) (20,10) ● The students will work on these independently until they are done with their graph ○ Once some students are done, they will go work with another person who is not done to help them ■ "Students, when you are working with another person, is it your job just to tell them the answer? How should you help them?" (No, guide them to finding the right answers) ● Once all the students are done I will use an attention getter to bring them all back to me ● "Learners, what kinds of observations are you having when you are looking at these graphs?" ● "What stands out to you most?" ● "How tall does the average meerkat get?" ● "Why do the different colored lines help you keep track of data? Do you think that engineers, business leaders, teachers, and other professionals use this when they make charts?" ● "Is Shakespear above or below the average height of meerkats, explain your thinking?" (highlight the line that is above average hight) ● "How might this same graph relate to humans?" ● On the back side of your paper write the answer to this question, "what would be the best measurement unit to graph human age and height, why?"
	Review (wrap up and transition to next activity): ● "Today learners we worked on graphing and comparing data of meerkats. In what professions do you think that adults graph information and analyze it?" ● "Please hand in your graphs and get your things put away so we can get ready for lunch."

Formative Assessment: (linked to objectives) **Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.** ● Using their white boards to show the answer to questions before turn and talks and share outs. **Consideration for Back-up Plan:** ● If the students are having a hard time with graphing the lines, graph the first one myself with the student's help. Graph the second line of Flower with different students volunteering to come up to graph	**Summative Assessment (linked back to objectives)** **End of lesson:** ● Students will hand in their graphs that they have created to show the data of the average meerkat, Flower, Shakespear, and Tosca. The students will have the meerkat that is above average high highlighted. **If applicable- overall unit, chapter, concept, etc.:**

a point until the line is completed. Have the students graph the third and fourth line by themselves or with a partner on their own paper.	

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

Math is one of my favorite subjects to teach to students so this lesson was fun planning for. Most of the students didn't know what a meerkat was, so it was fun being able to add some science terms into the engagement portion of this lesson. I usually don't like to open a lesson with a video, but I feel like it worked well for this lesson because the students were able to see some background information of them, what they looked like, where they lived, what they ate, and their habitat. After the video the students then were excited to graph the average size of meerkats and I could tell this because they were making predictions on how tall they were at what age. The students did well with using graphing terms like "the line plateaued," "at (__,__) the line increased by __ from the previous dot, "the overall average adult height is __," and so on. For the first part of the lesson I had the students volunteer to come and place the dots on the graph I had drawn from the board but I would change this if I taught this lesson again. If I did this again, I would have two different graphs on the board and then divide the class so they can plot the points and as a call we could compare them at the end. I feel like this would have been a better idea because there were only twelve points for the students to graph so not everyone got a change to graph something. I could tell students wanted to be involved and graph because the majority of the students had their hand raised to help graph a point. I also like the idea of have the two graphs instead of just the one we did together because it would have built on teamwork and communication which is a struggle for this class. The next portion of the lesson was for the students to graph three other meerkats on their own, which I thought went really well. The students learned to compare data and use mathematical language when comparing different lines. I could tell that they learned this skill farely well because on their summative assessments, the students represented the data in the correct way. I have attached an image below to show the work of a student. I also really enjoyed the conversation that the class and I had at the end of the lesson which connected graphing to real world experiences and questions. Some students wondered if their parent used graphing in their jobs because they were an engineer, etc. The students did a good job of connecting and representing real world problems on graphs.