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| **DAY ONE**  **TOPIC:** Intro to the Coordinate Plane and its 4 Quadrants  **CONTEXT OF LESSON:** On class warm-ups that students work on to begin class each day, they have been introduced to quadrant I on a coordinate plane (will be on today’s warm-up too).  When they are shown a full coordinate plane with all 4 quadrants, it will probably look familiar to most students but they may or may not know anything about it.  In the past, students have always been excited to learn about the coordinate plane because it’s a new concept but not an extremely difficult one.  Also, the activities and even the assignments that go along with topic interest most students.   This lesson starts just as students finish up with integers so positive and negative numbers will be fresh in their minds.  **LEARNING OBJECTIVES AND ASSESSMENT:**   |  |  |  | | --- | --- | --- | | Learning Objective | Bloom | Assessment (Formative/Summative) | | Students will define and then in their own words explain the following terms: x and y axis, coordinate plane, quadrant, origin, ordered pair | R | Vocabulary packets where students define in their own words the key terms and also where students write the more precise definitions discussed in class will be collected at the end of the class period.  Each term discussed will be checked for certain key words. | | Students will apply their definitions as they create and label their coordinate plane. | A | Coordinate planes will be collected at the end of the class period and be given 1 point for each piece that is correctly labeled.  The grade will be recorded.  1 point for each of the following: quadrant I, II, III, IV, origin, x and y axis.  Also one ordered pair in each quadrant must be correctly labeled (each ordered pair is worth 2 points.  Total assignment weight: 15 points in grade book. | | Students will demonstrate their knowledge on a homework assignment due the next day.  The assignment is a puzzle with a coordinate plane.  In each quadrant, letters are plotted and students solve the puzzle by correctly matching the letter to its ordered pair. | U | The next time we meet, students will discuss their answers to the assignment within their group.  The assignment will then be collected and I will check to see which students understood the concept (less than 3 incorrect answers) and which students are still struggling.  Those that are still struggling will meet with me on a designated day during study hall to get more practice with coordinate planes. | |

**SOL:** 6.11 – The student will

1. identify the coordinates of a point in a coordinate plane; and
2. graph ordered pairs in a coordinate plane

**MATERIALS:**

30-40 pieces of 2 different colored pieces of paper (green/pink provided)

30-40 blank coordinate planes

Scissors (each group has plastic storage container, scissors in there)

Glue (in group’s container)

Vocab packets (students will provide)

Textbooks (under each desk)

Homework assignment (wkst)

**PROCEDURE(Intro to Coordinate Plane – 30 minutes):**

1. After finishing the warm-up, which included a question using only the first quadrant of a coordinate plane, students will be shown a complete (all 4 quadrants) coordinate plane on the smart board. I will ask the students if they’ve ever seen one of these before and if so, what they know about it. I anticipate many students saying either, it looks a lot like the question we just did on our warm-up except bigger OR something about it looking similar to a graph.
2. Once students have run out of ideas about the coordinate plane, I will tell them the name of it and mention the terms they need to know associated with a coordinate plane, while pointing them out (origin, x and y axis, ordered pair, quadrant).
3. Students will then be asked to take out their vocabulary packet and use their textbooks to define the following words (coordinate plane, ordered pair, origin, x and y axis, quadrant). Definitions will be written in the appropriate place in their vocab packet.
4. Once students have used their textbooks to define the 6 terms, they will discuss with their partner (students sit in groups of 4 but have partners within their groups) each term and come up with a definition in their own words (to be recorded in the appropriate place in their vocab packet). Students will also draw a picture or come up with some sort of example to go with their definition. Some pairs may struggle to come up with a definition of their own so those groups will be told to underline key words from the book definition and then as other pairs are sharing their ideas with the class, they should take a definition they like to be their own.
5. Next, as a class, we will go over each term. The book definitions will be given on the smart board. Students will share their own definitions. As a class, we will decide which words from the book definition must be included in student definitions and underline them on the smart board.
6. To finish up with the definitions, before we begin the activity, we will go back to the blank coordinate plane originally shown and using student definitions, we will label the coordinate plane (ordered pair, origin, x and y axis, 4 quadrants).

**ACTIVITY PROCEDURE (25 minutes):**

1. Students will be given the following materials: 1 piece of green paper, 1 piece of pink paper, blank coordinate plane.
2. First, students will be label the blank coordinate plane. They will only label the x and y axis and should be told to plot a point in each of the 4 quadrants with the ordered pair location beside each point.
3. After the coordinate plane is labeled, students will set that aside an focus on the 2 pieces of colored paper. Each paper will need to be folded into fourths. Then, with the paper folded once on the vertical line and the open side out, students will cut along the horizontal line (to make this MUCH simpler, I will be doing this at the same time, showing students exactly where to cut).
4. Next, students will glue on the inside half of the part of the paper that they did NOT cut and glue it to half of the coordinate plane. They will do the same with the other piece of paper (again, I will be doing this at the same time).
5. When they finish gluing, the colored pieces of paper should open up in 4 places (4 quadrants) to reveal the coordinate plane underneath.
6. On the colored pieces of paper, the students will label the 4 quadrants. To remember where the 1st quadrant is located and in which direction the quadrants go in, students should write a big “C” on the center of the colored pieces of paper. The quadrant that the letter C begins in is the 1st quadrant and if you trace it the next quadrant it goes to is quadrant II and then III, etc. They will also label what the ordered pairs in each quadrant look like (quadrant I should be (+,+), quadrant II (-, +), etc.).
7. Once students are done, they should have something that looks like the example I have been doing along with them. They will trade coordinate planes with their partner and will check each other’s to make sure all 15 points that they will be graded on are included and correct (see lesson objectives for 15 points).

**CLOSURE PROCEDURE (5 minutes):**

1. After activity is picked up and students have turned in their coordinate planes, the assignment will be given.
2. Students will read the directions and try numbers 1 and 2 on their own. Quickly, they’ll check with their partner and see if they agree.
3. I will then show the worksheet on the smart board and do numbers 1 and 2. Students will check their own work and make corrections if necessary. We will then do number 3 together, making sure students are clear on what I expect.
4. Students will be given the remainder of the class period (should be less than 5 minutes) to start the assignment with their partner.
5. The assignment will be collected during the first part of class tomorrow to check for understanding (see objectives to determine understanding).

**MEETING THE NEEDS OF ALL STUDENTS:**

Since this is an inclusion class, many students have IEP’s. One accommodation that many of the students have in their IEP is that notes will be provided. When given their vocab packets at the beginning of the advisory, those students packets differed from the other students packets. Instead of having to write out the whole book definition, students were given the definition with the blanks that they have to fill in. Also, for the “in your own words” part of the vocab, students with certain accommodations were given the main parts of the definition and only had to fill in the words that they were key from the book definition. Another way to meet the needs of visual learners was done during the activity. As I was telling the students how to cut, fold, and glue, I was also doing it, allowing them to see what was going on as well as hear it.

**POTENTIAL PROBLEMS AND SOLUTIONS:**

With almost 100% certainty, at least one or two students aren’t going to cut along the correct line or they will put the glue on the wrong part of the paper. This can’t be avoided but it can be helped by making sure that I have extra paper on hand.

**CONNECTION TO CTA:**

This is an introduction lesson to coordinate planes. In the lesson that follows this, students will be doing an activity that was quickly mentioned by Tyminski (although it has nothing to do with fractions) involving coordinate planes. Also, during almost each session of CTA, it seemed to be stressed how important it was to get students involved rather than just lecturing. The activity in this lesson is very hands on and allows students a little freedom to move around and discuss things with their peers (Strebe was big into that idea).

**DAY TWO**

**TOPIC:** Plotting Points on a Coordinate Plane/Connecting it to the “Real” World

**CONTEXT OF LESSON:** Vocabulary associated with the coordinate plane was discussed during yesterday’s lesson. As a warm-up today, students will review with their partners the key terms. During that time, students will be given their coordinate planes from yesterday. Today’s lesson will be more practice with the coordinate plane however the focus will be on identifying and plotting points. Today’s lesson isn’t so much of a lesson as it is an activity which usually means students will be in to what’s going on.

**LEARNING OBJECTIVES AND ASSESSMENT:**

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| Learning Objective | Bloom | Assessment (Formative/Summative) |
| Students will recall what they learned yesterday and correctly name the word associated with a definition. | R | Students will “quiz” their partner on the key terms discussed yesterday in class. They will assess each other and then I will assess them as a group by giving them a definition and then having them write the correct term on their white board. Students who appear to be struggling will be noted and during study hall, will work with a partner to further go over the terms. |
| Students will plot battle ships on a blank coordinate plane and correctly label each point on their ship. | A | Upon completion of the game, the coordinate plane students were working will be collected. I will check over them to ensure that students correctly labeled their “ships.” Also, as students are playing, I will be walking around and looking over their game boards to check for errors. |
| In groups, students will complete a “team” homework assignment (the same one from last night’s homework). If there is disagreement among them, they will need to explain why they think their answer is correct. | U | After groups are given a sufficient amount of time to complete the worksheet, they will trade papers with another group and answers will be discussed. For each correct answer, they will get one point added to their team score. Groups who get less than 15 points will be the groups that I focus on during the activity. |

**SOL:** 6.11 – The student will

1. identify the coordinates of a point in a coordinate plane; and
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**MATERIALS:**

Blank coordinate plane (front to back)

Copies of assignment from yesterday

**PRE-ACTIVITY PROCEDURE (20 minutes):**

1. Each group will be given a blank copy of last night’s homework assignment. Any student that does not have last night’s homework assignment completed or doesn’t have it at all will go to the back table to work ON THEIR OWN to finish it.
2. As a group, students will complete the assignment on the copy given to them today. If there is disagreement among the group on any of the answers, they may raise their hand for help but only if they are prepared to explain to me why they think their various answers are correct and the other are not correct.
3. Once groups have been given a sufficient amount to complete the task, they will trade their group paper with another group. Students who were working on their own will trade papers among themselves.
4. A completed worksheet with answers will be shown on the smart board and students will correct their paper and/or another group’s paper.
5. After correcting, I will add the number of correct answers to the team’s overall score and make sure to make note of which groups received less than 15 points so that I can focus on them during the activity.
6. I will ask the students if there are any questions on the assignment. Once they have been answered, I will collect the students individual assignments to be checked for a grade and we will begin the activity.

**PROCEDURE FOR MAKING “REAL” WORLD CONNECTION (15 minutes):**

1. I will tell the students although coordinate planes may seem a little useless to them for things outside of math class, something similar to a coordinate plane can be used in real life and actually, students may have used it before.
2. Before giving them an example of using an ordered pair in real life, I will ask students if they can they think of anything they’ve done or seen in the “real” world that might be related to a coordinate plane and ordered pairs. If none of the students come up with on it their own, I will guide them to relating a coordinate plane to a map and giving directions.
3. As a real life example, I will say to them, “If you're trying to find a street that you've never been on before, you look for the street's name in the map's index. Suppose the index says that your target street is located at D12. This means that you go across the top of the map and find "D", and then you go down the side and find "12". You then trace down and across to find the box labeled as "D12", and look inside that box for the street you need. Somebody figured out that this was a handy way to specify the right general area on the map, telling you how far over (the D) and how far up or down (the 12) you needed to go (example from website: <http://www.purplemath.com/modules/plane.htm>). A French mathematician named Rene Descartes came up with a coordinate plane which sort of takes this example involving the map and turns it into math!
4. We will then begin today’s activity and I will start by asking the student’s if any of them have played or at least of a game called battleship.
5. Students who are familiar with the game will be asked how it might be related to a coordinate plane. After that, I will begin discussing the activity.

**ACTIVITY PROCEDURE (20 minutes):**

1. Students will be given a blank coordinate plane. On the coordinate plane they will label the x and y axis, the origin and number it -7 thru 7 vertically and horizontally.
2. Next, they will be told to place three ships on their coordinate plane. The destroyer will be 5 units (or ordered pairs), the tanker will be 4 units, and the submarine will be 3 units. Each point on each of the 3 ships needs to be labeled with an ordered pair to make it easier for students to quickly identify their partner’s guess as either a hit or miss. To ensure students are clear on what I want, I will place a destroyer ship on blank coordinate plane on the smart board and label the 5 ordered pairs on it.
3. After their ships have been placed, I will explain the directions. “The goal of this game is to sink your partners’ ships or if there isn’t enough time to sink them, then to be the one who has the most hits. You and your partner will take turns trying to guess where the other person’s ships are located. When it’s your turn, you will look at other coordinate plane, the one WITHOUT your ships on it and guess an ordered pair. If your partner says miss, you will put an “X” on that location and LABEL THE ORDERED PAIR; if they say hit, you will put a dot on that location, LABEL THE ORDERED PAIR, and guess again. A hint for you…the ship either has to run vertically or horizontally. If you get a hit on one of your partner’s ship, your next guess should be a point above, below, left, or right of the ordered pair you just guessed. When it’s your partners turn, you will look at the side with your ships on it, locate the ordered pair that your partner guesses and let them know if a point on your ship is located there. If it isn’t say miss, if it is say hit.”
4. Students will be given about 15 minutes (once directions are given and questions are answered, write the time the game will end on the smart board) to play the game. As they are playing, I will be walking around, focusing my attention on the groups who seemed to struggle on the assignment from last night.
5. Once time is up, the student who had the most hits in each pair will be rewarded with a pack of smarties and coordinate planes will be collected.

**CLOSING PROCEDURE (5 minutes):**

1. Tell the students, “Tomorrow you will have a quiz on what we have discussed over the last two days. Make sure to go over the definitions of the words we defined yesterday and are prepared to label the specific parts of a coordinate plane as we did on the one you made in class yesterday.”
2. I will then have all the students stand up. I will give each student an ordered pair and ask them to tell which quadrant it is located in. If they get it correct, they will sit down. If not, they will remain standing until I come back to them with another ordered pair. If they are still standing when class ends, I will write their name on the board and have them come to me during study hall that day to quickly review ordered pairs.

**MEETING THE NEEDS OF ALL STUDENTS:**

For this activity, students with certain accommodations in their IEP will get their “game board” with the 3 ships their partner is trying to sink already in place and labeled for them. They will be required to label the x and y axis however they will already be numbered -7 thru 7. Also for the visual learners, as I am explaining directions, I will do an example of how the game should work using the coordinate plane on the smart board.

**CONNECTION TO CTA:**

To go over the homework from yesterday, I will be using John Strebe’s respect and consensus strategy (due to time restraints, we will skip the defense step). Also, as mentioned in the previous lesson, CTA stressed the importance of getting students involved and this is an activity that will do that. I had used battle ship during my first year of teaching but during one of Tyminski’s sessions on fractions, he mentioned using battle ship and it reminded me what a great activity this was.