

Lesson 31: The Coordinate Grid

Weekly Focus: coordinate grid
Weekly Skill: identify points

LESSON 31: The Coordinate Grid

Lesson Summary: For the warm up, students will solve a problem about test grades. In Activity 1, they will learn vocabulary related to the coordinate grid and practice identifying points. In Activity 2, they will do problems with the grid. In Activity 3, students will draw a picture with the grid. In Activity 4, they will solve problems in the workbook. Activity 5 is a partner activity like battleship. Estimated time for the lesson is 2 hours.

Materials Needed for Lesson 31:

- Video (length 3:50) on translations in the coordinate grid. The video is required for teachers and optional for students.
- Graph paper
- 4 Worksheets (31.1, 31.2, 31.3, 31.4) with answers (embedded links). Worksheets 31.3 and 31.4 are optional homework.
- Instructions for partner Activity 5 (31.5)
- *Mathematical Reasoning Test Preparation for the 2014 GED Test Student Book (pages 70 – 71)*
- *Mathematical Reasoning Test Preparation for the 2014 GED Test Workbook (pages 98 – 101)*

Objectives: Students will be able to:

- Solve the test grade word problem
- Understand the parts of the coordinate grid
- Identify points on the grid
- Transform points on the grid

ACES Skills Addressed: N, CT, ALS

CCRS Mathematical Practices Addressed: Reason Abstractly and Quantitatively, Mathematical Fluency

Levels of Knowing Math Addressed: Intuitive, Pictorial, Abstract, and Application

Notes:

You can add more examples if you feel students need them before they work. Any ideas that concretely relates to their lives make good examples.

For more practice as a class, feel free to choose some of the easier problems from the worksheets to do together. The “easier” problems are not necessarily at the beginning of each worksheet. Also, you may decide to have students complete only part of the worksheets in class and assign the rest as homework or extra practice.

The GED Math test is 115 minutes long and includes approximately 46 questions. The questions have a focus on quantitative problem solving (45%) and algebraic problem solving (55%).

Students must be able to understand math concepts and apply them to new situations, use logical reasoning to explain their answers, evaluate and further the reasoning of others, represent real world problems algebraically and visually, and manipulate and solve algebraic expressions.

This computer-based test includes questions that may be multiple-choice, fill-in-the-blank, choose from a drop-down menu, or drag-and-drop the response from one place to another.

The purpose of the GED test is to provide students with the skills necessary to either further their education or be ready for the demands of today's careers.

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Lesson 31 Warm-up: Solve the test grade problem

Time: 10 Minutes

Write on the board: Blanca wants to get an 80% average in her science class. On the first 4 tests she earned 75, 70, 90, and 82 percent. How many points does she need on the last test to get at least an 80% average?

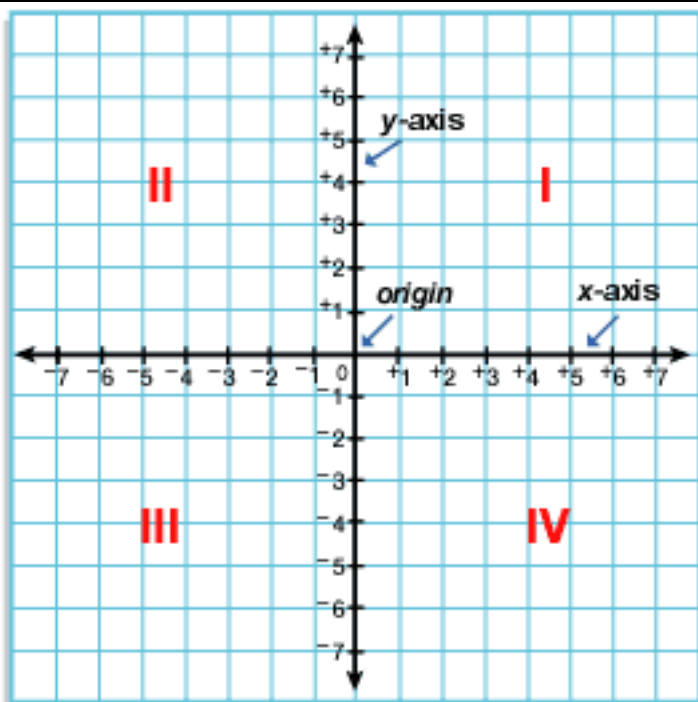
- Note to teacher: There could be good discussion around this question because there are many ways to solve it. If students need a hint to get started, ask them how many points would she need total to get a minimum average of 80%.
- Possible solutions:
 - She needs $5 \times 80 = 400$ points total to have an average of 80 points per test.
 - $75 + 70 + 90 + 82 + n = 400$ points needed total. Solve for $n = 83$ on last test
 - 400 points total $- 75 - 70 - 90 - 82 = 83$ needed on last test
 - $\frac{75+70+90+82+n}{5} \geq 80$. Solve for $n \geq 83$. Point out that 83 is the minimum she needs to get. Since she can get 83 or more, we set it up as an inequality. Make sure to teach this last option if students don't do it themselves first.

Lesson 31 Activity 1: Intro to Coordinate Grid

Time: 25 Minutes

1. Teach the vocabulary for the coordinate grid as you draw it on the board.
2. Give students a sheet of graph paper or have them draw in their notebooks.
3. First, draw a number line from 0 to about +10.
4. Add the y-axis. Ask students to identify the **x-axis** and the **y-axis**.
5. Add the other quadrants of the coordinate grid.
6. Point out to students that they have done many graphs in Quadrant I. Now they will be using all parts of the **coordinate grid** (or **coordinate plane**).
7. Show the **origin** (0,0). It is the starting point for counting units (or intervals) right and left on the x-axis and up and down on the y-axis.
8. Label a **point** in quadrant I such as (3,5). Label the point as an **ordered pair**. Explain how you identified that ordered point and that x is always listed first. Do a few more examples in Quadrant I. State that in QI both x and y are positive and also write this in the quadrant.
9. Do 2-3 examples for each of the other quadrants and label when x and y are positive or negative in each quadrant.
10. Do [Worksheet 31.1](#) to practice identifying points.

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Lesson 31 Activity 2: Identifying Points and Translating

Time: 15 Minutes

- 1) Do **pages 70-71** in the **student book**.
- 2) Explain how to **translate** a figure on the coordinate plane. Use the example on page 71.

Lesson 31 Activity 3: Puzzle A

Time: 10 Minutes

- 1) Explain to students that they are learning how to identify points on the coordinate grid because later they will learn to graph lines on the grid.
- 2) Do [Worksheet 31.2 Puzzle A](#). Explain how to connect the lines for each sequence.
- 3) There will be an identifiable drawing when they are done.

Lesson 31 Activity 4: Independent Practice

Time: 30 Minutes

- 1) Have students work independently in the **workbook pages 98-101**.
- 2) Circulate to help. Review any questions that students found challenging.
- 3) Choose 1-2 translating problems to have volunteer students do on the board.
- 4) Note that there may be questions like #16 that students cannot answer yet.

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Lesson 31 Activity 5: Partner Activity Battleship

Time: 15 Minutes

- 1) See the attached **instruction 31.5** for this partner game.
- 2) This is similar to the battleship game some students may know.

Lesson 31 Finish Early? or Homework

Time: 15 Minutes

Give **Worksheets [31.3](#) or [31.4](#) puzzles** for students to do at home or in class if they have time. 31.4 is more difficult than 31.3.

Instructions 31.5 Partner Game

Play Graphing Battleship

Being able to plot points correctly on a graph is an important skill for algebra and geometry students. You can help your child with this difficult concept by making it into a fun game! This game, modeled after the classic game of “Battleship,” will help your child practice the concept of ordered pairs.

What You Need:

- Graph paper
- Large book, or other divider
- Pen
- Highlighter

What You Do:

1. Draw a square on each of the four pieces of graph paper. Each square should cover exactly 10 X 10 boxes.
2. Draw an X-axis and a Y-axis directly down the center of each paper so that the four graphs each have four equal quadrants. Each quadrant on the graphs should be 5 X 5 boxes.
3. Label the number of lines for the X-axis and Y-axis on the graphs.
4. Give two graphs to each player. One will be the “home” graph, and the other graph will be for “aiming.” Place a divider between the two players so that they cannot see each other’s graphs.
5. Each player should take one graph and create five different “battleships” on it – one made from two dots, two made from three dots, one made from four dots, and one made from five dots. To make a battleship, the players simply use pens to draw dots in a line, either vertical or horizontal, on the graph. (For a harder version of the game, players can put the battleships diagonally as well.) They then draw a highlighted line over the row of dots to represent the ship.
6. Players take turns calling out an ordered pair where they think one of her opponent’s ships are located. The opponent calls out “hit” or “miss.”
7. If a player gets a hit, she puts an X on the coordinate that she specified on her “aiming” graph. The opponent puts an X on his “home” graph. If she missed, she’d put a dot on the specified coordinate on her “aiming graph.”
8. If a player has hit the last dot on the ship, the opponent should call out “You sunk my ship!” The first player to sink all of the opponent’s ships wins the game.

