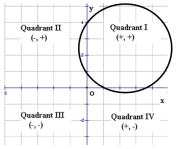
Kentucky Alternate Assessment Instructional Support Document - Math

KAS: KY.5.OA.3_____

Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.

Standard	Clarifications
KY.5.OA.3 Generate numerical patterns for situations. a. Generate a rule for growing patterns, identifying the relationship between corresponding terms (*x*, *y*). b. Generate patterns using one or two given rules (*x*, *y*). c. Use tables, ordered pairs, and graphs to represent the relationship between the quantities.  ***Note: Grade 5 limits to quadrant 1 of the coordinate plane.*** ***Alternate Assessment Target:*** *Limit full standard to one rule.*	Given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, students generate terms in the resulting sequences (creating ordered pairs). Students observe the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. Graph the ordered pairs on a coordinate plane. ***Alternate Assessment Clarification:*** *The clarification above for the KAS describes comparing the relationship between two patterns; however, the Alternate Assessment Target for this standard limits to one rule. For example, Given the rule "Add 3," generate terms in the resulting sequences (creating ordered pairs). Graph the ordered pairs on a coordinate plane (quadrant 1 is defined as positive numbers only).*
Connections to Math Practices	**Coherence/Foundational Understandings**
MP.2 Reason abstractly and quantitatively. (Add or remove context to solve problems.*) **MP.4** Model with mathematics. (Ask and answer questions about the real world.*) ***Key Vocabulary:*** graph, point, ordered pair, coordinate plane, growing pattern, rule (as used in this context), table **Click here to see more about what teachers and students do to build math practices: Engaging the Math Practices and Question Stems**	**Pre-requisite Skills** • Identify a growing pattern • Understand the (*x*,*y*) coordinate plane • Graph points in quadrant I KY.4.OA.5, KY.5.G.1, KY.5.G.2 **Coherence** KY.4.OA.5→ KY.5.OA.3→KY.6.EE.9 Kentucky Academic Standards for Mathematics

*Clarification from Kaplinsky, R. (2018, November 18). *Making the Math Practices Readable*.

Instructional Considerations

Possible Areas of Difficulties/Misconceptions

- Students may reverse the points when plotting them on a coordinate plane.
- Students may count up first on the y-axis and then count over on the x-axis. The location of every point in the plane has a specific place. Have students plot points where the numbers are reversed such as (4, 5) and (5, 4). Begin with students providing a verbal description of how to plot each point. Then, have them follow the verbal description and plot each point.

Suggested Tools/Visual Aids

- KY Alternate Assessment Resource Guide (General terms pps 6-11; Math terms pps 22-26)
- Graphing paper
- Square tiles, connecting cubes, centimeter cubes (any square manipulative that could transfer to grid paper)

Other Considerations

- Students should have experience generating and analyzing numerical patterns using a given rule in Grade 4.
- Given two rules with an apparent relationship, students should be able to identify the relationship between the resulting sequences of the terms in one sequence to the corresponding terms in the other sequence. For example, starting with 0, multiply by 4, and starting with 0, multiply by 8 which generates each sequence of numbers (0, 4, 8, 12, 16, ...) and (0, 8, 16, 24, 32,...). Students should see that the terms in the second sequence are double the terms in the first sequence, or that the terms in the first sequence are half the terms in the second sequence.
- Have students form ordered pairs and graph them on a coordinate plane. Patterns can be also observed from the graphs.
- Graphing ordered pairs on a coordinate plane is introduced to students in the Geometry domain where students solve real-world and mathematical problems. For this cluster, use only the first quadrant of the coordinate plane, (which contains positive numbers) only. Provide coordinate grids for the students, but also have them make coordinate grids.

Additional Resources

- Howard County Public Schools. (nd). *Mathematics*. Retrieved April 1, 2020 at https://www.hcpss.org/academics/mathematics/
- Kaplinsky, R. (2018, November 18). *Making the Math Practices Readable*. https://robertkaplinsky.com/?s=revised+math+practices.
- *Nguyen, Fawn.* (2020). *Visual Patterns.* http://www.visualpatterns.org/
- Toy Theater. (2001-2020). *Virtual Manipulatives*. https://toytheater.com/category/teacher-tools/virtual-manipulatives/ (Van de Walle, J.A., Karp, K.S., Bay-Williams, J.M., Wray, J. & Nicole Rigelman, N. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally (10th Edition).* Pearson.