

# Unpacked South Dakota State Mathematics Standards

**Purpose:** *In order for students to have the best chance of success, standards, assessment, curriculum resources, and instruction must be aligned in focus, coherence, and rigor. Unpacked standards documents are intended to help align instruction to the focus, coherence, and rigor of the South Dakota State Mathematics Standards. The standards have been organized in clusters as they are not so much built from topics, but rather woven out of progressions. Not all content in a given grade is emphasized equally in the mathematics standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting standards will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.*

<b>Domain: Geometry</b>		<b>Grade Level: 5</b>
<b>5.G.A Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems.</b>		
Students use the coordinate plane, learn to graph ordered pairs, and apply understanding of coordinate points to real world contexts.		
<p><b>**This is an ADDITIONAL cluster.</b> <i>Students should spend the large majority of their time (65-85%) on the major work of the grade. Supporting work and, where appropriate, <b>additional</b> work should be connected to and engage students in the major work of the grade.</i></p> <p><b>5.G.1</b> Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).</p> <p><b>5.G.2</b> Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.</p>		
<b>Aspects of Rigor for Student Learning: (Conceptual, Procedural, and/or Application)</b>		
<b>Conceptual Understanding</b>	<b>Procedural Fluency</b>	<b>Application</b>
Define and understand how to find a given point on a coordinate plane, using the origin, X-coordinate, and Y-coordinate. <b>(5.G.1)</b>		
Interpret coordinate values of points in the context of the situation. <b>(5.G.2)</b>	Graph points in the first quadrant of the coordinate plane. <b>(5.G.2)</b>	Represent real world mathematical problems by graphing points on coordinate plane. <b>(5.G.2)</b>
<b>Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices</b>		
<ol style="list-style-type: none"> <li><b>1. Make sense of problems and persevere in solving them.</b> <ul style="list-style-type: none"> <li>Students will make connections between applying a rule to a set of numbers and graphing those points through the use of coordinate plane. <sup>1</sup></li> </ul> </li> <li><b>2. Reason abstractly and quantitatively.</b></li> <li><b>3. Construct viable arguments and critique the reasoning of others.</b></li> <li><b>4. Model with mathematics.</b> <ul style="list-style-type: none"> <li>Students will use a coordinate plane to represent real world problems by graphing points in the first quadrant.</li> </ul> </li> <li><b>5. Use appropriate tools strategically.</b></li> </ol>		

**6. Attend to precision.**

- Students will use clear, specific directions, attending to precision as points are plotted on the coordinate plane.

**7. Look for and make use of structure.**

- Students will notice patterns that may be generalized as real world problems are represented on the coordinate plane.

**8. Look for and express regularity in repeated reasoning.**

**Vertical and Horizontal Coherence and Learning Progressions**

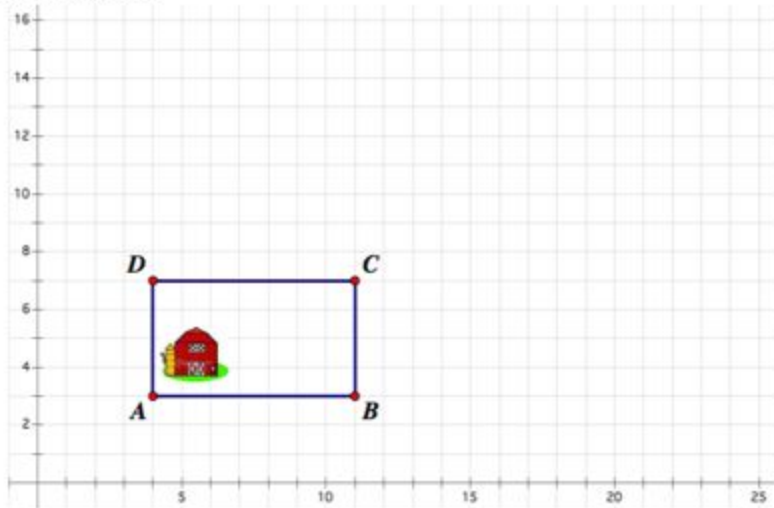
<u><a href="#">Previous Learning Connections</a></u>	<u><a href="#">Current Learning Connections</a></u>	<u><a href="#">Future Learning Connections</a></u>
In previous years students plotted points on a number line and constructed perpendicular lines. <b>(4.G.1, 4.MD.4)</b>	Students will form ordered pairs from given rules and graph points on a coordinate plane. <b>(5.OA.3)</b>	Students are extending understanding of a coordinate plane to the negative number coordinates. <b>(6.NS.6)</b>

**Vocabulary** (Key Terms Used by Teachers and Students in this Cluster):

- |                     |                |                 |
|---------------------|----------------|-----------------|
| • Axis              | • Y-coordinate | • Ordered pairs |
| • Coordinates       | • Origin       |                 |
| • Coordinate system | • X-axis       |                 |
| • Coordinate plane  | • Y-axis       |                 |
| • X-coordinate      | • Quadrant     |                 |

**Relevance, Explanations, and Examples:**

Farmer Dave built a rectangular fence around the barn to enclose all the animals as shown below. However, his farm is growing and needs more space. He wants to redraw the perimeter of the rectangular fence so that the new width is twice the original width and the new length is 6 units longer than the original length. He wants to keep Point A where it is. Find the new coordinates of Points B, C, and D for the new fence.



Point B \_\_\_\_\_ Point C \_\_\_\_\_ Point D \_\_\_\_\_

Greetings from the Kalahari Desert in South Africa! In this activity, you will learn a lot about the Kalahari's most playful residents: meerkats.

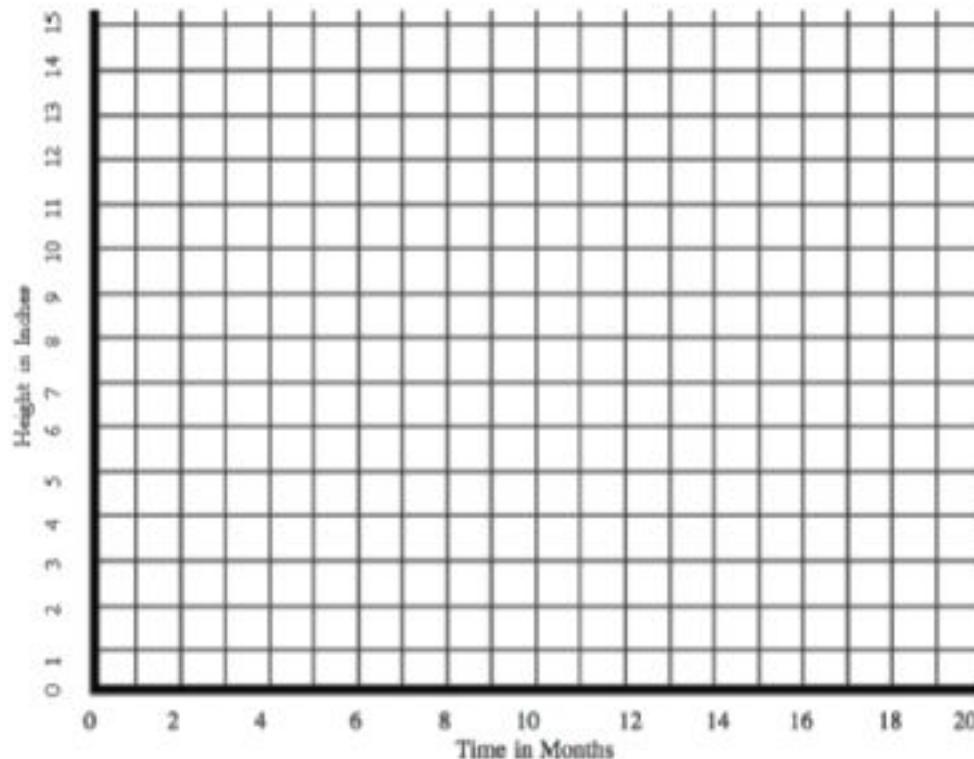
- a. The following ordered pairs show the height of a typical meerkat at different times during the first 20 months of life. Graph the corresponding points and see what you can discover about meerkats. Once you have graphed them all, connect the points in the order they are given to form a line graph.



See if you can graph these ordered pairs:

- (0 months, 3 inches)
- (2 months, 5 inches)
- (4 months, 6 inches)
- (6 months, 7 inches)
- (8 months, 8 inches)
- (10 months, 9 inches)
- (12 months, 10 inches)
- (14 months, 12 inches)
- (16 months, 12 inches)
- (18 months, 12 inches)
- (20 months, 12 inches)

Title: Meerkat Height in Inches Over First 20 Months

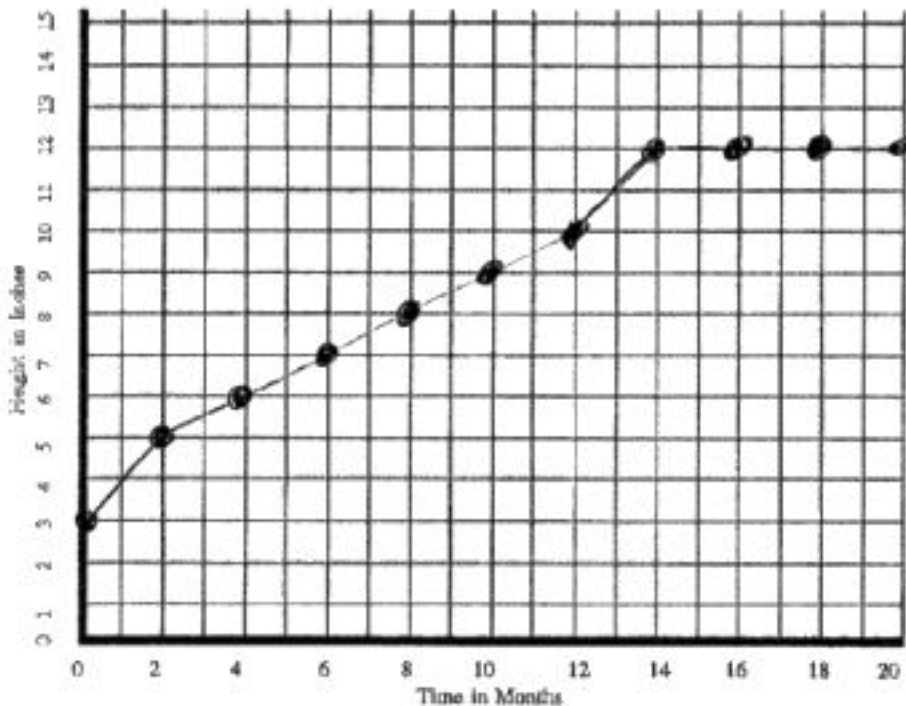


- b. What does the point (0 months, 3 inches) mean for a typical meerkat's height?
- c. How tall do you think a typical meerkat gets? Why?
- d. At what age do meerkats reach their full height? How do you know from this graph?
- e. If this graph were about a human instead of a meerkat, at what age do you think the height would stop getting larger?

## Solution

a

Title: Meerkat Height in Inches Over First 20 Months



- b. The point (0 inches, 3 months) means that when a meerkat is first born, it is typically 3 inches in height.
- c. The graph shows that meerkats grow to about 12 inches tall because none of the points given has a  $y$  value greater than 12. It looks like the meerkat has stopped growing.
- d. Meerkats stop growing at about 14 months old. At that point, time continues to pass, but meerkats stay about 12 inches tall.
- e. Answers may vary, but most students will predict that humans usually stop growing at about 17 years old.

### Achievement Level Descriptors

**Cluster:** Graph points on the coordinate plane to solve real-world and mathematical problems.

#### Concepts and Procedures

**Level 1:** Students should be able to graph whole number coordinate pairs in the first quadrant of a coordinate plane with unit axis increments.

**Level 2:** Students should be able to graph whole number coordinate pairs on a coordinate plane with whole number axis increments to solve problems.

**Level 3:** Students should be able to graph coordinate pairs where one term is a whole number and one is a fraction on a coordinate plane with whole number axis increments.

**Level 4:** Students should be able to graph coordinate pairs where both terms are fractions on a coordinate plane with fractional axis increments.