

## Just in Time Quick Check

### Standard of Learning 4.MG.4

#### **Strand: Measurement and Geometry**

#### **Standard of Learning 4.MG.4**

**The student will identify, describe, and draw points, rays, line segments, angles, and lines, including intersecting, parallel, and perpendicular lines.**

*Students will demonstrate the following Knowledge and Skills:*

- a) Identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices.
- b) Describe endpoints and vertices in relation to lines, line segments, rays, and angles.
- c) Draw representations of points, line segments, rays, angles, and lines, using a ruler or straightedge.
- d) Identify parallel, perpendicular, and intersecting lines and line segments in plane and solid figures, including those in context.
- e) Use symbolic notation to name points, lines, line segments, rays, angles, and to describe parallel and perpendicular lines.

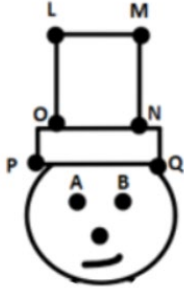
#### Just in Time Quick Check

#### Just in Time Quick Check Teacher Notes

**Supporting and Prerequisite SOL: 4.MG.5, 4.MG.6, 3.MG.4**

### Just in Time Quick Check 4.MG.4

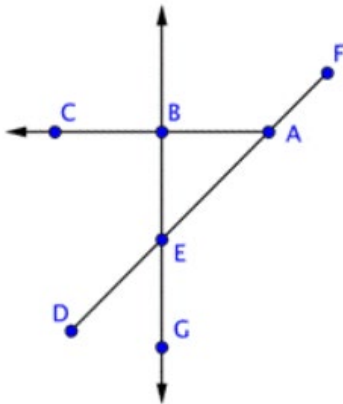
1. Use the picture below to answer the following questions.



a) Identify two points using symbolic notation.

b) Describe a point using words.

2. Use the picture below to answer the following questions.



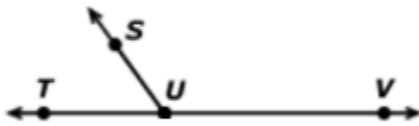
a) Identify a line using symbolic notation.

b) Describe a line using words.

c) Identify two line segments using symbolic notation.

- d) Describe a line segment using words.
- e) Identify two rays using symbolic notation.
- f) Describe a ray using words.

3. Use the picture below to answer the following questions.



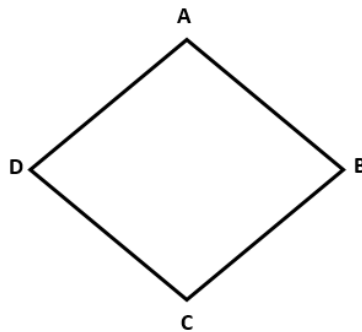
- a) Identify one angle in the figure below using symbolic notation.
- b) Describe an angle using words.

4. Complete the chart below. Use a ruler to draw your pictures.

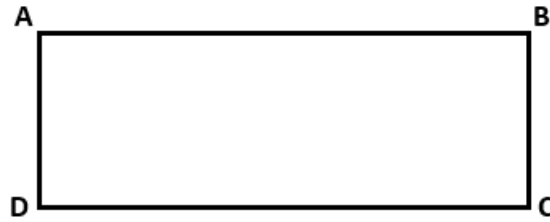
	Picture	Number of Endpoints	Number of Vertices
Line			
Line segment			
Ray			
Angle			

5. On each picture you drew in the chart above:
- Circle all the endpoints.
  - Label all the vertices with a "V."

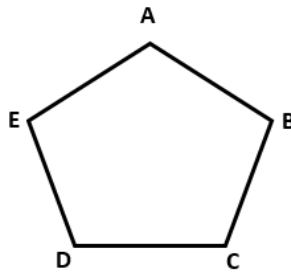
6. Look at the rhombus below. Which side is parallel to  $\overline{AD}$ ?



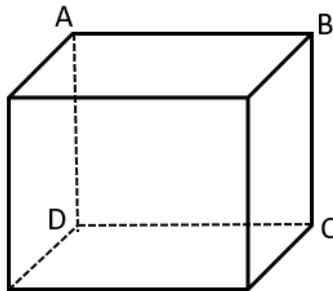
7. Look at the rectangle below. Identify a side of this rectangle that is perpendicular to  $\overline{BC}$ .



8. Look at the pentagon below. Name a side that intersects  $\overline{DE}$ .

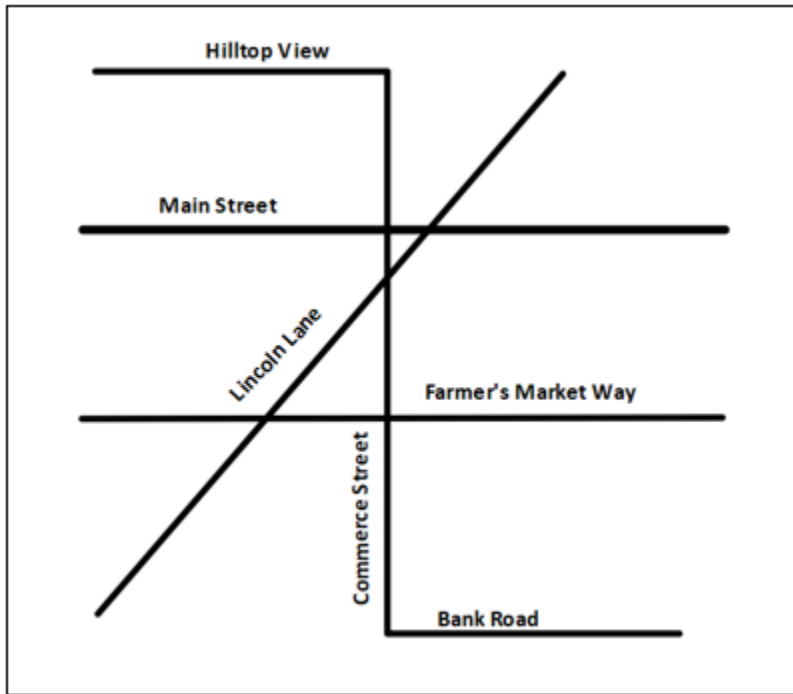


9. Look at the cube. Four vertices of the cube are labeled. Use the labeled vertices to answer the questions.



- Which edge is parallel to edge AB?
- Name an edge that is perpendicular to edge AB.
- Name an edge that intersects edge AB.

10. Use the map below to fill in the blank in each sentence that follows. There may be more than one correct answer.

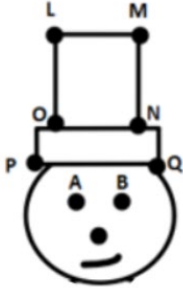


- a) Main Street appears parallel to \_\_\_\_\_.
- b) Lincoln Lane intersects \_\_\_\_\_.
- c) Commerce Street appears perpendicular to \_\_\_\_\_.

## 4.MG.4 Just in Time Quick Check Teacher Notes

### Common Errors/Misconceptions and their Possible Indications

1. Use the picture below to answer the following questions.



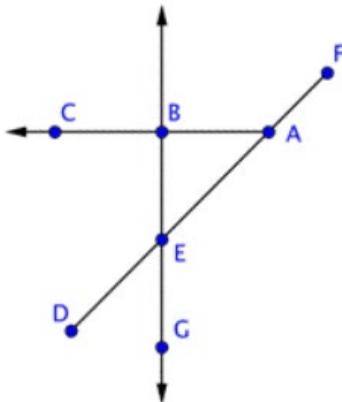
- a) Identify two points using symbolic notation.

*Some students may be able to identify a point but may have difficulty with the symbolic notation. Other students may have the misconception that only A and B can be points. Teachers may wish to reinforce the definition of a point (i.e., that it is an exact location in a plane and in space that has no length, width, or height). Students should understand that line segments, lines, etc. are made of a collection of points.*

- b) Describe a point using words.

*Some students may have difficulty articulating what a point is in their own words. Teachers may wish to reinforce the definition of a point (i.e., that it is an exact location in a plane and in space that has no length, width, or height). Students should understand that line segments, lines, etc. are made of a collection of points. It may be helpful to engage students in a discussion of the vocabulary terms and ask questions like, "How would you describe a point? What does a point make you think of?" Students may also benefit from contextual associations such as a map. For example, a Virginia map or a Google map image may help students think of a point and its representation in other contexts.*

2. Use the picture below to answer the following questions.



- a) Identify a line using symbolic notation.

*The concept of a line is abstract because it continues in either direction infinitely, and some students may struggle between differentiating between a line, a ray, and a line segment. This will be evident if students mistakenly identify a ray or a line segment as a line. Some students may be able to identify a line but may have difficulty with the symbolic notation. These students may identify line  $BG$ , but may try to name it with one point, three points (i.e.,  $\overleftrightarrow{BEG}$ ), or name it using the wrong symbolic notation (e.g.,  $\overline{BG}$ ,  $\overrightarrow{BG}$ ). Some students may not understand that line  $BG$  may also be named with any two points on the line, for example, line  $BE$  ( $\overleftrightarrow{BE}$ ) or line  $EG$  ( $\overleftrightarrow{EG}$ ). Students would benefit from discussions on the similarities and differences between lines, segments, and rays. They would also benefit from examples that are based on contexts. “Look around the room. Do you see a representation of a line, a ray, a line segment? Describe what you see and why it is a line/ray/line segment.”*

- b) Describe a line using words.

*Students may be able to identify a line given a representation but may have difficulty describing what a line is in their own words. When asking students to describe a line, it may be helpful to follow up with, “How do you know it is a line? What features make it a line and not a ray/line segment?” You can use the characteristics they describe to help formulate a written description of a line. It may also be beneficial to create anchor charts or have students create cards for each term (e.g., line, ray, line segment) to provide additional reinforcement of vocabulary.*

- c) Identify two line segments using symbolic notation.

*Some students may have difficulty conceptualizing that line segments are parts of a line because any straight line or line segment is often referred to as a “line” in everyday language. For example, students may think that the sides of polygons are composed of lines instead of line segments. This may lead to the misconception that  $\overline{FD}$  is the only line segment in the diagram, and students may struggle with naming an additional line segment. It is important for students to have exposure to different images containing lines, line segments, and rays. Teachers may wish to use specific terminology when identifying line segments, as well as emphasizing that, unlike lines, line segments have two distinct endpoints.*

- d) Describe a line segment using words.

*Students may be able to identify a line segment given a visual representation but may have difficulty providing a written description of a line segment. If students can identify a line segment, ask them how they know it is a line segment, and not another geometric figure. Have students discuss the characteristics of a line segment. Ask the question, “What makes it a line segment and not a line/ray?” Students may also benefit from thinking of items in their environments that would represent a line segment.*

- e) Identify two rays using symbolic notation.

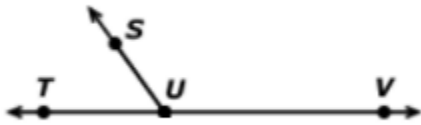
*Some students may not understand that a ray is part of a line. This may lead to the misconception that  $\overrightarrow{AC}$  is the only ray in the diagram, and students may struggle to name an*

additional ray. Some students may recognize that ray AC is a ray but may incorrectly name it  $\overrightarrow{CA}$ . These students will need a reminder that rays are named with the endpoint (starting point) listed first. Students would benefit from examples of rays represented in diagrams in various spatial orientations, including representations where the rays may not always appear as a single ray.

- f) Describe a ray using words.

Some students may have difficulty conceptualizing that a ray is part of a line and will not know how to provide a written description. Students may think that rays and lines are separate entities instead of making connections among them. Students may benefit from a class discussion on the definition of a ray, and from hearing how other students recognize a ray. Additionally, teachers may wish to use a comparison chart to show similarities and differences among lines/rays/line segments.

3. Use the picture below to answer the following questions.



- a) Identify one angle in the figure below using symbolic notation.

Some students may be able to recognize an angle but have difficulty naming the angle using symbolic notation. Since there are three ways to name an angle, some students may think they can name angle U. Have students discuss how angle U could cause confusion as to which angle students should be referencing. Using the vertex (U) as the starting point, have the students identify and name the sides of one angle. Once they can do this, have students verbally name and write the symbolic notation of the angle. It may be helpful to create an anchor chart or have students create vocabulary cards that demonstrate the three ways to name an angle.

- b) Describe an angle using words.

Some students may have difficulty identifying that an angle consists of two rays that share a common vertex. Teachers may wish to have students draw an angle and reflect on their drawing, and what components they used to create an angle. Teachers are encouraged to lead a class discussion on angles, identifying different angles in the students' environments. Students may express confusion as to whether angles always must have rays as their sides. They may wonder whether an angle could have segments as the sides. It may be helpful to provide different representations for students to identify angles and sides. Once students can conceptualize what an angle is, encourage them to write their own definition.

4. Complete the chart below. Use a ruler to draw your pictures.

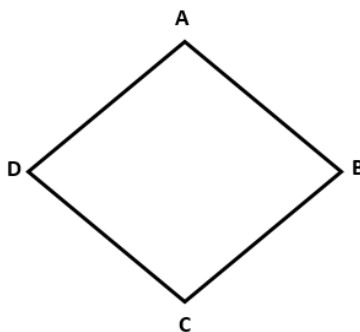
	Picture	Number of Endpoints	Number of Vertices
Line			
Line segment			
Ray			
Angle			

*Students who confuse these vocabulary terms may need additional opportunities to identify and describe the similarities among and differences between these attributes, in isolation as well as within other figures. Teachers are encouraged to provide and discuss examples of lines, line segments, rays, and angles (anchor charts or vocabulary cards can support this work), along with opportunities for students to draw representations using a ruler.*

5. On each picture you drew in the chart above:
- Circle all the endpoints.
  - Label all the vertices with a "V."

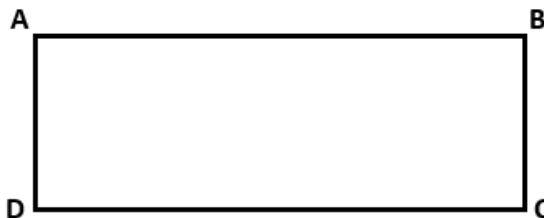
*Students may confuse endpoints and vertices. This error indicates that while students understand that each term describes a specific location on certain types of figures, they would benefit from additional experiences differentiating between vertices and endpoints.*

6. Look at the rhombus below. Which side is parallel to  $\overline{AD}$ ?



*Some students may have difficulty identifying parallel lines because the parallel lines in the given figure are not oriented horizontally or vertically. Teachers may wish to have students trace or color the parallel lines in plane figures and rotate them to different orientations. This will help students understand parallel lines may appear in figures in a different orientation.*

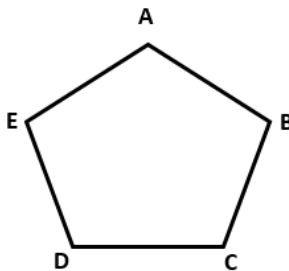
7. Look at the rectangle below. Identify a side of this rectangle that is perpendicular to  $\overline{BC}$ .



*Some students may have the misconception that  $\overline{AD}$  is perpendicular to  $\overline{BC}$ . This may indicate students are confusing “perpendicular” with “parallel.” Teachers may wish to use manipulatives such as Anglegs, etc. to create plane figures. Encourage students to discuss which line segments are parallel/perpendicular. Creating an anchor chart with examples of parallel, perpendicular, and intersecting lines in isolation, within polygons, or within a context will help students discern the difference between parallel and perpendicular.*

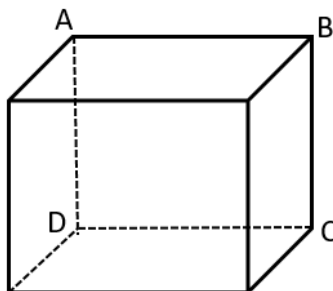
*Other students may have difficulty with this problem because perpendicular lines (or line segments) are defined as intersecting lines/line segments that must create 90-degree angles. Students may struggle with recognizing that lines/line segments may be intersecting lines as well as perpendicular if these lines/line segments form a 90-degree angle. Teachers may wish to have students identify perpendicular lines and line segments using real life objects to provide contextual examples. Providing opportunities for students to share and explain their examples will benefit all students. Encourage students to create perpendicular line segments with pictures or drawings in a vocabulary journal.*

8. Look at the pentagon below. Name a side that intersects  $\overline{DE}$ .



*Some students may not be able to identify an intersecting side. This may indicate they have the misconception that intersecting lines always extend beyond the point of intersection. Students would benefit from exposure to a variety of representations of intersecting lines and line segments, including those that comprise plane and solid figures. Teachers may wish to have students extend the sides of the plane/solid figures with a straightedge to show the line segments intersect.*

9. Look at the cube. Four vertices of the cube are labeled. Use the labeled vertices to answer the questions.

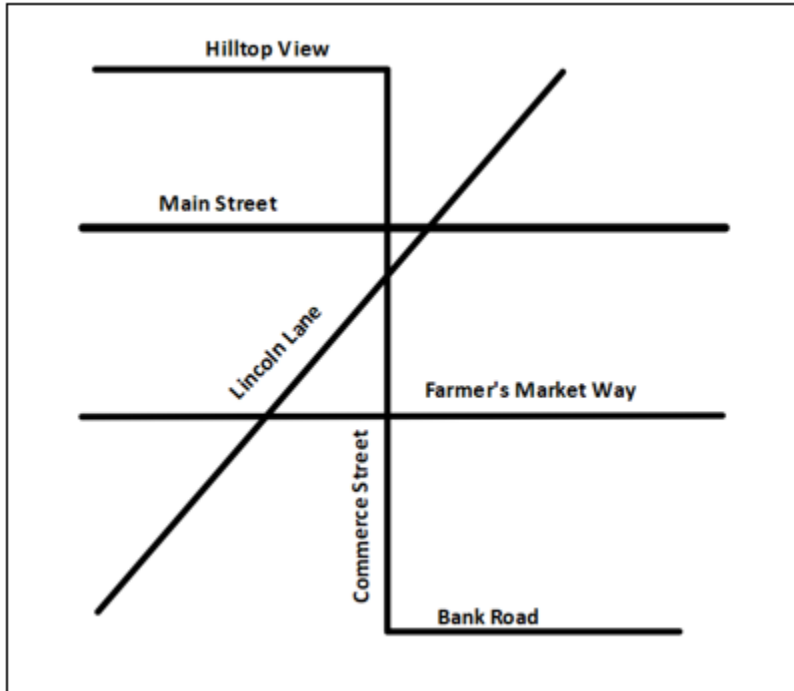


- Which edge is parallel to edge AB?
- Name an edge that is perpendicular to edge AB.
- Name an edge that intersects edge AB.

*Some students may have difficulty with this problem because they have not had experience recognizing parallel, perpendicular, and intersecting line segments in solid figures. Students may not understand that the edges of a solid figure can be parallel, perpendicular, or intersecting. They also may not understand that the vertices are points of intersection for intersecting line segments. Teachers may wish to use manipulatives of solid figures to have students 1) identify the plane figures that compose the solid figure, 2) identify the vertices, and 3) describe the types of line segments in the figures as intersecting/parallel/perpendicular. In addition, using a net for a solid figure may help some*

*students visualize how the edges of the solid create parallel/perpendicular/intersecting line segments.*

10. Use the map below to fill in the blank in each sentence that follows. There may be more than one correct answer.



a) Main Street appears parallel to \_\_\_\_\_.

b) Lincoln Lane intersects \_\_\_\_\_.

c) Commerce Street appears perpendicular to \_\_\_\_\_.

*Some students may be unable to apply their understanding of parallel, perpendicular, and intersecting lines to a map. Teachers may wish to use manipulatives to create a physical model of the map. Have students identify the intersecting/parallel/perpendicular lines from the model and participate in a class discussion on why they decided certain lines were intersecting/parallel/perpendicular. Once students can identify lines from a model, provide them with the map. Teachers may wish to have students mark/color/highlight the lines to provide a connection from the conceptual to the abstract. Students would benefit from exposure to a variety of representations of parallel, perpendicular, and intersecting lines, including in isolation, in plane and geometric figures, and in various contexts.*