6 COORDINATE GEOMETRY

GRADE SIX MATH: COORDINATE GEOMETRY
LONG RANGE PLANNING - CESD

Please note:

- These documents may be used to **support planning** for the Grade 6 math curriculum. En Francais
- Financial Literacy has been included here in order to share opportunities for **cross-curricular connections**.
- These documents **will be updated throughout the year,** aligning with the *suggested* Grade 6 Long Range Plan. En Francais
- All included resources are available **at no cost**, however some may require you to download from an outside source.
- Resources from the New Learn Alberta website will require you to login with your google email to access them.

Organizing Ideas:

In order to reduce the size of these documents, each of the Organizing Ideas have their own documents, which you can access below.

- **Grade 6 Math - NUMBER - Long Range Planning-CESD**
- **Grade 6 Math - ALGEBRA - Long Range Planning-CESD**
- **Grade 6 Math - GEOMETRY - Long Range Planning-CESD**
- **Grade 6 Math - COORDINATE GEOMETRY - Long Range Planning-CESD**
- **Grade 6 Math - MEASUREMENT - Long Range Planning-CESD**
- **Grade 6 Math - PATTERNS - Long Range Planning-CESD**
- **Grade 6 Math - STATISTICS - Long Range Planning-CESD**
- **Grade 6 Math - FINANCIAL LITERACY - Long Range Planning-CESD**

Learning Outcomes:

Moved to tab on left.

- 6CG1 Students explain location and movement in relation to position in the Cartesian plane. *Updated June 2, 2025 (Curriculum wording update)*

Vocabulary Legend:

Student language - Important to know — **NEW to Grade**
Student language — **NEW to Grade**
Tier 2 words* — Hyperlinked with example or definition — (Professional Language - for the teacher)

Resource Legend:

Teacher Lesson plan | A book in Learning Services or IMC | Video | Printable

ARPDC Resources

Geometry Scope and Sequence K-6
This resource provides the Scope and Sequence of outcomes for the Organizational Ideas Geometry and Coordinate Geometry for Alberta K-6 Mathematics.

Curriculum Planning and Assessment Resources

- Coordinate Geometry

Webinars

- Session 1: "This session provides teachers an opportunity to look at what could be focused on for the months of September and October 2023 in the new Math 6 program. In addition, this video will assist you in planning and instructional strategies as well as resource supports."
- Session 3: "In this session, we will look at a review of December plans and what we might focus on for January and February. The theme for this session is to make math and the strategies visible to the students to support their learning and thinking. Specifically, we move forward with 6N4 looking at strategies for multiplying and dividing and we will begin our work on reviewing the important "unit fraction" to prepare students for 6N5 and 6N6 that we will revisit in February for addition of fractions and work with equivalent fractions and decimals. This session also revisits the terminology surrounding algebraic expressions as well as revisiting 6G1.2 and 6CG1.2. Recorded December 6, 2023."
- Geoboards: Coordinate Grids and Cartesian Planes Video

Misc

- Grades 4-6 Resources to Support the Teaching and Learning of Math Verbs

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REMEMBER

Rote memorization focuses on memorizing facts in isolation. This often leads to the belief that math is about memorization and seldom leads to long term retention.

Fluency with facts is developed when students are provided with many opportunities to

- work with facts in a variety of situations, using a variety of models and manipulatives
- connect unknown facts to known facts
- explore patterns within the facts

Other

Important note about LearnAlberta Resources
In order to access LearnAlberta resources, *you must be logged into your LearnAlberta account and have added your teacher certificate number.* If you have not logged in or you have not added your teacher certificate number, you will end up with a "Page not found" error when clicking on one of the links.

Other:
Math Tasks/Manipulatives/Resources

General Manipulatives

Relational Rods

- Relational Rods
  - Slide 1: Each of these 4 images show the number of relational rods in one bag.
  - Slide 2: Images of the relational rods that can be printed or used when making slideshows or handouts.
- Polypad (make a teacher account and make a copy!)
  - This is a simple interactive page that displays each relational rod that is infinitely cloned.

Assessment

Students need opportunities to demonstrate conceptual understanding in a variety of ways, both in formative and summative situations. High quality assessment practices provide opportunities for this when data is triangulated through observations, conversations and product.

Two book series that focus on identifying and analyzing student misconceptions are:

- "Uncovering Student Thinking About Mathematics" Cheryl Rose Tobey et al.
  - In the Common Core Grades 3-6: Alberta Grades 3-6 alignment guide
  - Grades K-8: Alberta K-6 alignment guide
- "Mine the Gap for Mathematical Understanding" by John SanGiovanni et al.
  - Grades 3-5: Alberta Grades 3-6 alignment guide
  - Grades 6-8: Alberta Grades 4-6 alignment guide

6CG1 explain loc and move in Cartesian plane

GRADE SIX MATH: 6CG1
LONG RANGE PLANNING - CESD

Coordinate Geometry (CG)
Location and movement of objects in space can be communicated using a coordinate grid.

6CG1 Students explain location and movement in relation to position in the Cartesian plane.

UNDERSTANDINGS	KNOWLEDGE	SKILLS & PROCEDURES
1. Location can describe the position of shapes in space. 2. Location can be described precisely using a coordinate grid.	1. The Cartesian plane is named after French mathematician René Descartes. 2. The Cartesian plane uses coordinates, (x, y), to indicate the location of the point where the vertical line passing through (x, 0) and the horizontal line passing through (0, y) intersect. 3. The x-axis consists of those points whose y-coordinate is zero, and the y-axis consists of those points whose x-coordinate is zero. 4. The x-axis and the y-axis intersect at the origin, (0, 0). 5. An ordered pair is represented symbolically as (x, y). 6. An ordered pair indicates the horizontal distance from the y-axis with the x-coordinate and the vertical distance from the x-axis with the y-coordinate.	1. Relate the axes of the Cartesian plane to intersecting horizontal and vertical representations of the number line. 2. Locate a point in the Cartesian plane given the coordinates of the point. 3. Describe the location of a point in the Cartesian plane using coordinates. 4. Model a polygon in the Cartesian plane using coordinates to indicate the vertices. 5. Describe the location of the vertices of a polygon in the Cartesian plane using coordinates.
UNDERSTANDINGS	**KNOWLEDGE**	**SKILLS & PROCEDURES**
1. Location can change as a result of movement in space. 2. Change in location does not imply change in orientation.	1. A translation describes a combination of horizontal and vertical movements as a single movement. 2. A reflection describes movement across a line of reflection. 3. A rotation describes an amount of movement around a centre of rotation along a circular path in either a clockwise or counter-clockwise direction.	1. Create an image of a polygon in the Cartesian plane by translating the polygon. 2. Describe the horizontal and vertical components of a given translation. 3. Create an image of a polygon in the Cartesian plane by reflecting the polygon over the *x*-axis or *y*-axis. 4. Describe the line of reflection of a given reflection, limited to reflection over the x-axis or y-axis. 5. Create an image of a polygon in the Cartesian plane by rotating the polygon 90°, 180°, or 270° about one of its vertices, clockwise or counter-clockwise. 6. Describe the angle and direction of a given rotation, limited to 90º, 180º, or 270º about a vertex. 7. Relate the coordinates of a polygon and its image after translation, reflection, or rotation in the Cartesian plane.

SPECIAL CARE AND ATTENTION

Curriculum Update
6CG1.2.K3 was changed from “A rotation describes an amount of movement around a turn centre along a circular path in either a clockwise or counter-clockwise direction.” to “A rotation describes an amount of movement around a centre of rotation along a circular path in either a clockwise or counter-clockwise direction.”

Curriculum Update
6CG1.2.SP4 was changed from “Describe the line of reflection of a given reflection.” to “Describe the line of reflection of a given reflection, limited to reflection over the x-axis or y-axis.”

Curriculum Update
6CG1.2.SP6 was changed from “Describe the angle and direction of a given rotation” to “Describe the angle and direction of a given rotation, limited to 90º, 180º, or 270º about a vertex.”

Clarification
- From Alberta Education, November 7, 2024: “students are working with rotating shapes, limited to the vertex of a shape, and

describing the rotation as 90°, 180°, or 270° clockwise or counter-clockwise. Exposing students to various centers of rotation, such as the origin, continues to support their ability to describe the angle and direction of rotation. This approach can also deepen their understanding of how location changes due to movement. However, assessment should be limited to rotations around a vertex."

- From Alberta Education, January 31, 2025: "students are limited to rotations of a polygon about one of its vertices, and therefore, assessment for the new K-6 Mathematics curriculum is limited to rotations around a vertex."

VOCABULARY

Angle	Describe	Location	Relate / Relation	**Translate / translation**
Cartesian plane	Direction	**Movement**	Represent	**Vertical distance**
Clockwise	Explain	Ordered pairs	Rotate	Vertical line
Counter-clockwise	Horizontal distance	**Origin**	Shapes	Vertices
Create	Image	Polygon	Space	**X-axis**
Coordinate grid	**Indicate**	Position	Symbolically	**Y-axis**
Coordinates	**Line of reflection**	Reflect		

ASSESSMENTS

Formative Assessment

- "Transformations, Similarity, and Congruence" *Mine the Gap For Mathematical Understanding: Grades 6-8* pg. 306

Summative Assessment

- 6CG Assessment Questions

INSTRUCTION

High Leverage Instructional Strategies / Practices

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Learning Experiences

Warmups

- CG1 Math WarmUps/Talks (Red Deer Public) CG1 Math WarmUps/Talks (FRENCH VERSION)

Learning

- CoreKnowledge Math Units: (This is an amazing in-depth free resource.)
  - Expressions and Equations
    - Focus:
      - Equations in One Variable (Grade 5, Contains grade 6 operations)
      - Equal and equivalent (5A1, Contains grade 6 operations)
      - Expressions with Exponents (6A1)
      - Relationships between Quantities (6A1, 6CG1)
      - Let's Put it to Work (6A1)
  - If you download the entire unit, you will find
    - Teacher Guide: lesson plans, student tasks, family support materials, assessments, cool downs, and instructional masters.
    - Student Book: Student Tasks
    - Other: PowerPoints

Gizmos on LearnAlberta

- City Tour (Coordinates) Students write ordered pairs and find them on a grid.
  - Teacher version with answer key
- Points in the Coordinate Plane Students identify ordered pairs by considering the x-axis and y-axis.
  - Teacher version with answer key
- Rock Art (Transformations) Students recognize and describe transformations - on a cartesian plane.
  - Teacher version with answer key
- Rotations, Reflections and Translations Students learn about rotations, reflections, and translations in a coordinate plane.
  - Teacher version with answer key
- Translations Students explore translations on a coordinate plane.
  - Teacher version with answer key

GRADE SIX MATH: 6CG1
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Math Tasks (Collated by CBE)

- Position In the Cartesian Plane
  - When Lightning Flashes, is it Raining? This task will support the importance of plotting the location of a point in the Cartesian plane using coordinates.
  - Coordinate Cunning Like Connect 4, students play in partners trying to get four points in a row.
  - Finding Treasure An activity that explores the relationship of order pairs and the horizontal and vertical nature of the Cartesian plane.
  - Battleship This game is played just like the old Milton-Bradley game Battleship. Yet here we'll be playing within the context of the Cartesian Plane.
  - The (Awesome) Coordinate Plane Activity In this activity, students will encounter a series of challenges, each asking them to graph a point Cartesian Plane.
- Transformations
  - A Cartesian Puzzle This task will support understanding in location of the vertices of a polygon in the Cartesian plane using coordinates.
  - Mirror Mirror This task represents an initial task for exploring the idea of reflection across an axis and the impact a reflection has on the appearance of a polygon.
  - Transformation Tease This activity explores the location and movement of the vertices of a polygon in the Cartesian plane using coordinates.
  - Transformations In this Open Middle task your learners will be challenged to locate points on the Cartesian plane given the coordinates of the point and translate given points.

Review

- https://studyjams.scholastic.com/studyjams/jams/math/algebra/ordered-pairs.htm How to plot ordered pairs (coordinates)
- https://www.learnalberta.ca/content/mesg/html/math6web/index.html?page=lessons&lesson=m6lessonshell18.swf Ordered pairs (coordinates)
- https://www.learnalberta.ca/content/mesg/html/math6web/index.html?page=lessons&lesson=m6lessonshell17.swf Flips (reflections) and slides (translations)

Games

- battlegraph

Opportunities to Connect Outcomes:

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Resources
Printables
Printables

- Mathsbot.com
  - Coordinate grids

INDIGENOUS RESOURCES

From ARPDC

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PROFESSIONAL LEARNING

If you'd like to learn more about why we name the four quadrants in the order we do, you can read James Tanton's explanation.

Podcast:

- Pamela Harris
  - Graphing, Integers, Quadrants, Oh My!