



Algebra 2 UNIT PLANNER



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| Unit title | Polynomial Functions (DOE Unit 3) | Unit duration | 3 weeks |
| Essential Questions (OR GUIDING QUESTIONS?) | | | |
| <ul style="list-style-type: none">• What is the Remainder Theorem and what does it tell us?• What is the Rational Root Theorem and what does it tell us?• What is the Fundamental Theorem Algebra and what does it tell us?• How can we solve polynomial equations?• Which sets of numbers can be solutions to polynomial equations?• What is the relationship between zeros and factors?• What characteristics of polynomial functions can be seen on their graphs?• How can we solve a system of a linear equation with a polynomial equation? | | | |
| Assessments | | | |
| Quiz on shape of polynomial functions, even and odd Unit assessment | | | |
| Content Standards | | | |
| <p><u>Use complex numbers in polynomial identities and equations.</u> MGSE9-12.N.CN.9 Use the Fundamental Theorem of Algebra to find all roots of a polynomial equation.</p> <p><u>Interpret the structure of expressions</u> MGSE9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context. MGSE9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients, in context. MGSE9-12.A.SSE.1b Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors. MGSE9-12.A.SSE.2 Use the structure of an expression to rewrite it in different equivalent forms. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</p> <p><u>Understand the relationship between zeros and factors of polynomials</u> MGSE9-12.A.APR.2 Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$. MGSE9-12.A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.</p> | | | |

Interpret functions that arise in applications in terms of the context

MGSE9-12.F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. (*Limit to polynomial functions.*)

Analyze functions using different representations

MGSE9-12.F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. (*Limit to polynomial functions.*)

MGSE9-12.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

Learning Activities and Experiences

| Topic | Resource | Content Covered | Standards Addressed | |
|---|--|--|--|--|
| Characteristics of / Graphing Polynomials | 3-1 Graphing Polynomial Functions Pearson enVision pg. 131 – 138 | <ul style="list-style-type: none"> Graph polynomial functions and show key features of the graph. Predict the end behaviour of polynomial functions by interpreting the leading coefficients and degrees. Sketch graphs showing key features, given a verbal description. | MGSE9-12.A.SSE.1 MGSE9-12.A.SSE.1a MGSE9-12.A.SSE.1b MGSE9-12.F.IF.4 MGSE9-12.F.IF.7 MGSE9-12.F.IF.7c | |
| | 3-7 Transformations of Polynomial Functions Pearson enVision pg. 179 – 186 | <ul style="list-style-type: none"> Recognize even and odd functions from their graphs and algebraic equations. Identify the effect on the graphs of cubic and quartic functions of replacing $f(x)$, with $f(x) + k$, $kf(x)$, and $f(x + k)$. | MGSE9-12.F.IF.4 MGSE9-12.F.IF.7 MGSE9-12.F.IF.7c | |
| | Additional Resources: <ul style="list-style-type: none"> DOE Framework Tasks: <ul style="list-style-type: none"> Polynomial Patterns Polynomial Potpourri Representing Polynomials | | | |
| | 3-5 Zeros of Polynomial Functions Pearson enVision pg. 162 – 169 | <ul style="list-style-type: none"> Identify the zeros of a function by factoring or using synthetic division. Use the zeros of a polynomial function to sketch its graph. | MGSE9-12.N.CN.9 MGSE9-12.A.APR.2 MGSE9-12.A.APR.3 MGSE9-12.F.IF.7c | |
| | 3-Act Task What are the Rules Pearson enVision pg. 170 | | | |
| | 3-6 Theorems about Roots of Polynomial Equations Pearson enVision pg. 171 – 178 | <ul style="list-style-type: none"> Extend polynomial theorems and identities to find the real and complex solutions of polynomial equations. Write polynomial functions using conjugates. | MGSE9-12.N.CN.9 MGSE9-12.A.APR.2 MGSE9-12.F.IF.7c MGSE9-12.A.SSE.2 | |

Additional Resources:

- DOE Framework Tasks
 - Factors, Zeros, and Roots Oh My!
 - Polynomial Project Culminating Task

Personalized Learning and Differentiation

Teachers differentiate by providing examples (work samples or task-specific clarifications of assessment criteria); structuring support (advance organizers, flexible grouping, peer relationships); establishing flexible deadlines, and adjusting the pace.

- SWD/504- Accommodations provided
- ELL- Five Principle ELL Curriculum Framework and Vocabulary Supports
- Intervention Support- Re-teaching Activities in Small Groups with Progress Monitoring
- Extensions- Enrichment Tasks and Projects

Resources

DOE Framework Tasks
Pearson enVision and Pearson Realize Online Resources
Algebra 2 Schoology PLC Resources

Curriculum Unit Approval Statement

Every team member is expected to read and review the unit planner and contents contained in the unit planner.

This unit meets the rigorous review and approval process of Marietta City Schools. All components of the unit have been reviewed and approved including learning experiences, materials, resources, texts, and assessments. This unit's components:

- Are aligned to Georgia Standards of Excellence and MYP/DP subject area guide (if applicable)
- Are aligned to the pacing of the approved Subject Group Overview
- Provide resources that are appropriate for students' grade level, subject/course level, etc.
- Provide learning experiences that prepare students for course assessments

PLCs review each learning experience using three criteria and collaborate to provide explicit and specific information.

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| <p>Criteria I: Standards Alignment:</p> <p><i>Learning experiences should provide alignment to the standards and the MYP subject area guide (if applicable).</i></p> | <p>Criteria II: Materials, Resources, and Text Complexity and Controversial Topics and Issues:</p> <p><i>Materials, resources, and texts are grade level and content appropriate.</i></p> | <p>Criteria III: Assessment Alignment:</p> <p><i>Since assessment drives instruction, learning experiences must align to and prepare students for regular common formative and summative assessments used to determine whether students are mastering standards-based content and ATL skills.</i></p> |
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Common Formative and Summative Assessments

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| <p>Assessment Title</p> | <p>Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources</u> to:</p> <ol style="list-style-type: none"> 1. State Standards 2. MYP/DP (if applicable) components 3. Aligned to learning experiences <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.</p> | <p>Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding</p> <ol style="list-style-type: none"> 1. Complexity of resources including text and vocabulary 2. Controversial topics and issues in learning experiences, materials or resources <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video).</p> |
| <p>Formative Assessment(s):</p> | <p>Quiz</p> | |
| <p>Summative(s) Assessment:</p> | <p>Midterm (Fall 22')</p> | |
| <p>Plan to address issues or concerns noted:</p> | | |

Learning Experiences

Add additional rows below as needed.

| Learning Experience Title | Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources</u> to: 1. State Standards 2. MYP/DP (if applicable) components Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. | Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding 1. Complexity of resources including text and vocabulary 2. Controversial topics and issues in learning experiences, materials or resources Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video). | Criteria III: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding 1. Common Assessment alignment to instruction and/or standards Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. |
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| LE 1: | | | |
| LE 2: | | | |
| LE 3: | | | |
| Plan to address issues or concerns noted: | | | |

Resources listed on unit planner

Add additional rows below as needed.

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| <p>Resources</p> | <p>Criteria I: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding the <u>alignment of learning experiences, materials, and resources</u> to:</p> <ol style="list-style-type: none"> State Standards MYP/DP (if applicable) components <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.</p> | <p>Criteria II: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding</p> <ol style="list-style-type: none"> Complexity of resources including text and vocabulary Controversial topics and issues in learning experiences, materials or resources <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution. Include the specific quote(s) and reference page numbers or location (ex: time in video).</p> | <p>Criteria III: Does the PLC have any <u>concerns</u> or <u>issues</u> regarding</p> <ol style="list-style-type: none"> Common Assessment alignment to instruction and/or standards <p>Respond below with a N/A if you have no concerns or provide explicit comments related to concerns including method of resolution.</p> |
| <p>Resource:</p> | | | |
| <p>Plan to address issues or concerns noted:</p> | | | |

By typing my name below I am acknowledging that I have fully read, reviewed, listed concerns with resolutions, and approved of all contents included in the unit planner including learning experiences, materials, resources, texts, and assessments referenced on it. All other content and materials not included on the unit planner are the local school's responsibility (BOE IKB).

Curriculum Team Signatures: