



WEST SHORE SCHOOL DISTRICT
AP Calculus BC Learning Module 2

Title of Module	Limits	Grade Level	11-12
Curriculum Area	Mathematics	Time Frame	10 days

Desired Results

Best Practices

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

Transfer Goals

Students will be able to independently use their learning to...

- Connect old problem solving techniques to curriculum.
- Connect material to real world applications.
- Create viable mathematical arguments and use them to critique the arguments of fellow classmates.

Key Learnings/Big Ideas

Students will review fundamental terms and concepts from the courses prior to calculus.

Content and Reading and Writing Standards

Content standards

CC.2.2.HS.C.2

Graph and analyze functions and use their properties to make connections between the different representations.

CC.2.2.HS.D.1

Interpret the structure of expressions to represent a quantity in terms of its context.

CC.2.2.HS.C.1

Use the concept and notation of functions to interpret and apply them in terms of their context.

Essential Questions	Vocabulary (Best Practices) Utilize concepts & competencies to add to vocabulary
<p>Unit EQ: What is the relationship between a function's values, limits, and continuities?</p> <p>LEQ: 1. How can a Grapher's suggested limit of a function be invalid? 2. What can you learn from a function's end behavior model? 3. How do you remove the discontinuities of a function? 4. How can limits be used to identify the vertex of a parabola?</p>	<ul style="list-style-type: none"> • Average and Instantaneous Speed • Definition and Properties of Limits • One-sided and Two-sided Limits • Sandwich Theorem • Finite Limits • Infinite Limits • Sandwich Theorem • End Behavior Models • Continuity at a Point • Continuous Functions • Algebraic Combinations • Composites • Intermediate Value Theorem • Average Rates of Change • Tangent to a Curve • Slope of a Curve • Normal to a Curve
Concepts Students will know...	Skills/Competencies (I Can...) Based on LEQs Students will be able to...
<ol style="list-style-type: none"> 1. Calculate average and instantaneous speed 2. Define and calculate limits for functions values 3. Apply the properties of limits 4. Use the Sandwich Theorem 5. Find and verify end behavior models of functions 6. Calculate limits as x approaches \pm infinity 7. Identify horizontal and vertical asymptotes 8. Identify intervals over which a function is continuous 9. Remove, as possible, a functions discontinuities 10. Apply the Intermediate Value Theorem 11. Find equations of the tangent line and normal line to a curve 12. Find the average rage of change of a function 	<ol style="list-style-type: none"> 1. I can calculate average and instantaneous speed. 2. I can define and calculate limits for function values. 3. I can apply properties of limits. 4. I can use the Sandwich Theorem. 5. I can find and verify end behavior models of functions. 6. I can calculate limits as x approaches \pm infinity. 7. I can identify horizontal and vertical asymptotes. 8. I can identify intervals over which a function is continuous. 9. I can remove, as possible, a functions discontinuities. 10. I can apply the Intermediate Value Theorem 11. I can find equations of the tangent line and normal line to a curve 12. I can find the average rate of change of a function

Assessment Evidence

Formative Assessment

Questioning, Think Pair Share, Graphic Organizers, Visual Representations.

Summative Assessment

Common Assessments

Best Instructional Practices

- [Activating Strategies](#)
- [Extended Thinking](#)
- [Summarizing](#)
- [Vocabulary in Context](#)
- [Advance Organizers](#)
- [Non-verbal Representation](#)
- [Integration of Webb's Depth](#)
- [Integration of 21st Century Skills](#)
- [Reading and writing across disciplines](#)
- [Rigor and Relevance](#)

Resources

Student	Teacher
Finney, Demana, Watts, Kennedy. Caclulus (4 th Edition)	Finney, Demana, Watts, Kennedy. Caclulus (4 th Edition)

Adapted from Wiggins, Grant and J. Mc Tighe. (1998). *Understanding by Design*, Association for Supervision and Curriculum Development, ISBN # 0-87120-313-8 (ppk)