

Unit 5: Representing Vectors

Lesson Outline

<u>Big Picture</u>			
Students will: <ul style="list-style-type: none"> introduce vectors in two-space and three-space; represent vectors geometrically and algebraically; determine vector operations and properties; solve problems involving vectors, including those arising from real-world applications. 			
Day	Lesson Title	Math Learning Goals	Expectations
1	Calculus and Vector Connections <i>(lesson not included)</i>	<ul style="list-style-type: none"> Explore connections between calculus and vectors. 	C1.1
2	Vectors in Two-Space <i>(lesson not included)</i>	<ul style="list-style-type: none"> Represent vectors geometrically and algebraically in two-space. Develop an understanding of equivalent vectors. Use geometric vectors to interpret information arising from real-world applications (Use applets described in Appendix A.). 	C1.1, 1.2
3	Going from Geometric to Algebraic <i>(lesson not included)</i>	<ul style="list-style-type: none"> Determine methods for changing from geometric (directed-line segment) to algebraic (Cartesian) forms of a vector in two-space and vice versa. 	C1.3
4	Vector Operations <i>(lesson not included)</i>	<ul style="list-style-type: none"> Add, subtract, and multiply vectors by a scalar in two-space, both geometrically and algebraically. Solve problems including problems arising from real-world applications involving vector operations in two-space. 	C2.1, 2.3
5	Dot Products in Two-Space <i>(lesson not included)</i>	<ul style="list-style-type: none"> Determine the dot product of vectors in two-space geometrically and algebraically. Describe applications in two-space of the dot-product including projections. 	C2.4
6	Jazz Day	(Use applets described in Appendix A.)	
7	Summative Assessment		
8	Vectors in Three-Space <i>(lesson not included)</i>	<ul style="list-style-type: none"> Represent both points and vectors algebraically in three-space. Determine the distance between points and the magnitude of vectors in three-space both geometrically and algebraically. Solve problems including problems arising from real-world applications involving vector operations in three-space. 	C1.4, 2.1, 2.3
9	Investigating Properties of Operations <i>(lesson not included)</i>	<ul style="list-style-type: none"> Investigate, with and without technology, the commutative, associative and distributive properties of the operations of addition, subtraction, and multiplication by a scalar in two and three-space (Use Vector Laws applet described in Appendix A.). 	C2.2

Day	Lesson Title	Math Learning Goals	Expectations
10	Dot Products in Three-Space <i>(lesson not included)</i>	<ul style="list-style-type: none"> Determine the dot product of vectors in three-space geometrically and algebraically. Describe applications in three-space of the dot-product including projections. 	C2.4
11	Investigating Properties of Dot Products <i>(lesson not included)</i>	<ul style="list-style-type: none"> Determine through investigation the properties of dot product in two-and three-space. 	C2.5
12	Three-Space Cross Products <i>(lesson not included)</i>	<ul style="list-style-type: none"> Determine the cross product of vectors in three-space algebraically including magnitude and describe applications. 	C2.6
13	Properties of Cross Products <i>(lesson not included)</i>	<ul style="list-style-type: none"> Through investigation, determine properties of the cross product of vectors. 	C2.7
14	Applications of Vector Operation <i>(lesson not included)</i>	<ul style="list-style-type: none"> Solve problems arising from real-world applications that involve the use of dot products, cross products, including projections. 	C2.8
15	Jazz Day		
16	Summative Assessment		