Guided Lesson Notes

Name:_____ **Date:**_____

Two-Dimensional Vector Addition

Directions: Complete this study guide as you move through the lesson. By taking notes, you are more likely to remember what you are learning. The completed study guide can be used for practice activities and to prepare for quizzes and exams. Be sure to save each study guide so you can access it when you need it.

Essential Vocabulary

As you encounter these scientific terms in the lesson, enter the meaning and an example (or two) for each. You can even draw a picture. If there are other unfamiliar words you find, enter them in the blank spaces provided.

vector	*resultant*
components	*sine*
cosine	*tangent*

Pythagorean theorem	non-perpendicular vectors

Introduction

1. **How can the Pythagorean theorem help you determine the length of one of the sides of the Great Pyramid of Giza?**

2. **Which two trigonometric ratios are used to find vertical and horizontal components of resultant vectors?**

Finding Component Vectors

Which trigonometric ratio is used to find the x-component of a vector? The y-component of a vector?

x-component	y-component

Practice Finding Component Vectors

1. **Choose one of the examples from the lesson and record: a) the problem, b) the picture, c) the given/find, d) the equation, and e) the solution.**

a)	
b)	
c)	

d)	
e)	

2. Why do these examples all use angles from 0º to 360º?

Adding Non-Perpendicular Vectors

Fill in the blanks below about adding non-perpendicular vectors.

To find the _____ vector looks difficult, but it can be _____ by finding the _____ and vertical _____ of each _____ and then adding the _____ vectors.

Find the x and y _____ of each vector using the _____ you are familiar with.

Now, that leaves a familiar _____ perpendicular _____ problem. First, find the _____ in the _____ and _____ directions.

Next, use the _____ _____ and the _____ _____ to find the resultant _____ of the airplane.

Adding Two-Dimensional Vectors

1. **Draw each given vector for the helicopter problem. Then show the two components of each displacement vector. Finally, calculate the total displacement vector, including magnitude and direction.**

Task	Work	Drawing
Draw and label the two displacement vectors.		
Calculate and add the horizontal and vertical components of each vector.		

Add the components in each dimension.		
Use the Pythagorean theorem to find the magnitude of the resultant displacement vector.		
Use inverse tangent to find the angle (direction) of the resultant displacement vector.		

2. Write the resultant displacement vector using proper notation.

3. What is involved if you need to add more than two two-dimensional vectors?

Adding Two-Dimensional Vector Practice

Choose one of

a. The Dog

b. The Walker

c. The Golfer

and answer the question posed. Draw and label a picture, find the horizontal and vertical components, then combine the results to show how the two vectors add together to produce the resultant vector.

Use the P.I.R.A.T.E. method to write out and solve this challenge problem.

Picture:	
Identify information:	
Write equations:	
Algebra:	
Think: give the answer—does it make sense?	

Explain your final answer:	