

## Ski Indoors!

Skiing is a popular sport in the north, but avid skiers in Florida are constrained by the fact that the climate is too warm to create the snowy slopes that are needed! Indoor ski slopes are gaining in popularity as they allow for the control of many of these constraints and could provide year-round fun in any location. Still, the most interesting indoor ski slopes are probably yet to be designed. Try your hand at it!

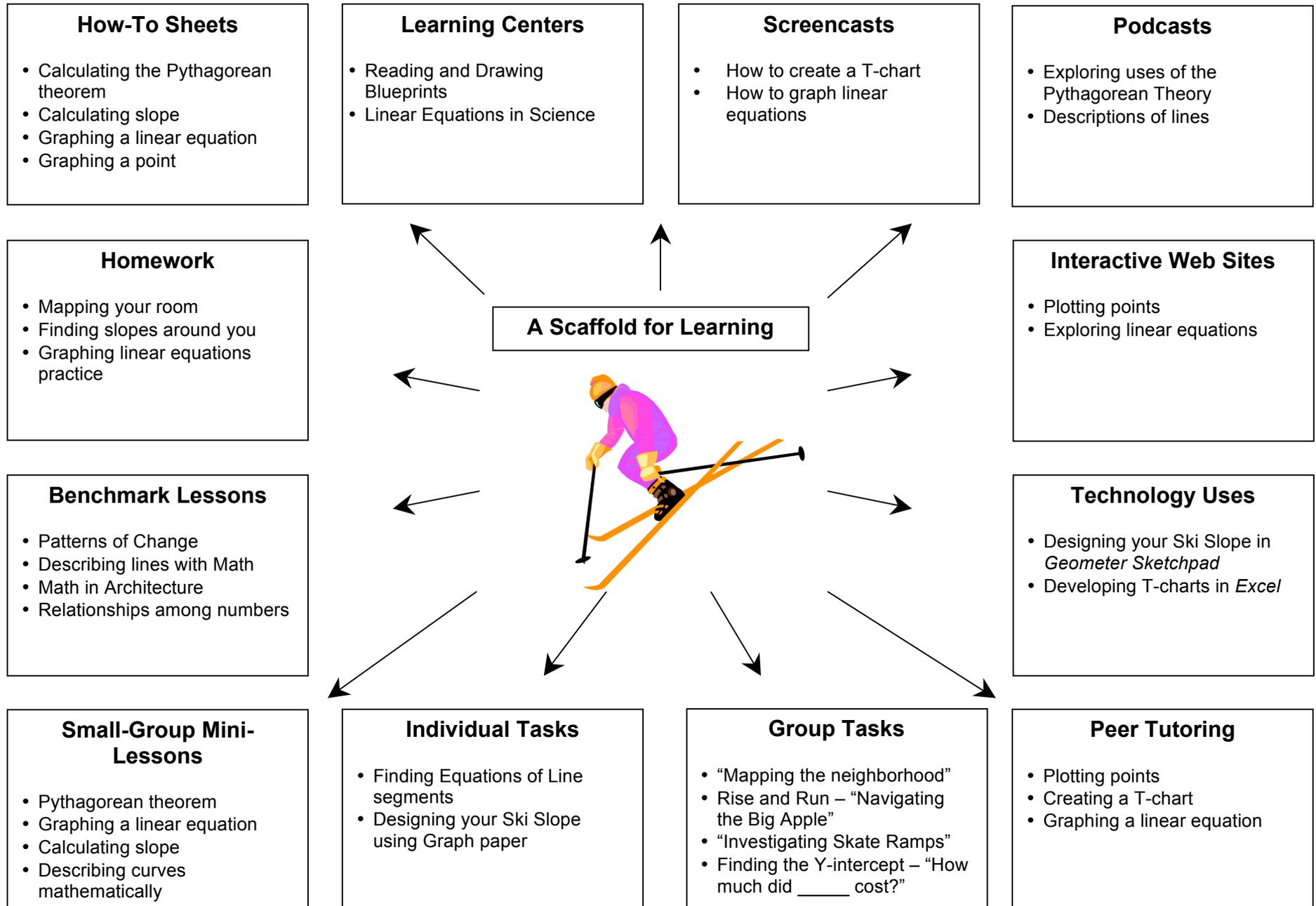


You are going to explore various existing indoor ski slopes and then develop a plan for an indoor ski center of your own. You'll need a healthy background knowledge of coordinate planes, slopes, lines, and graphing linear equations (those equations that produce straight lines.) Your task is to graph the mathematical slope of various existing indoor ski slopes and design three unique ski slopes for varying abilities. Your ski slopes should be drawn carefully on graph paper and include the linear equations for the straight segments.

## Ski Indoors! - Rubric

	<b>Novice</b>	<b>Apprentice</b>	<b>Practitioner</b>	<b>Expert</b>
<b>Existing ski slope exploration</b>	<ul style="list-style-type: none"> <li>graphs at least 2 existing indoor ski slopes</li> <li>describes, by showing the slope of each section, at least 2 existing indoor ski slopes</li> </ul>	<ul style="list-style-type: none"> <li>graphs at least 5 existing indoor ski slopes</li> <li>describes, by showing the slope of each section, at least 5 existing indoor ski slopes</li> </ul>	<ul style="list-style-type: none"> <li>graphs at least 5 existing indoor ski slopes, citing with links the measurements from research</li> <li>describes, using a series of linear equations, at least 5 existing indoor ski slopes</li> <li>graphs partner's data using Google sheet to check for accuracy of slopes</li> </ul>	all of <i>Practitioner</i> plus compares and contrasts the 5 slopes using quantified slope, and discusses change in slope between sections
<b>Unique ski slope design</b>	designs at least 1 ski slope, each with at least 3 straight segments	designs at least 1 ski slope, each with: <ul style="list-style-type: none"> <li>at least 3 straight segments of varying slopes</li> <li>proportions similar to existing slopes</li> </ul>	designs 3 different ski slopes, each with: <ul style="list-style-type: none"> <li>at least 3 straight segments</li> <li>proportions similar to existing ski slopes</li> <li>slopes of straight segments include slopes of <math>&gt;2</math> and <math>&lt;1</math></li> </ul>	designs 3 different realistic ski slopes with a combined total of at least 20 straight segments of varying slopes
<b>Mathematical description</b>	describes each straight segment including <ul style="list-style-type: none"> <li>linear equation</li> <li>slope</li> </ul>	describes each straight segment including <ul style="list-style-type: none"> <li>linear equation</li> <li>slope</li> <li>y-intercept</li> <li>coordinates for 1 point on the segment</li> </ul>	describes each straight segment using commenting within a doc, including <ul style="list-style-type: none"> <li>linear equation</li> <li>slope</li> <li>y-intercept</li> <li>coordinates for 3 points on the segment</li> <li>captures verbal mathematical descriptions of digital graphs using a screencasting tool</li> </ul>	all of <i>Practitioner</i> plus uses non-linear equations to describe the curved segments
<b>Vocabulary</b>	in descriptions appropriately uses terms: line, rise, and run	in descriptions appropriately uses terms: line, rise, run, slope, and, points	in descriptions appropriately uses terms: line, rise, run, slope, linear equation, points, and y-intercept	all of <i>Practitioner</i> plus uses additional related terms e.g. tangent and derivative

## Ski Indoors! - Scaffold for Learning





## Ski Indoors! - Slope Exploration Sheet



Use the following directions to explore five different world indoor ski slopes.

1. Out of class assignment: Gather information on five indoor ski slopes that will allow you to graph the mathematical slope of the ski slope. You will need at least two of the three necessary pieces of information: length of the slope; distance of the drop from the top of the hill to the bottom; length of indoor space needed to accommodate the slope and drop. (If you have two, you can determine the third number! You'll find out how later on.)

Conduct an Internet search using the keyword phrase "indoor ski slope" to find appropriate websites

2. For each slope, write down a descriptive sentence describing the ski slope, such as: "The Skidome Nicky Broos ski facility in Ruchpen, the Netherlands features a run that is 160 meters long with a 25 meter drop."
3. Graph the overall slope from the highest point to the lowest (realizing that no slope is a straight line). Note: in most cases, the information you will find on the Internet will be the drop (height) and the slope length (the hypotenuse of a right triangle.) You will have to use the Pythagorean theory to determine how much indoor length is required to accommodate the slope and drop. Show your equation and work for each ski slope calculation.
4. Identify the run and rise of each line drawn.
5. Write the equation to calculate the mathematic slope of each line drawn.
6. Write a paragraph comparing and contrasting the five ski slopes you selected.

## Ski Indoors! Content Facilitation Questions



<b>Comprehension</b>	<ul style="list-style-type: none"><li>• How do you determine the run of an object?</li><li>• How do you determine the rise of an object?</li><li>• How do you find the length of a slope?</li></ul>
<b>Application</b>	<ul style="list-style-type: none"><li>• Demonstrate how you would find the slope of a line.</li><li>• What strategy could you use to draw your ski slope?</li><li>• How would you locate the Y-intercept?</li></ul>
<b>Connection</b>	<ul style="list-style-type: none"><li>• Name one reason you would need to find the rise and run of an object.</li><li>• Name one situation, other than a ski slope, where knowing the slope of a line would be useful.</li><li>• How could knowing these formulas help you in the future?</li></ul>
<b>Synthesis</b>	<ul style="list-style-type: none"><li>• Explain how a right angle connects with the understanding of slope.</li><li>• Describe how slope correlates to the distance of a straight line.</li><li>• What types of careers would involve determining slope?</li></ul>
<b>Metacognition</b>	<ul style="list-style-type: none"><li>• What problems did you encounter during this activity and how did you solve them?</li><li>• What aspect of this activity was most helpful to your learning process?</li><li>• If you were to do this activity again, what would you do differently?</li></ul>