## Teaching notes



## How to use this resource

This resource, *A slippery slope*, is designed to support student use of laptops in both online and offline classroom environments.

The mix of online and offline resources and tasks in this resource is intended to promote student understanding and capability with distance, midpoint and gradient of straight lines. Students work mathematically and build their capacity to use a variety of Information and communications technologies.

### Explore

In this section students review how to plot points on the coordinate axes with interactive quizzes. The GeoGebra interactive worksheet is a useful learning resource that examines plotting points and examines gradient in more detail.

### Your tasks

1. Students should click on either the icons or the hyperlinked text to view each particular task in a pop-up window. Links have been provided if additional resources are required to complete the task.
2. Brief student instructions for using particular software programs are provided with each task. Other tutorials offering additional assistance are also available online.

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| **Task 1:** **Scary slopes**  Excel | Students design a spreadsheet to calculate the *horizontal run* and *slope* of the ski-lifts at Thredbo. Then they make a safety flyer.  1. Discuss the distance and gradient formulae with the class first.  2. Helpful formulae are **H. RUN**: =SQRT(C4^2-D4^2) and **SLOPE**: =D4/E4  These formulae assume that students are using the same columns, and this would be a good time to remind them how to copy equations. |
| **Task 2:** **Scary slopes**  Presentation software, Excel | Students design a presentation describing the requirements of a new ski-lift. They can use the spreadsheet from Task 1.  1. This is an open-ended response task. Students should begin to work backwards from the recommended slopes using the given heights.  2. Remember that the 2000m of cable must allow for a return journey.  3. The weakest point of a cable is the midpoint. Students may consider other locations depending on the terrain of the landscape. |
| **Task 3:** **Steepest slope**  Presentation software | Students assess the claim that Canton Street, Pittsburgh is actually the world’s steepest street and design a local tourism advertisement. They then work on finding the steepest street in their local area or NSW. |

### Quality teaching framework

This resource has been developed to support pedagogy and improve student outcomes based around the NSW Quality Teaching framework, with particular focus on the following elements:

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| ***Intellectual quality*** | | | ***Quality Learning Environment*** | | | ***Significance*** | | |
| 1.1 | Deep knowledge |  | 2.1 | Explicit quality criteria |  | 3.1 | Background knowledge |  |
| 1.2 | Deep understanding |  | 2.2 | Engagement |  | 3.2 | Cultural knowledge |  |
| 1.3 | Problematic knowledge |  | 2.3 | High expectations |  | 3.3 | Knowledge integration |  |
| 1.4 | Higher-order thinking |  | 2.4 | Social support |  | 3.4 | Inclusivity |  |
| 1.5 | Metalanguage |  | 2.5 | Students’ self-regulation |  | 3.5 | Connectedness |  |
| 1.6 | Substantive communication |  | 2.6 | Student direction |  | 3.6 | Narrative |  |

**Ski Lift SAMPLE**

