re(Solve) MATHS BY INQUIRY

Trigonometric Trajectories

Y10

Summary of learning goals

- Students' understanding of trigonometric and Pythagorean relationships are reinforced through two engaging real-world contexts: researching and building a thrilling (yet safe) zip-line ride for a doll, and outlining a proposal for building glider poles in their local area.

Australian Curriculum: Mathematics (Year 10)

ACMMG245: Solve right-angled triangle problems, including those involving direction and angles of elevation and depression.

Summary of lessons

Who is this sequence for?

- This sequence is for students who are familiar with Pythagoras' theorem and angles of depression and elevation. There are opportunities for students to independently design and conduct practical experiments by creating models, drawing diagrams, and conducting and refining practical experiments.

Lesson 1: World's Greatest Zip-lines

Students apply known trigonometric and Pythagorean relationships to investigate the dimensions of adventure zip-lines around the world. They plan, draw, model and construct a zip-line for a Barbie doll.

Lesson 2: Glider Poles

Students learn about the importance of building glider poles by the sides of highways to allow gliding mammals to cross wide roads. They then design a pair of glider poles that are appropriate for the animals and roads in their region, using their knowledge of trigonometry, particularly angles of elevation and depression.

Australian Academy of Science

Reflection on this sequence

Rationale

This sequence contains two intriguing real-world applications of trigonometry, providing opportunities for students to use mathematics to investigate real-life contexts and solve real-life problems.

reSolve mathematics is purposeful

- Students build fluency with calculations in engaging real-world contexts.
- Students explore issues of real-world relevance and concern: preserving the Australian ecosystem and investigating the safety issues in popular adventure activities.

reSolve tasks are inclusive and challenging

- There are multiple possible approaches to building a safe, yet thrilling, zip-line in Lesson 1: detailed diagrams and calculations in the planning stage or repeated experimentation and reiteration.
- Both lessons allow students to set their own level of difficulty based on the location and conditions they choose.

reSolve classrooms have a knowledge-building culture

- Students collaborate to model, design, experiment and redesign.

Acknowledgements