

Safe Landings

Purpose:

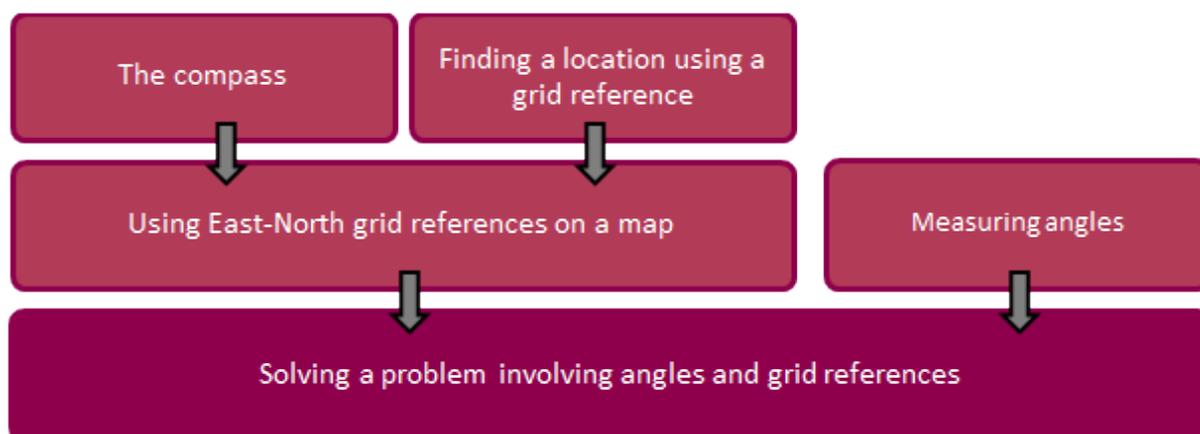
The purpose of this activity is to engage students in finding locations from descriptions given and using these to solve a problem.

Achievement Objectives:

GM4-7: Communicate and interpret locations and directions, using compass directions, distances, and grid references.

Description of mathematics:

The background knowledge and skills that need to be established before and/or during this activity are outlined in the diagram below:



Finding a location using a grid reference

Set up a patrol boat, for a game of battleships, sitting on B3 and B4.

The compass

Draw an arrow showing the direction NE (Northeast).

Using East-North grid references on a map

Find 1260 kmE, 4796 kmN, on the map provided.

Measuring angles

Use a protractor to measure an angle.

Solving a problem involving angles and grid references

If a boat sails from 1220 kmE, 4840 kmN to 1230 kmE, 4842 kmN, find the bearing (angle of journey clockwise from due North) the boat followed.

To solve this problem, the students may locate the positions given with a combination of calculations and measurements. The guidance given should be chosen in sympathy with their skills and preferred method of solution.

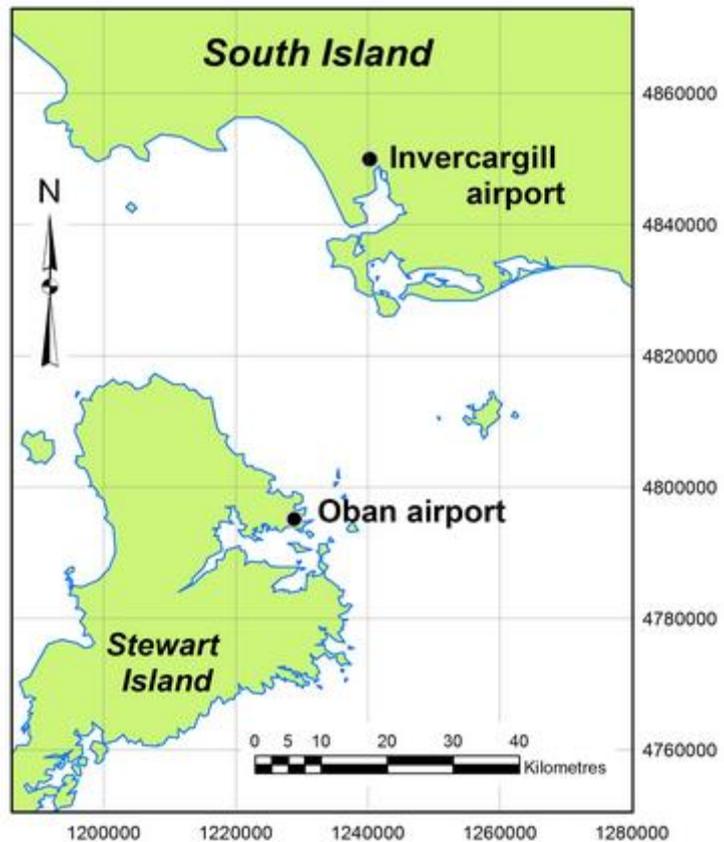
Activity:

On a cloudy day, a learner pilot tried to fly a small plane from Invercargill Airport to Oban Airport following the bearing he thought would take him there.

Unfortunately, he had forgotten to factor in drift from the strong Westerly wind and his instructor stopped him from attempting to land when they passed over the sea when their East-North Grid Reference was:

1260000 mE, 4796000 mN.

Find the angle of deviation from the original flight plan that occurred.

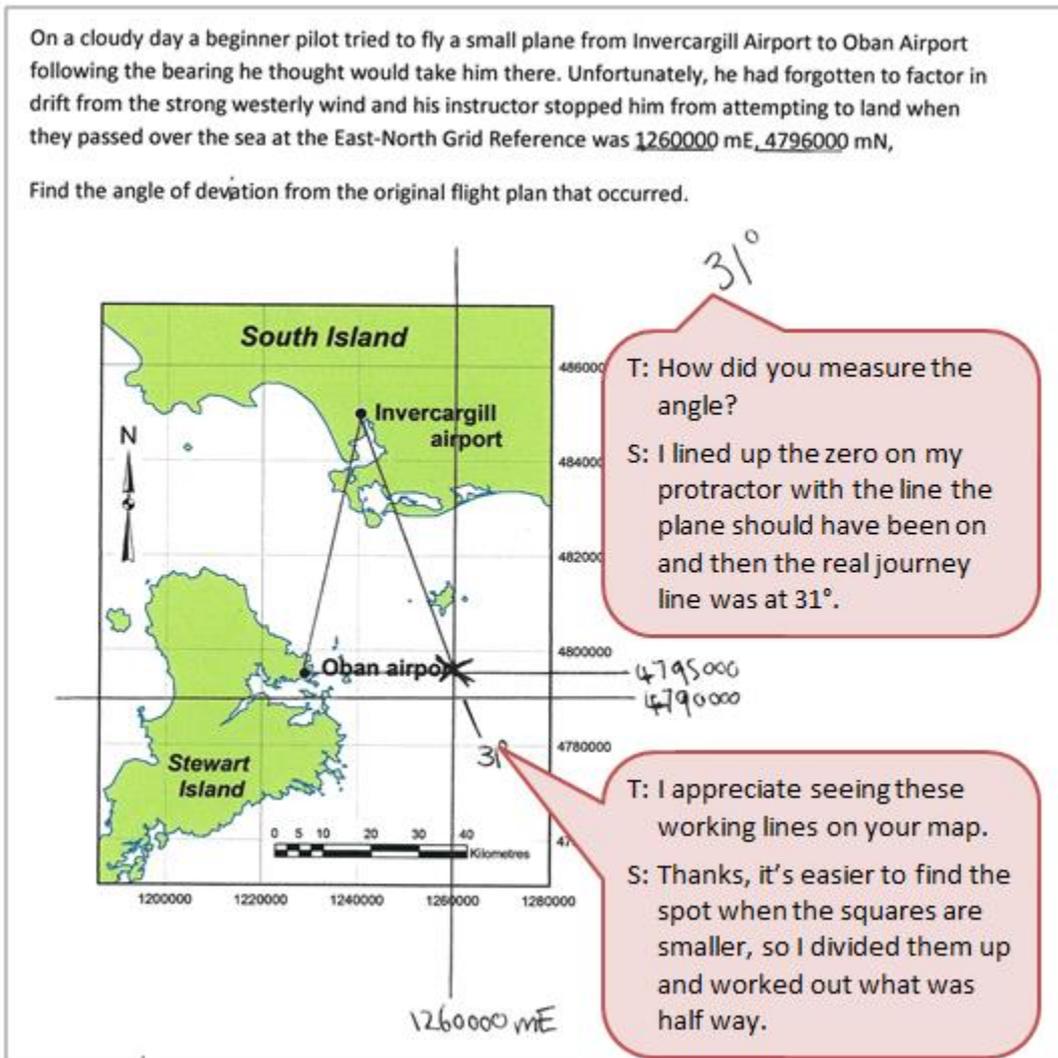


The procedural approach

The student is able to solve the problem, with guidance.

Prompts from the teacher could be:

1. Mark, on the map, the intended route.
2. Find the grid reference for where the pilot wanted to land, on the map.
3. Mark, on the map, the route the plane took.
4. Use a protractor to measure the angle of deviation from the original flight.



The conceptual approach

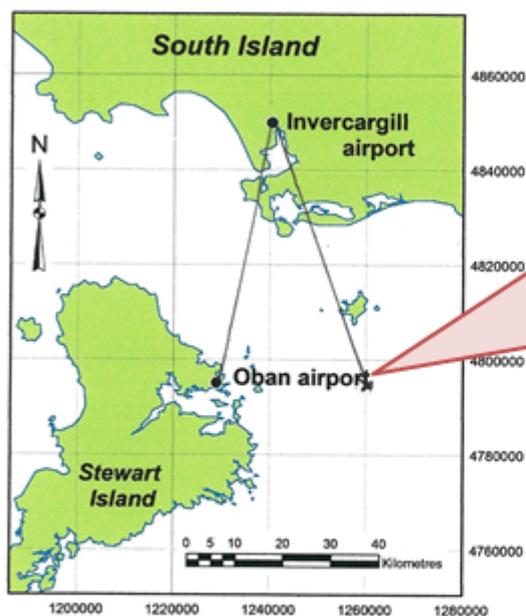
The student is able to solve the problem independently, within the context given.

Prompts from the teacher could be:

1. Consider how you will transfer the information from the question to the map.
2. How can you make your measurements as accurate as possible?

On a cloudy day a beginner pilot tried to fly a small plane from Invercargill Airport to Oban Airport following the bearing he thought would take him there. Unfortunately, he had forgotten to factor in drift from the strong westerly wind and his instructor stopped him from attempting to land when they passed over the sea at the East-North Grid Reference was 1260000 mE, 4796000 mN,

Find the angle of deviation from the original flight plan that occurred.



T: How did you locate the grid referenced position?

S: I used the fraction of a square, because a square is 20 000 units.
 $4\ 800\ 000 - 4\ 780\ 000 = 20\ 000$
 $4\ 800\ 000 - 4\ 796\ 000 = 4000$
4000 is 4/20, or 1/5, of 20 000

original planned bearing = 190°
compromised bearing = 160°
 $190 - 160 =$
 30° deviation from original flight plan

T: I see you've used bearings. Have you learned about these in school?

S: No, but in gaming, and war books and stuff that's how directions are given that's not as confusing as degrees east of north and stuff. They're easy; I could see that the plane should have been on a bearing of 190° because it was just 10° more than going south.