THERE AND BACK AGAIN

Bilbo decides to leave his hobbit-hole and go on an adventure. He walks 100 km South, then 100 km East, then finally 100 km North, at which point he is surprised to find that he has arrived back home!

Many people would think that because of this Bilbo must live at the North Pole. However, Bilbo doesn't live at the North Pole!

Can you describe where you think his home might be? Have you found all the possible locations?

SOLUTION

As the North Pole is the only point you get to by walking North from any point on the globe, we need to think about how he could walk East and end up due south of his home. **He could do this by walking on a line of latitude that has circumference 100 km.** As Bilbo starts by walking South he could live 100 km North of a line of latitude that has circumference 100 km, so he walks once around that line of latitude and again reaches the point due South of his home. He then walks 100 km due North and gets back home.

However this is not the only possible solution because he could walk around a line of latitude twice, or three times, or any number of times. Suppose he lives 100 km due north of a line of latitude that has circumference 50 km so he walks twice around that line of latitude and reaches the point due South of his home. He then walks 100 km due North and gets back home.

Bilbo could live 100 km due north of a line of latitude that has circumference 100/n km so he walks n times around that line of latitude and reaches the point due South of his home. He then walks 100 km due North and gets back home. So this gives a solution for many values of n.
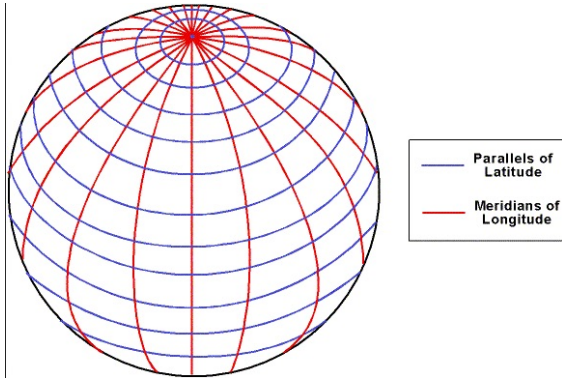
NOTES FOR TEACHERS

Why do this activity?
This is a good activity that relates to real life and gives the learners an experience of applying the maths they are learning about the sphere to Geography.

Intended Learning Objectives (Grade 9)
To learn to recognise and describe the properties of a sphere.

Possible approach

It would be a good idea to use a globe for this lesson and this diagram would be useful. Start with a whole class discussion of the question and why living at the North Pole could be a solution except that we are told that Bilbo does not live there.

Then discuss how he could walk due South then walk due East (around a line of latitude) and arrive back at the point again due South of his home. At this point give the learners some time to talk about the problem with a partner or small group.

You could give the problem one day and ask them to think about it and see if they can come up with an idea by the next lesson.

Discuss the problem with the whole class and invite the learners to suggest possible solutions and to explain them. If the learners do not have any suggestions ask the Key Question.

Key questions
If he starts walking East from a point due South of his home how could he get back to that same point and then walk North back to his home?

Possible extension
Learners could try the problem Belt Around The Earth:
https://aiminghigh.aimssec.ac.za/grade-7-to-12-belt-around-the-earth/

Possible support
A table tennis ball could be useful for this problem. Learners could mark Bilbo's walk on the ball with a marker that washes off.