NCCA
An Chomhairle Náisiúnta Curaclaim agus Measúnachta
National Council for Curriculum and Assessment

Mathematical investigation: Easter Egg Hunt

Learning outcomes in focus

Students should be able to:

U.4 represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse, and compare such representations

U.7 make sense of a given problem, and if necessary, mathematise a situation

U.8 apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions

U.9 interpret their solution to a problem in terms of the original question

U.10 evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions (if any)

U.13 communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use the language and notation of mathematics to express mathematical ideas precisely

N.3 investigate situations involving proportionality

GT.1 calculate, interpret, and apply units of measure and time

GT.1 investigate 2D shapes and 3D solids

Learning intentions

We are learning to:

- break problems down into parts
- draw scale drawings
- make 2D representations of our environment
- look for patterns and make conjectures
- validate our conjectures
- solve problems involving proportionality
- draw conclusions from our work
- use representations to communicate and justify mathematical ideas clearly

Mathematical investigation: Easter Egg Hunt

Teaching and learning context

First year students were learning about measurement and this task was designed as their first introduction to a mathematical investigation. Students were given the problem (to hide 10 eggs). They were instructed where to locate 6 of them and they had to decide where to hide the remaining 4 eggs in order to design the fastest route. Students undertook this task over a two-week period which facilitated the planning, recording or measurements and the writing of the report. Students were encouraged to justify their decisions.

Task

Design a route map in your groups for an Easter Egg Hunt around the school.

- You must hide **10 eggs**.
- One egg must be hidden in each of the following areas: **Gallery (Upstairs)**, **Reception**, **Gym, Hall**, **Basketball Court**, **Library** and you must hide the remaining 4 eggs in **4 different locations**.
- Estimate the fastest time that the hunt could be completed in.

Hint! Once you have designed your map. You may need to calculate several route options. Document all of your workings. It may be useful to demonstrate trial and improvement.

You can use a variety of Mathematical strategies or topics to try and solve this problem.

Success Criteria

I can

SC1 recognise proportion in real life situations

SC2 break a problem down into manageable parts

SC3 make simplifying assumptions

SC4 carry out calculations involving proportion

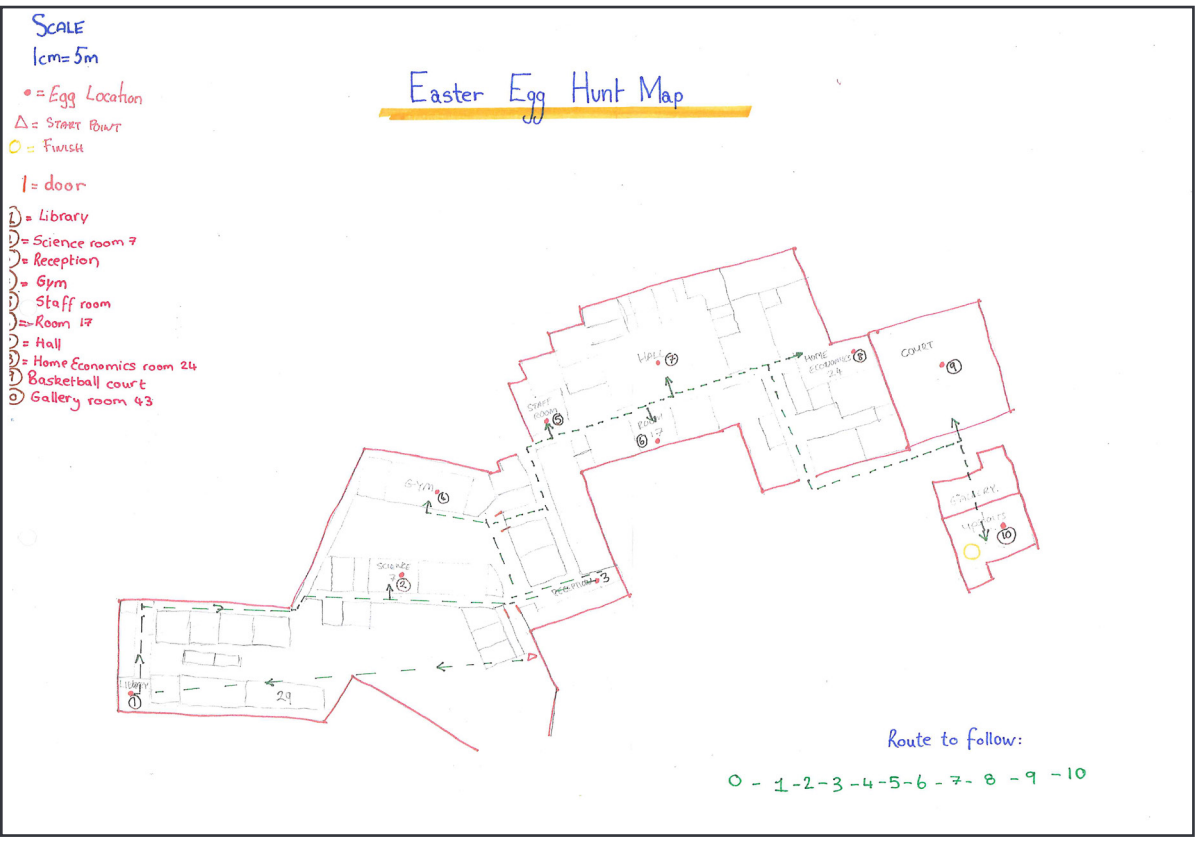
SC5 make a 2D representation of my school environment

SC6 adjust my solution strategy if necessary

SC7 justify decisions I make with mathematics

SC8 draw and interpret scale drawings

Mathematical investigation: Easter Egg Hunt



SC.5 Makes a 2D representation of the school environment

SC.8 Draws and interprets scale drawings

Mathematical investigation: Easter Egg Hunt

Easter egg hunt: Report

Attempt 1:

Hannah and I started by thinking of our first attempt. We thought that because my fitbit counts distance as well as steps, we could use it to calculate the distances we had to measure.
Our decision was to measure from room 29 to the end of the basketball court, and the end of the basketball court to room 43 in the gallery.
* See my powerpoint for photo proof

Firstly, we measured from basketball court to gallery. Our method was to both run and walk the distance each.

Walking:

It took us 1 minute to walk from basketball court to the gallery. We got 59 steps from it, burned 0 calories from it as well.
We walked 50m from the basketball court to room 43.

Running:

It took us 29 seconds to run from basketball court to the gallery. We got 86 steps, and burned 4 calories from it as well.
The distance was also 50m.

Then we walked + ran from room 29 to the basketball court. We both ran and both walked for it to be fair. Unfortunetly, when I took the photos of my fitbit they came out blurry and you couldn't see it well. But luckily I wrote them down.
We measured it was 250m. We got 296 steps

SC.1 Recognises proportion in real life situations

SC.2 Breaks a problem down into manageable parts

Mathematical investigation: Easter Egg Hunt

2

from it, burned 10 calories, average heart rate was 78bpm and average pace was 5"2. It took us 1 minute 42seconds; for running it and we didn't get steps/bpm/pace for walking.

We thought that if we have the distance from room 29 to basketball court, and the basketball court we could find the ~~distance~~ scale
If it was 250m from 29 to basketball court, & and from the basketball court to room 43 was 50m, the total distance was 300m.

The reason why we used the ~~tram~~ fitbit to calculate distance is because, when we got our trundle wheel it was broken.

So we waited, and the next day we got one.

We had an idea of a diffrent route.

Attempt 2:
Our second attempt was to use the trundle wheel and measure from room 29 to the basketball court but instead taking a right past the careers office, going straight down by John's Office, past the gym and out through the door by the junior toilets.

Instead of measuring it all without staping, we decided that for every turn, we stopped and measured.
It didn't matter about spteps/bpm/pace.

→
Map

SC.6 Adjusts solution strategy

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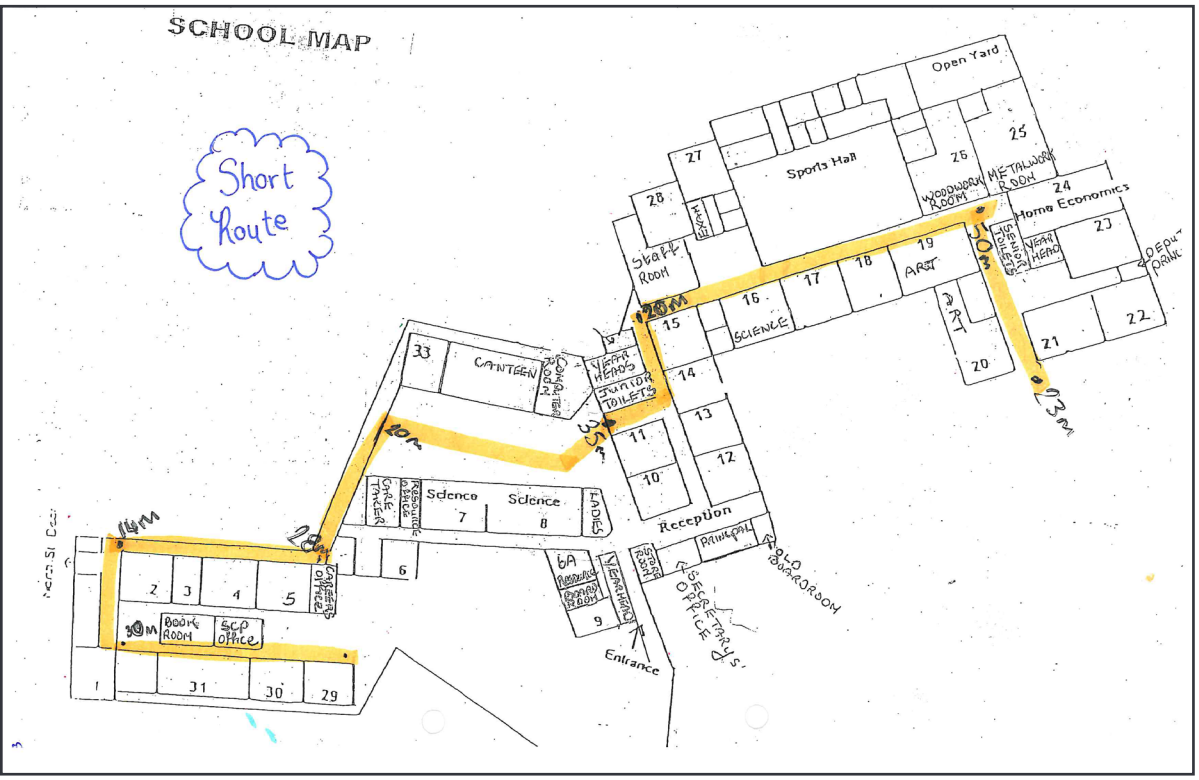
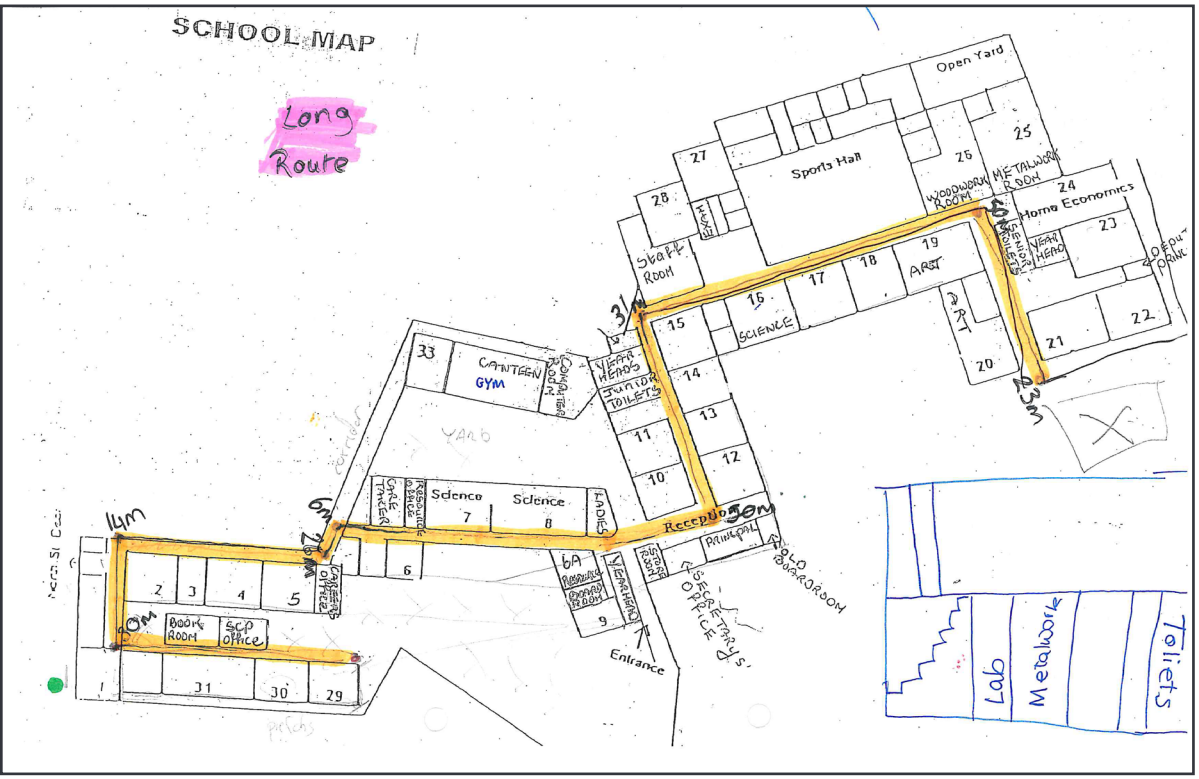


SC.6 Adjusts solution strategy



SC.6 Adjusts solution strategy

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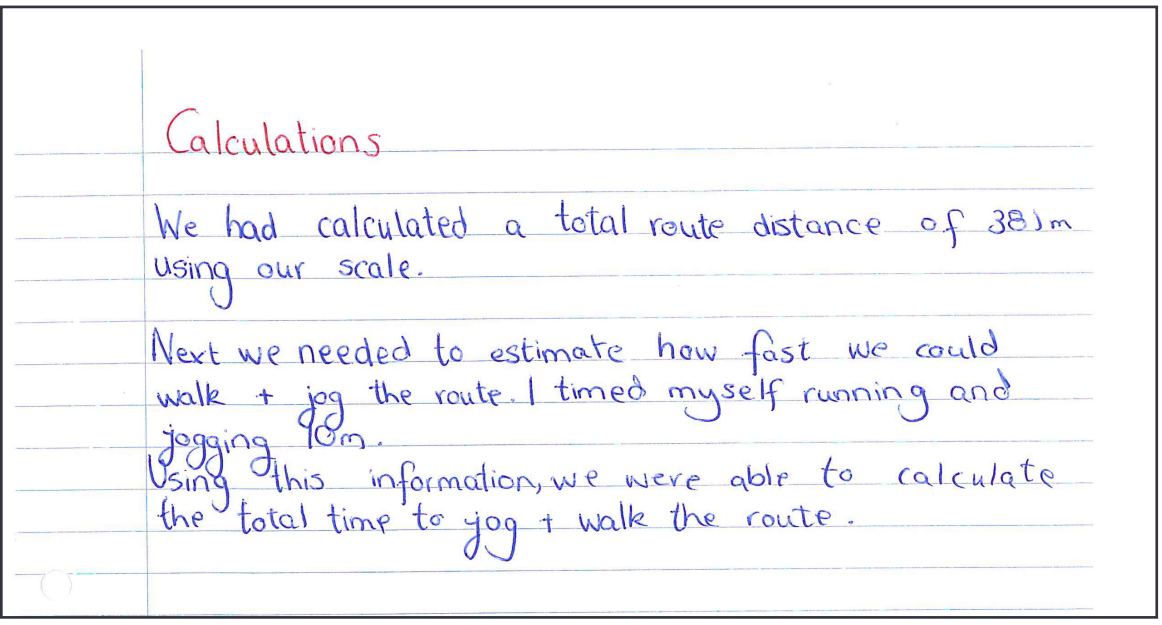


Calculations

We had calculated a total route distance of 381m using our scale.

Next we needed to estimate how fast we could walk + jog the route. I timed myself running and jogging 10m.
Using this information, we were able to calculate the total time to jog + walk the route.

SC.3 Makes simplifying assumptions

4

Easter Egg Hunt Report

~~After measuring~~
We estimated the distance with the trundle wheel at 310m.

Attempt 3:

Our third attempt was to scale the map using distances we had.
We measured ~~f~~ with the trundle from room 29 to room 1 and we got 30m. We then measured the map from r29 to r1 with a ruler and we got 6cm. So our scale was 1cm = 5m. We used this to do all our calculations.

Conclusion:

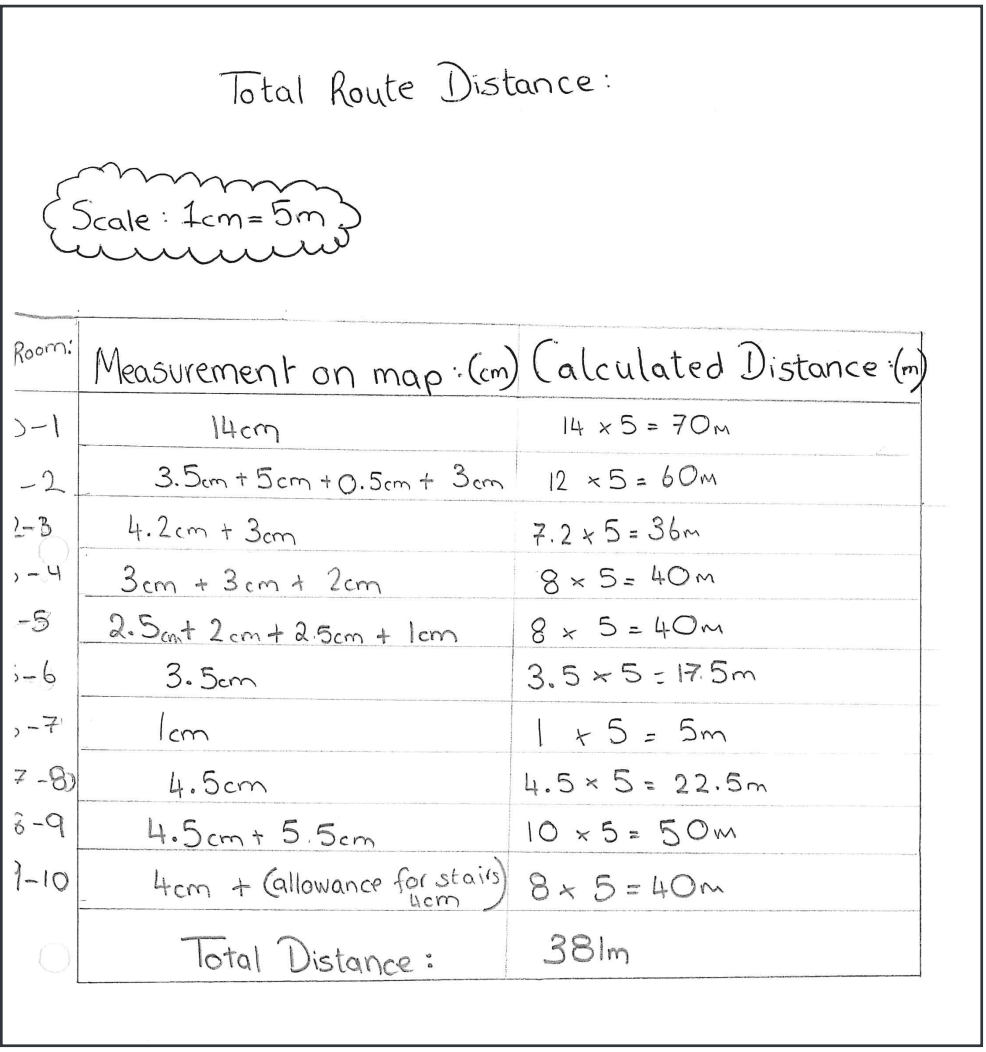
We have concluded that ~~that~~ the fastest time the egg could be completed in:
Walking: ~~2~~ 4 minutes 27 seconds
Running: 2 minutes 13 seconds

We have also found our shortest route which is highlighted on the map.

We found scaling ~~w~~ the easiest as we had access to all measurments from simply using a ruler.

SC.7 Justifies decisions made with mathematics

Mathematical investigation: Easter Egg Hunt



Total Route Distance:

Scale: 1cm = 5m

Room:	Measurement on map: (cm)	Calculated Distance: (m)
)-1	14cm	14 × 5 = 70m
-2	3.5cm + 5cm + 0.5cm + 3cm	12 × 5 = 60m
2-3	4.2cm + 3cm	7.2 × 5 = 36m
)-4	3cm + 3cm + 2cm	8 × 5 = 40m
-5	2.5cm + 2cm + 2.5cm + 1cm	8 × 5 = 40m
)-6	3.5cm	3.5 × 5 = 17.5m
)-7	1cm	1 × 5 = 5m
7-8)	4.5cm	4.5 × 5 = 22.5m
8-9	4.5cm + 5.5cm	10 × 5 = 50m
1-10	4cm + (allowance for stairs 4cm)	8 × 5 = 40m
	Total Distance:	381m

SC.4 Accurately carries out calculations involving proportion

Mathematical investigation: Easter Egg Hunt

Speed

I can ~~run~~ jog 10m in 3.5 seconds. I can walk 10m in 7 seconds.

Jog:

10m = 3.5 seconds

3.5 secs ÷ 10 = 0.35

0.35 × 381 = 133.35 seconds

133.35 − 120.00 = 13.35

2 minutes 13 seconds to jog the route.

1 minute = 60 secs
2 minute = 120 seconds

Walk:

10m = 7 seconds

7 secs ÷ 10 = 0.7

0.7 × 381 = 266.7 seconds

266.7 − 240.0 = 26.7

4 minutes 27 seconds to walk the route.

1 minute = 60 secs
2 minutes = 120 secs
3 minutes = 180 secs
4 minutes = 240 secs

SC.3 Makes simplifying assumptions

SC.4 Carries out calculations involving proportion

Overall judgement: Above expectations