

Science Fair 2025

Why Does Greenland Appear Larger On Maps Than It Actually Is?

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Grade 3T

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Step 1: Introduction

When we look at a map, “Greenland” looks really big. But when we look at an earth globe, it seems much smaller. I want to figure out why this happens and understand why maps sometimes show things differently from what they really are.

Step 2: Theory Research Notes

1. Where and How is Greenland ?

Greenland is a territory of **Denmark** right now.

It is the world's largest island with an area of **836,330 square miles**. Greenland is covered by **ice and snow** with a very cold climate.

It is **adjacent to Canada**, located in the **Arctic Circle** mainly.



Step 2: Theory Research Notes

2. Find easy tools to identify Greenland

A globe (a ball that illustrates the world)

A flat map from my elementary school's library

A school chromebook connected to internet for searching An orange

Crayons, pencil, ruler and A4 papers for drawing

Step 2: Theory Research Notes

3. *Look at the Globe*

We found a white area in the arctic part of the globe.

The area labeled with “Greenland” has a capital named Nuuk.

We find that the area of Greenland is smaller than the east part of the United States from the Mississippi river.

Compared with Africa and South America, the area of Greenland is even smaller.



Step 2: Theory Research Notes

4. *Look at the Flat Map*

When we look at the flat map, Greenland looks really big, bigger than the United States, South America and even Africa. Actually, this is not true.

United States: 3,796,742 square miles

South America: 6,878,706 square miles

Africa: 11,730,000 square miles



Step 2: Theory Research Notes

5. What happened to Greenland?

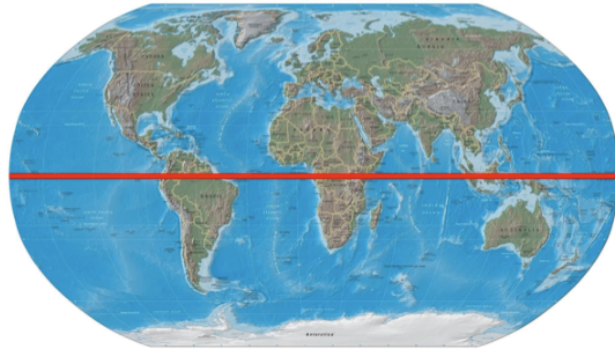
The size of Greenland may be stretched?

Because we look at it from different angles, the difference between global and flat maps is the reason.

Step 2: Theory Research Notes

6. *Global and flat map, which one deceives us?*

As a matter of common sense, the earth is like soccer. Compared to the globe, a flat map is more likely to give us some kind of illusion.



Step 2: Theory Research Notes

7. *Let's focus on the Map*

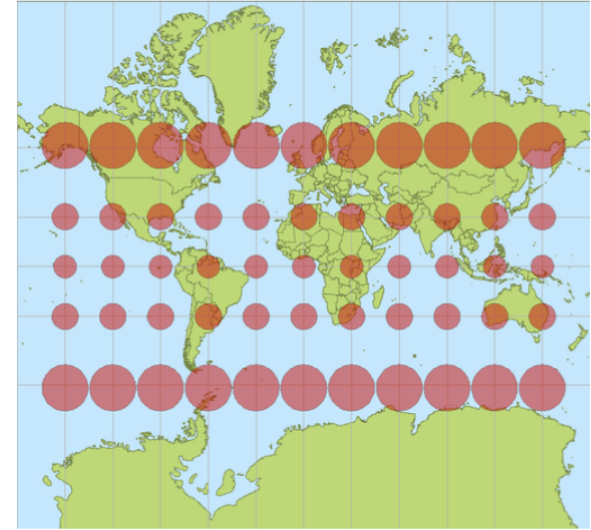
I searched the definition of Map on the wikipedia.
Geographic maps use a projection to translate the three-dimensional real surface of the geoid to a two-dimensional picture.

one dimensional stuff: a straight line

two dimensional stuff: a rectangle on a paper, a little man on a paper, a flat map of the world

three dimensional stuff: a ball, earth, sun, planet, a earth globe

One of the most important projection methods is **Mercator Projection**. It was used to draw most of the World Maps.

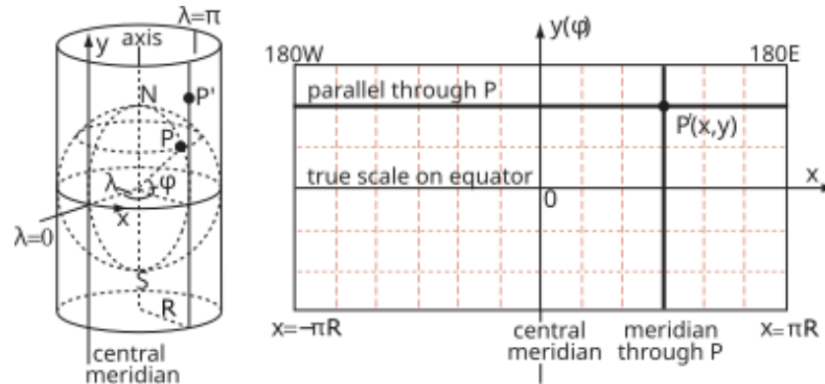


Step 2: Theory Research Notes

8. We found the key point

The **Mercator projection** is a conformal cylindrical map projection first presented by Flemish geographer and mapmaker Gerardus Mercator in 1569.

When applied to world maps, the Mercator projection **inflates the size of lands the further they are from the equator**. Therefore, landmasses such as Greenland and Antarctica appear far larger than they actually are relative to landmasses near the equator. Mercator projection uses **complex mathematical transformations** to convert three dimensional earth to a two dimensional map.



Step 2: Theory Research Notes

9. *We simulate the Mercator Projection*

Peel the Orange

Mark the Equator and Poles

Divide the Orange into Latitude Lines Simulate the Projection



Step 2: Theory Research Notes

10. What we found?

On the globe, an area like a triangle was stretched to a rectangle.

The closer to the North Pole, the more the map was stretched. Greenland is very close to the North Pole, So it was stretched a lot on a flat map.



Step 3: Conclusion

*A thing is often not what it appears to be. There must be a law behind it.
That's about science.*