

Contents

USING YOUR BOOK	4
1. THE CREATION	5
The Geographical Elements	6
Studying the Earth	8
Continental Contrasts	11
Continental Descriptions	15
The Physical Structure and Features of each of the Continents	18
2. THE EARTH	30
The Shape of the Earth	30
Earth Motions	31
The Seasons	32
Longitude and Latitude	35
Time	38
Moon and Tides	41
3. ATMOSPHERE	43
Composition of the Atmosphere	44
Atmospheric Circulation	45
Atmospheric Moisture and Precipitation	54
4. MAPPING AND MAP PROJECTIONS	60
Maps	60
Scale	61
Map Projections	63
Symbols	65
Map Types	66
GLOSSARY OF TERMS	68

Using your book

We want you to be able to explore extra details about the earth, to write about each section and to know the work so that you can share with the Lord the wonderful things He has revealed to you about our home.

There are three ways in this course that you will be able to share your new-found knowledge of the earth.



ENLARGE THE PLACE

ENLARGE THE PLACE — ISAIAH 54:2

Enlarge the place of your tent, and let them stretch out the curtains of your dwellings; Do not spare; lengthen your cords, and strengthen your stakes.

This symbol shows where you can seek out extra information that you can write about and tell your teacher and friends. You may not have time to do all the 'Enlarge the Place' exercises so ask your teacher or parent to guide you in which ones to do and how much time to spend on them.



WRITE THE VISION

WRITE THE VISION — HABAKKUK 2:2

Then the Lord answered me and said, 'Write the vision and make it plain on tablets, that he may run who reads it'.

Habbakkuk was told to write what he had been shown and make it clear. You will be able to write your answers to these exercises in your 3 ring binder or on the provided maps. All your written answers should be in clear sentences and use diagrams whenever you can to make your answer clearer.



BE TESTED

BE TESTED — I TIMOTHY 3:10

But let these also first be tested...

At various times your teacher or parent will give you an opportunity to share the good things God has been teaching you. From these tests you will know how much you have understood, then at the end of the course you will have the opportunity to give testimony to the Lord and your teacher of all you have learned about The Earth.

Things you will need

- 3 ring binder
- set of coloured pencils
- student atlas (Jacaranda and Collins atlases are available from Light Educational Ministries)
- encyclopedia, internet or similar resource materials for further reading

We have been given the responsibility to care for the earth and to use its resources to glorify the Lord. We are to outwork God's great plan for the earth and, in particular, to work to establish God's kingdom here on the earth as it is in Heaven (see Matthew 6:10).

The three physical elements of which the earth is composed are separate and distinct from one another. The atmosphere, or the air, being a gas and thus lighter than land or water, floats above the land and the sea. The other two elements have been divided by God, the land from the sea, so that

72% of the earth's surface is water, and
28% of the earth's surface is land.



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These three geographical elements 'are mutually dependent and connected by incessant action and reaction upon one another; and hence, that the earth is really a wonderful mechanism, all parts of which work together harmoniously to accomplish the purpose assigned to it by an all-wise Creator.' *Physical Geography*, Arnold Guyot, 1873, p.2.

Arnold Guyot (1807–1884)



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A well-known geographer and scientist, he was born near Neuchatel, Switzerland. He first planned to become a minister of the Gospel, but at last his increasing interest in the natural sciences resulted in his abandoning the idea of the ministry. His writings were devoted to glaciology, geography and orography. Deeply religious, in 1884 he wrote a book entitled *Creation or the Biblical Cosmogony in the Light of Modern Science*, in which he endeavoured to reconcile science with the biblical account of creation. He emigrated to America in 1848. From 1855 he was professor of geography and geology at Princeton University. He published a series of school geographies called *Earth and Man* in 1849.

Taken from *The Christian History of the Constitution of the United States of America*, compiled by Verna M Hall, published by Foundation for American Christian Education, p.436.

The ideas relating to the identities of the land masses and their characteristics presented in this book are taken from the work of Arnold Guyot in his text book *Physical Geography*.

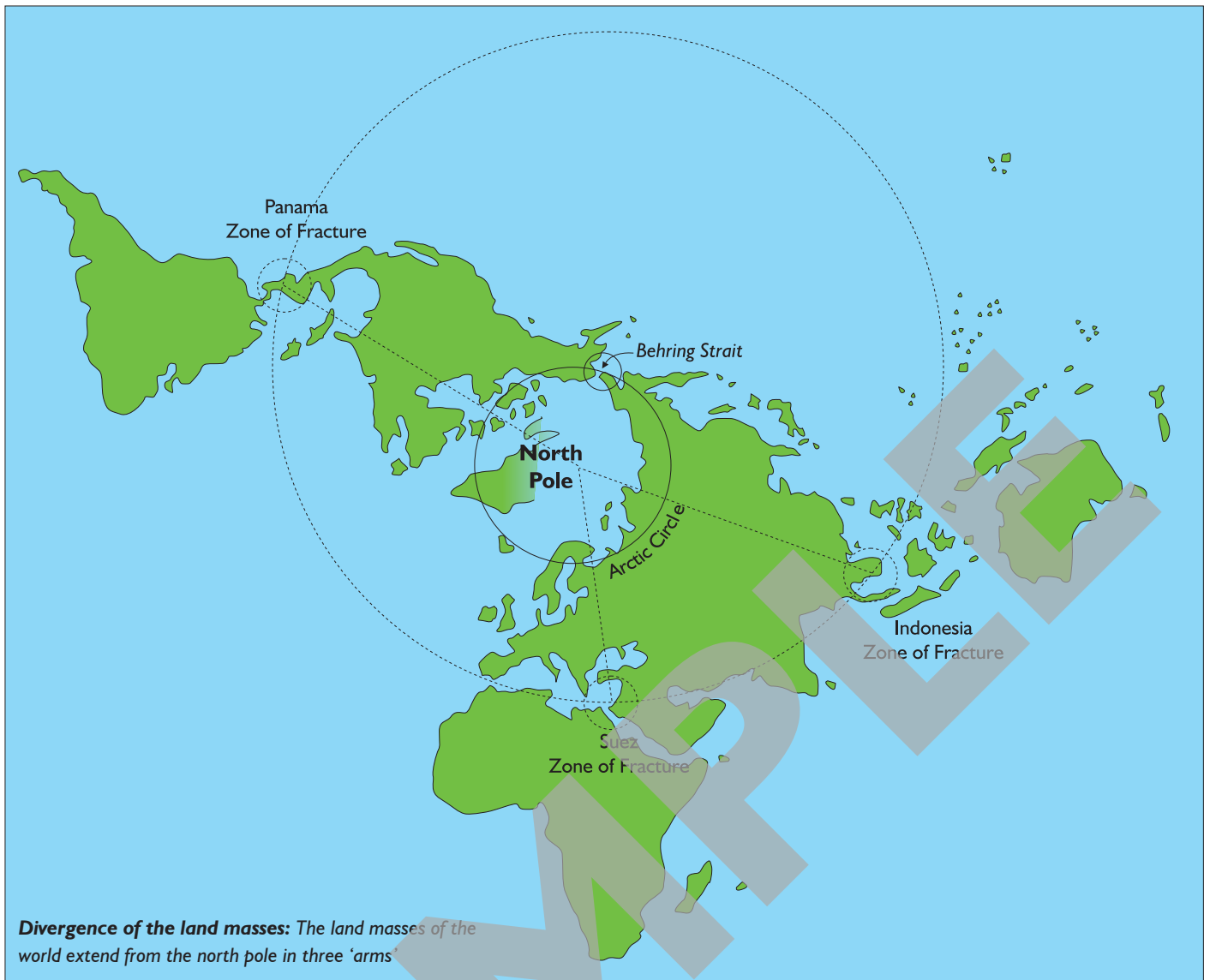


WRITE THE
VISION

WRITTEN EXERCISES—SET A

These exercises are to be done in your note paper or on the photocopiable maps provided. All written answers should be in sentences and you should use diagrams wherever appropriate in your answers.

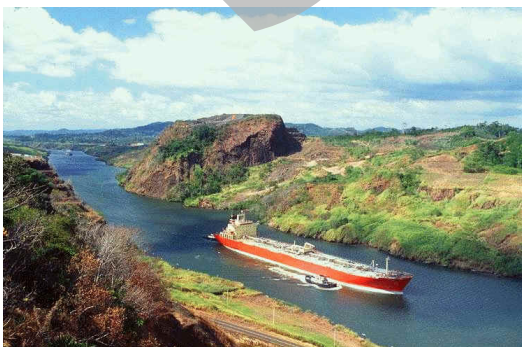
1. What are the three geographical elements, and how do they reflect an aspect of God's nature?
2. What is another name for atmosphere?
3. Name four life forms supported by the sea.
4. Name four life forms supported by the land.
5. From your research in an encyclopedia, or any other resource, write a half-page essay describing one of the life forms you named in Question 4.



North and South America — Panama Zone of Fracture

The arm of land called the Americas is almost cut in two by the sea at the **Isthmus of Panama**, where the land is reduced to a width of eighty kilometres. In 1914 the United States finished building the **Panama Canal** to enable ships to sail from the Atlantic Ocean to the Pacific Ocean without sailing the long and arduous journey around Cape Horn at the bottom of South America. This was of great benefit to the Americans in being able to ship goods from their east coast cities to the rapidly developing west coast, particularly California.

Even though the continents of North and South America are joined at Panama, they each have their unique and significantly different identities in the plan of God. The unique feature of this area between the Americas is the **Caribbean Sea** with its numerous islands, from Cuba to the West Indies.



The Panama Canal



THE PHYSICAL STRUCTURE AND FEATURES OF EACH OF THE CONTINENTS

Firstly we will define and explain the various features found on the earth's surface. Don't forget to check the Glossary at the back of this book for any new words you do not understand.

NAMES OF THE RELIEF FEATURES OF THE EARTH

Relief is the term used to describe the height of the land above the sea level, formed as plains, plateaux, mountains and valleys.

Altitude is the height of a place above sea level.

Plains (top right) are relatively flat lands up to 300 metres above sea level. Plains make up nearly half of the surface of the continents.

Plateaux (singular plateau) are relatively flat lands over 300 metres above sea level.

Mountains (middle right) are uneven lands over 600 metres above sea level.

Hills (lower right) are uneven lands up to 600 metres above sea level.

Valleys are folds in the earth's crust at the bottom of which water usually flows as rivers.

COMMON FEATURES IN THE RELIEF OF CONTINENTS

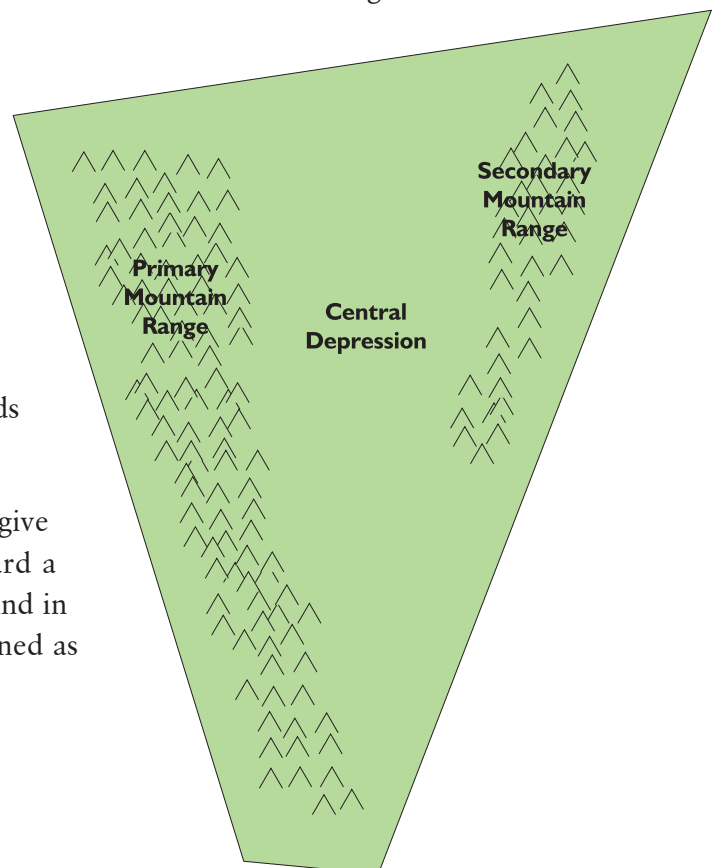
God, in His providence, has chosen to incorporate similar features on each of the continents, which illustrates the principle of unity. However, the way in which these features are structured and organised varies for each continent, thus illustrating His diversity.

There is a **primary mountain range** on one side of each continent, which is the primary feature of its relief and forms the main axis of the continent.

There is a **secondary range** on the opposite side of each continent, which is smaller than the major mountain range on the other side.

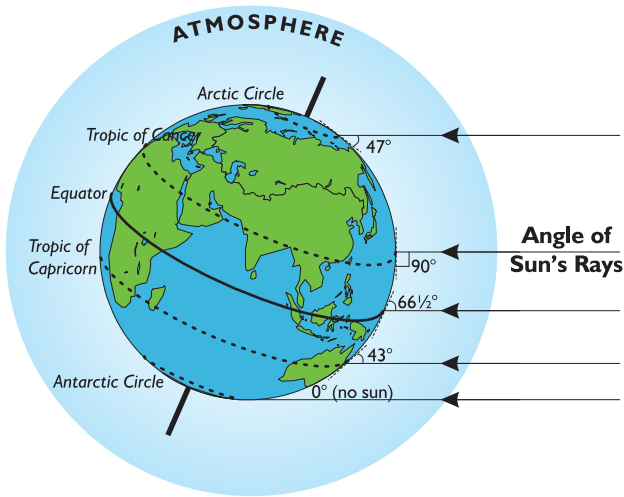
There is a **central depression** between the two highlands in the form of a plain or plateau.

The converging directions of these two mountain axes give most of the continents their common tendency toward a triangular shape. As God creates in a unique way, we find in some continents these features are not as sharply defined as they are, for example, in North America.

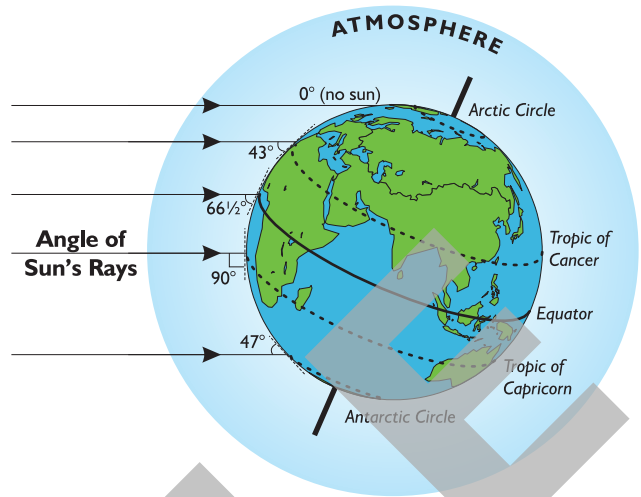


The Angle of the Sun (Southern Hemisphere)

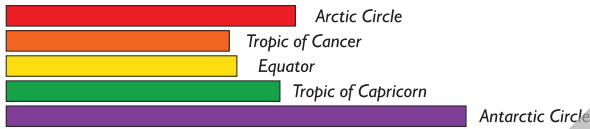
Winter Solstice (June 22)



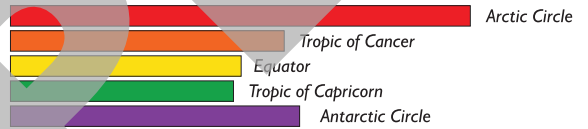
Summer Solstice (December 22)



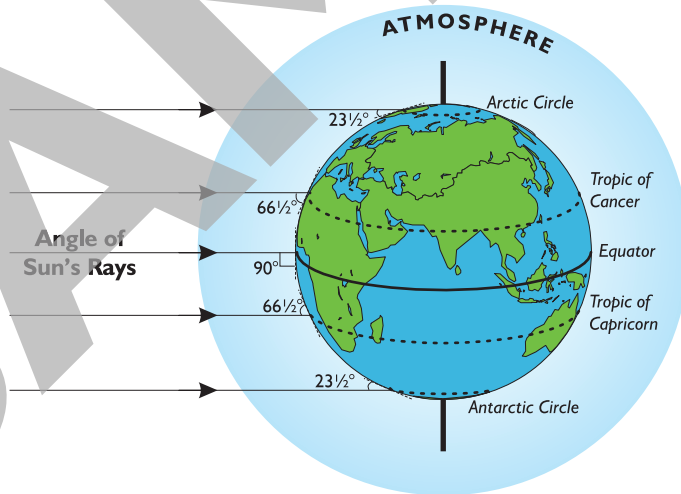
Relative amount of atmosphere for sun's rays to pass through



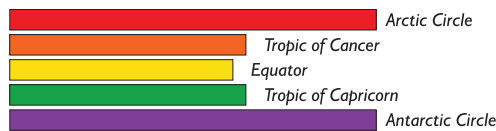
Relative amount of atmosphere for sun's rays to pass through



Autumn and Spring Equinoxes (22 March and 22 September)



Relative amount of atmosphere for sun's rays to pass through



ATMOSPHERIC CIRCULATION

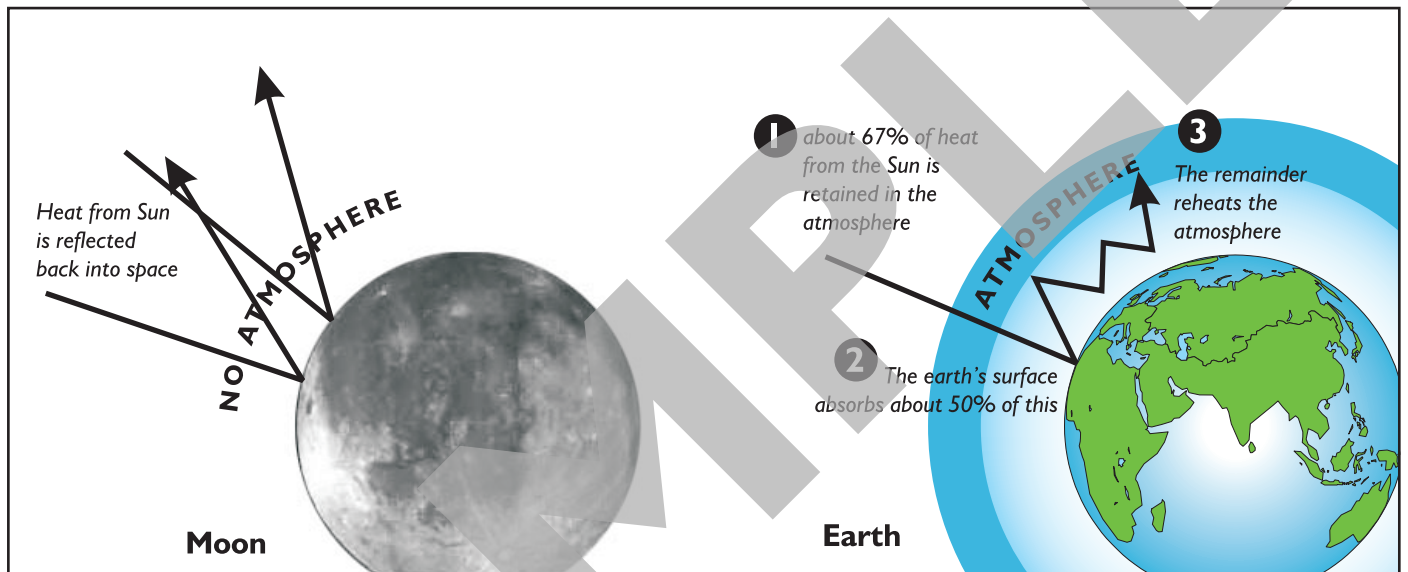
Ecclesiastes 1:6

The wind blows to the south and turns to the north; round and round it goes, ever returning on its course.

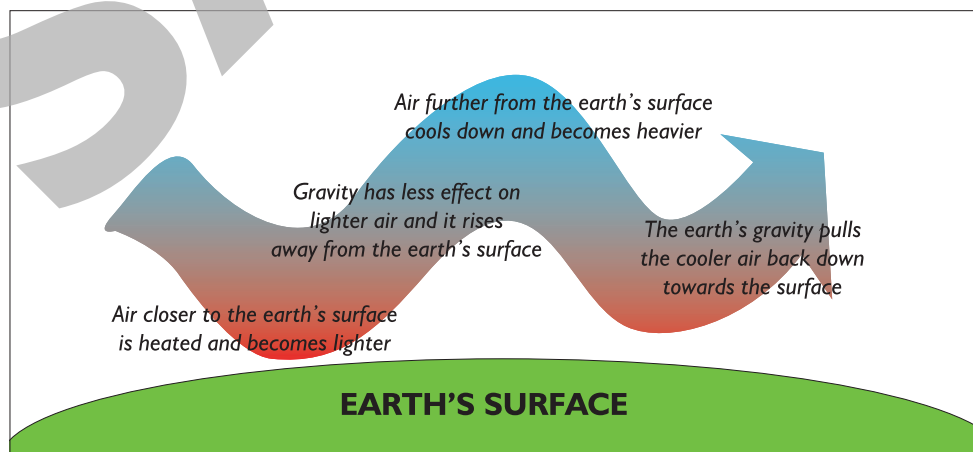
Air acts very much like a fluid, although it is much lighter and easier to move. The movement of the air is a major factor in our climate and our weather. This being the case, it is therefore important we first explore what makes the air move. Moving air is called **wind**.

AIR MOVEMENT AND HEAT ENERGY

The earth and the atmosphere receive heat energy from the sun. God has carefully designed His creation so that the earth and its atmosphere trap an optimum amount of the sun's heat to support man and other life on earth. The illustration shows that the air is mainly heated from the earth which re-radiates some of the heat it has absorbed, thus warming the atmosphere.



If the air could not move, the air closest to the earth would get extremely hot and would not be suitable for human occupation. Hence God designed air (and other things) so that they expand when heated and thus become lighter, or less dense. Gravity, therefore, does not have such a strong effect on the heated air and it rises away from the earth's surface. This is a key to climate and weather.



Making a hygrometer to measure moisture in the air

You will need:

milk carton
needle
small weight (blu-tac or plasticine)
2 paper clips
toothpick
a long clean washed hair.

What to do:

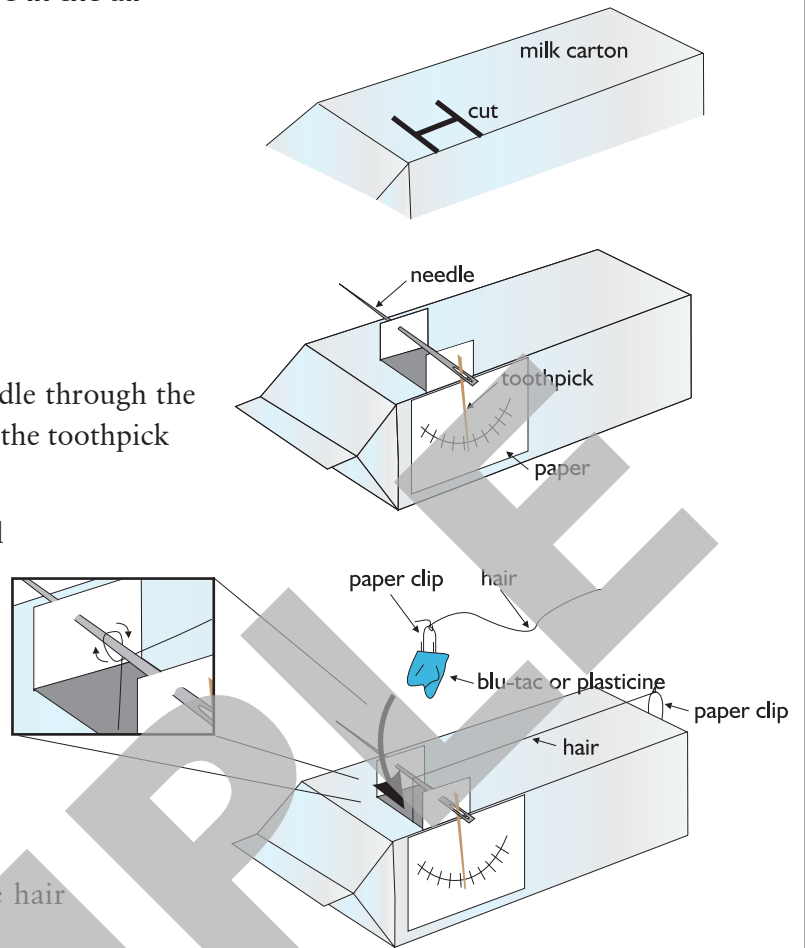
Cut the carton as in diagram. Push the needle through the two tabs as shown until it turns freely. Push the toothpick or similar through the eye of the needle.

Glue a piece of paper to the carton and label with regular lines as in the diagram.

Cut a slit in the end of the carton and fasten one of the paper clips to it. Tie one end of the hair to the clip and the other end to the other paper clip, then fix the small weight to this clip.

Loop the hair around the needle and lower the weight into the box, thus keeping the hair tight.

The hair stretches slightly in damp air causing the pointer to move over the scale.



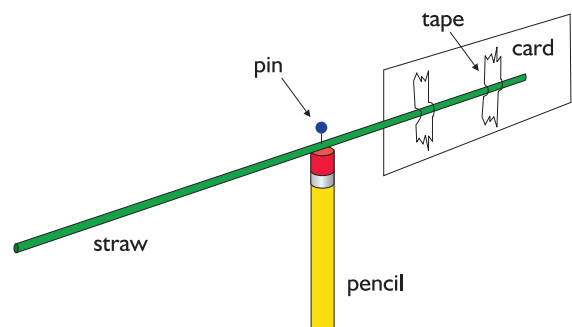
Making a wind vane to show wind direction

You will need:

plastic drinking straw
card
tape
pin
pencil with a rubber on the end

What to do:

Tape a rectangle of card to one end of the straw, then carefully push the pin through the straw as shown in diagram. You may need to put the pin closer to the end with the card to keep it balanced, and make sure the pin and the card are parallel to each other. Carefully push the pin into the rubber of the pencil and mount your wind vane in a non-sheltered area. To find the wind direction you will need to use a compass — remember that wind is labelled from the direction of origin. You may like to modify the design to make it more attractive.



MAP PROJECTIONS

Map projections have been developed to try to overcome the difficulty of representing the earth's spherical, three dimensional shape on a two dimensional surface. The surface of a sphere cannot be transferred to a flat surface without some compromise.

The lines of longitude and latitude (that we explored earlier) are a major key to helping develop map projections. Map projections are an ordered system of arranging parallels of latitude and meridians of longitude on a flat surface as the basis for drawing a map.

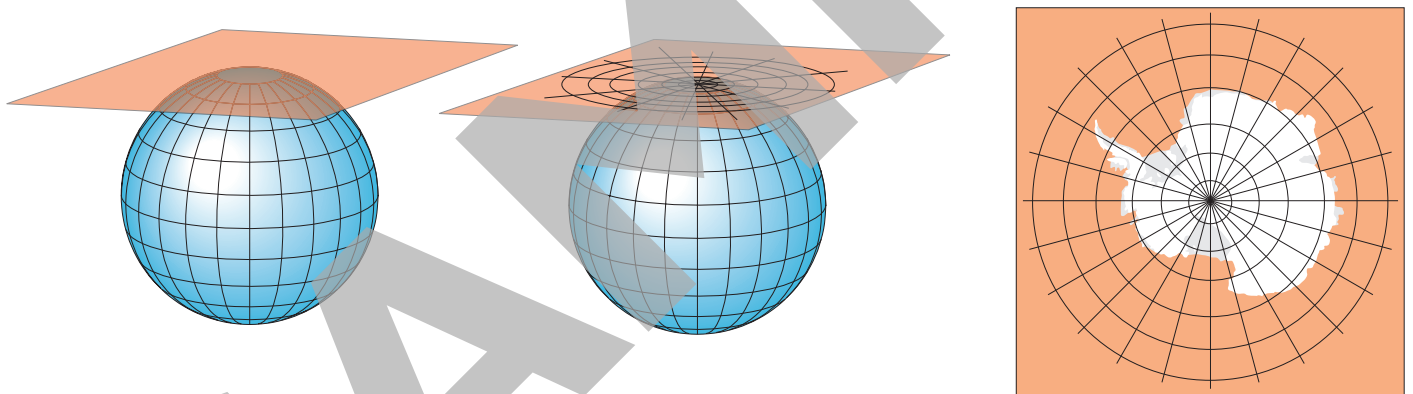
Many different types of projections have been developed, each with different properties. None of the projections are perfect, so cartographers choose one that is most suitable for the particular application. There are many variations of map projections, but there are three main types:

ZENITHAL (AZIMUTHAL)

In the Zenithal projection, the parallels of latitude and meridians of longitude are projected onto a plane (flat surface).

This method produces maps that vary in their depiction of land masses depending where the point of contact between the earth and the plane surface is located.

The zenithal projection is most useful and is commonly used for mapping polar regions where the point of contact is one of the poles.



CYLINDRICAL

In this projection, the parallels and meridians are projected onto a cylinder which usually touches the earth at the equator.

