KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 -12 DIRECTORATE

NCS (CAPS) SUPPORT

JUST IN TIME LEARNER SUPPORT DOCUMENT

GEOGRAPHY

TERM 2

GRADE 10

2022

TABLE OF C

NO.	CONTENT	PAGE NO.
1.	Cover Page	1
2.	Foreword	2
3.	Table of content	3
11.	Lesson plans, Notes and assessment A	4-43

TERMINOLOGY

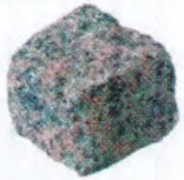
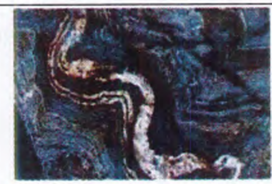
Geomorphology	Is the study of earth's physical features and the processes that formed them.
Active volcano:	Volcano which still erupts.
Anticline:	Upward fold
Batholith:	Very large igneous intrusion which forms deep in the Earth's crust.
Block Mountain/Horst:	Block of land uplifted between two parallel faults.
Butte:	Flat topped hill with a small top, eroded from a mesa
Cinders:	Fine fragments of hardened lava
Continental Drift:	Theory that continents were one landmass but have drifted apart over time.
Continental Plate:	Crust under land mass
Converging Boundaries:	Plates moving towards each other.
Core:	Central extremely hot layer of the Earth.
Crust:	Outer layer of the earth.
Cuesta:	Ridge with a gentle angle of 10° - 25°
Diverging Boundaries:	Plates are moving apart.
Dormant volcano:	Has not erupted for many years.
Dyke:	Forms when magma intrudes vertically between layers of rock.
Earthquake:	Vibration/shaking in earth's crust.
Epicentre:	Point on the Earth's surface immediately above the focus of an earthquake.
Erosion:	The process of moving weathered material by wind, water, and ice.
Extinct volcano:	Has stopped to erupt, scientists don't expect it to erupt ever again.
Extrusive igneous rock:	Rocks forming from lava on the surface of the Earth
Fault line:	Line along the surface of the earth where a fault occurs.
Faulting:	Cracks in rocks formed due to tension and compression forces.
Focus:	Point in the earth's crust where an earthquake begins.
Folding:	Bending of rocks into folds due to strong compressional forces from the side.
Fossils:	Remains of a dead plant or animal which have been preserved in rock.
Gondwanaland:	Supercontinent.
Hogsback:	Dipping strata of more than 45°.

Tsunami:	Series of huge sea waves caused by an earthquake in the sea floor.
Volcanic pipe:	Deep vent which allows magma to rise to the crater of a volcano.
Weathering:	The process of breaking down rocks into smaller stones, pebbles, and sand.

	• 2 250 km thick and consists of nickel (Ni) and iron (Fe) known as NiFe. **THE INNER CORE:** • Is extremely hot. • Solid because of extreme pressure. • 1 200 km thick.	

WEEK: 2 CLASSIFICATION OF ROCKS

You must study with these questions in mind

Type	1. IGNEOUS	2. SEDIMENTARY	3. METAMORPHIC
What does it look like?			
How do they form?	• From molten minerals • Magma wells up from the mantle • Magma cools below or on top of the Earth's surface • Deep cooling results in the formation of crystals	• From pre-existing rocks and sediments • Contains organic material • Weathered sediments are deposited by wind, ice and water • Material deposited in horizontal layers • Sediments are compressed over time and form sedimentary rocks	• Sedimentary and Igneous rocks that are subjected to high temperatures and/or pressure • Physical and chemical changes take place • Folding and faulting exerts extreme pressure • Molten magma intrusions cause extreme heat and pressure
What are the characteristics ?	• Fine to coarse crystalline rock • Made up of different minerals • Jointed when exposed • colorful	• Layered in appearance • Coarse- or fine-grained texture • Can contain fossils • Each layer is called a stratum • Bedding plane separates different types of rock	• Brittle • Streaky in appearance

2.1.4	Recognizable remains of plants and animals preserved in rocks.	D	Metamorphic
2.1.5	Granite change under heat and pressure to…	E	Gneiss
2.1.6	Sandstone change under heat and pressure to …	F	Igneous
2.1.7	Limestone turns to … under heat and pressure	L	Sedimentary
		M	Shale

(7 x 1) (7)

2.2.7 The type of rocks used as building blocks.

2.2.8 Builders use their rocks for roof tiles.

(8 x 1) (8)

3.1.1 List the three major rock types that make up the earth's crust (3 x 1) (3)

3.1.2 How can one distinguish between igneous rock and sedimentary rock with naked eye (2 x 2) (4)

3.1.3 Briefly explain how igneous rock and sedimentary rock can be changed into metamorphic rock (2 x 2) (4)

3.1.4 Outline how metamorphic rocks can be changed back into sedimentary rock (2 x 2) (4)

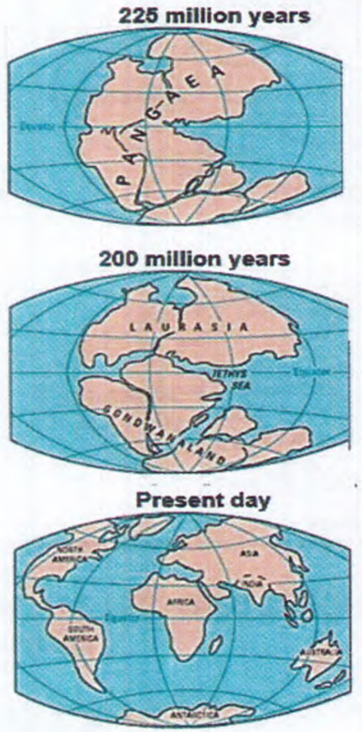
3.1.5 Give one way in which humans can make use of metamorphic rock (1 x 2) (2)

Refer to FIGURE 4

5.2.1 Refer to the diagram 5.2 showing world plate boundaries

5.2.1	What name did Alfred Wegener give to the one large supercontinent that existed before the continents broke up?	(1 x 1) (1)
5.2 2	All the continents and adjacent water masses are divided into tectonic plates. What is a tectonic plate?	(1 x 2) (2)
5.2.3	Name the plates found on either side of the boundary of South America?	2 x 1) (2)
5.2.4	Name this type of plate boundary	(1 x 1) (1)
5.2.5	Briefly explain how the tectonics move.	(1 x 2) (2)
5.2.6	Summarize, in a paragraph of approximately EIGHT lines, evidence that scientists use to prove the continents of Africa, Antarctica and South America were once joined.	(4x 2) 8)

DIAGRAM OVER TIME



Pangea

North - Laurasie
South - Gondwanna

North - N America, Asia
South - S America, Africa
India, Australia
Antarctica

EVIDENCE OF CONTINENTAL DRIFT

CONTINENTAL FIT

- Coastlines of South America and West Africa fit together like a jigsaw puzzle
- Rocks of similar age and sequence are found on both continents
- Mountain belts are the same on both continents
- Ore reserves match up across continents

FOSSIL MATCH

- Fossils of the same animals are found in South America and Africa,
- Some fossils are only found in Antarctica, India, South America, South Africa, and Australia
- Some of the fossils can only be found in Antarctica, India, and South Africa

SEA FLOOR SPREADING

- The age of the seafloor rocks is younger than the age of the continental rocks
- Ocean floor is new and is being added to on a regular basis
- Age of rocks on either side of the mid oceanic ridge mirror each other
- The youngest rocks are found closest to the ridges and the oldest rocks closest to the continents

GLACIAL DEPOSITS

- Similar glacial deposits are found in Antarctica, Africa, South America, India, and Australia
- Glacial striations show the direction of movement from the continents

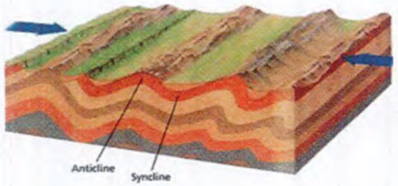
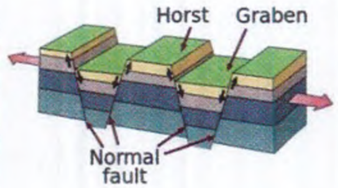
5.1.1 Who is the " father" of the continental drift theory? (1 x 1) (1)

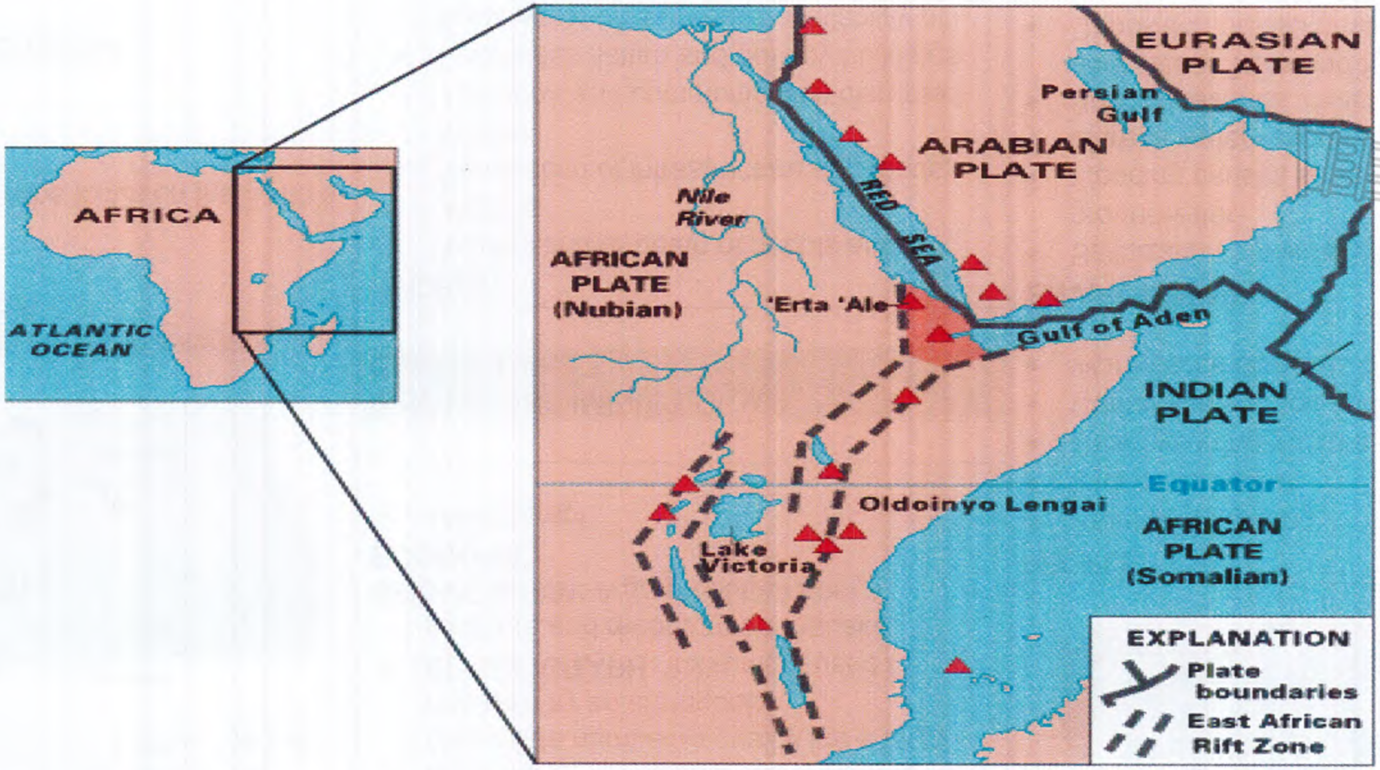
5.1.2 Recall the large water mass that existed 250 million years ago (1 x 1) (1)

5.1.3 Name the large landmass that existed 250 million years ago. (1 x 1) (1)

5.1.4 Name the TWO landmasses found in the north and south respectively when this large landmass split. (2 x 1) (2)

5.1.5 Locate any TWO of the present-day continents that use to be part of Gondwanaland (2 x 1) (2)

LANDFORMS		**Fold mountains**: At these colliding, compressing boundaries, rocks and debris are warped and **folded** into rocky outcrops, hills, **mountains**, and entire **mountain** ranges.		*Horst* and *Graben* are always formed together. *Graben* are usually represented by low-lying areas such as rifts and river valleys whereas horsts represent the ridges between or on either side of these valleys.



The East African Rift valley is 500 km long. It extends from the Syria to the Zambezi valley. There are many large lakes in the Rift Valley, the largest of which is Lake Tanganyika. The lake's surface is 760 m above the sea level and the bottom is 670 m below sea level. The eastern part of the African plate is breaking away from the western part. Many millions of years from now, the two parts will be separated by sea. The eroding highlands filled the valley with sediments. This created a good environment for the preservation of fossils. The bones of several hominid ancestors of modern humans have been found in the Rift valley, dating back over 3 million years. Many rift valley have steep sides called fault scarps.

<table>
<tr>
<td>Crack in the Earth's crust resulting from the movement of rock.

WAVE FRONTS:
Seismic waves releasing energy through the crust.

SEISMIC WAVES:
A wave of energy generated by an earthquake.</td>
<td rowspan="2">• Contaminated water cause health issues e.g. cholera
• Gas pipe leaks cause fires

ENVIRONMENT:
• Disruption of habitat
• Destruction of vegetation
• Landslides, mudslides
• Soil liquefaction
• Contamination of natural resources e.g. water, soil

• Businesses destroyed
• Reduce employment
• Expenses to rebuild/fix damages to infrastructure
• Developing countries are more affected because of lower economic growth
• A TSUNAMI can develop. A large wave produced by an Earthquake under the ocean</td>
<td rowspan="2">What strategies can be implemented to reduce the impact of Earthquakes and Tsunamis'?

• Develop early warning systems e.g. electronic media
• Upgrade the infrastructure e.g. buildings, sea walls
• Improved communication systems must be in place
• Disaster management program must be in place
• Coordinated rescue teams
• Unified plan of action for local services e.g. army, medical personnel, police
• Education of the population</td>
</tr>
<tr>
<td>WHAT CAUSES EARTHQUAKES?

• DIVERGENT PLATE boundaries cause tension to build up in crust.

• VOLCANOES: The sudden release of molten minerals through a crack in the earth's crust</td>
</tr>
</table>

	• Activities to consolidate what the educator taught to explain using sources / textbook and worksheets.
ERRORS/MISCONCEPTION/ PROBLEMATIC AREAS	• Differentiating between a seismogram and seismograph. • Differentiating between the Epicentre and the focus.
Differentiation	• Learners will be given more exercises for enrichment across differentiation
EAC	• Elaborate more on geographical terms, **EXAMPLE** ✓ Fault planes ✓ Plate movements • **Writing** Give the learners spelling activities to consolidate the spelling errors. • **Viewing and listening:** Data projector i.e. photos • Glossary of geographical terms around the classroom walls.

ACTIVITIES:

1. **READ THE SOURCE BELOW AND ANSWER THE QUESTIONS SET.**

EARTHQUAKE IN SA A MATTER OF TIME
By Pouza van der Fort

A major earthquake in South Africa is a real possibility but there is no way of predicting when it might occur. Durban has been singled out as the area of greatest concern in the event of an earthquake on the continent.
A major fault line starts underground at Port Shepstone and runs north through KwaZulu-Natal.
Dr. Hartnady from Umvoto Africa, a company that specialises in earth science research and consultancy, said that earthquakes occur when the tectonic plates of the Earth's crust move, slide, shear and grind against each other.
The intervals between major earthquakes of magnitudes greater than seven ranged between 500 and 1 000 years, he said. In some parts of the East Africa rift system, the last major quake might have occurred 1 000 years ago. The next time might be due anytime soon.
'It is not a question of if, but when and it could even be tomorrow,' said Hartnady

WEEK	**10-11**
TOPIC	**VOLCANOES**
SUB-TOPICS/ CONTENT	• Types of volcanoes • Structure of volcanoes • Impact of volcanoes on people and the environment • Use of Case studies
RELATED CONCEPTS	• Intrusive volcanism – the movement of magma within the earth's crust • Extrusive volcanism – the movement of magma from the crust to the earth's surface • Batholith - Huge mass of igneous rock linked directly to the source of magma. • Laccolith - Dome shaped mass of igneous rock • Lopolith - Saucer shaped mass of igneous rock • Sill - magma penetrates horizontal bedding planes and solidifies • Dyke - Magma penetrates vertical joints in cracks and solidifies • Volcanic cone characteristics.
PRIOR BACKGROUND AND KNOWLEDGE	• Grade 7: Recent volcanic eruptions in news.
RESOURCES	• Telematics broadcasts • Video clips • Climate maps in Atlas • Windy TV • Atlases showing Aerial photographs • World maps showing the ring of fire and location of volcanoes
ACTIVITIES/ASSESSMENT	• **TASK 3**: A3 MAP WORK 60 MARKS Orthophoto maps to be used in conjunction with1:50000 maps and aerial photos • TASK 4: JUNE CONTROLLED TEST
METHODOLOGY	• Explain concepts - refer to the list above • Explain the difference in the characteristics on each volcano type.

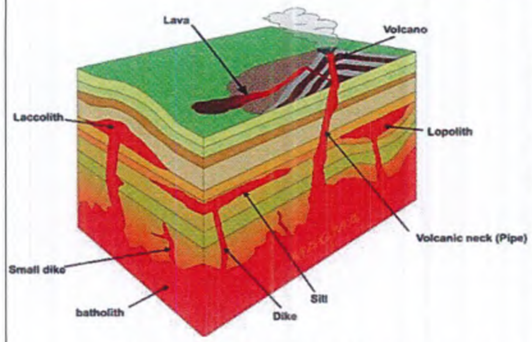
WEEK 8&9 VOLCANOES

You must study with these questions

HOW DOES A VOLCANO FORM?

- Magma rises through cracks in the Earth's crust.
- When pressure is released, e.g. as a result of plate movement, magma explodes to the surface causing a **volcanic** eruption.
- The lava from the eruption cools to form new crust.
- Over time the rock builds up and a **volcano** form.

IDENTIFY DIFFERENT TYPES OF VOLCANOES?



- **Extrusive volcano:** When magma pours onto the Earth's surface as lava.
- **Intrusive volcano:** When magma cools and solidifies within the Earth's crust.
- **Active volcano:** Volcano that erupt regularly.
- **Dormant volcano:** Volcano that is not currently erupting but is still capable of erupting.
- **Extinct volcano**: Volcano that has not erupted in recorded history.

SHIELD VOLCANO	COMPOSITE/STRATOVOLCANO	CINDER CONE VOLCANO
• Wide with gentle slopes • Low viscosity, lava flow slow and far before it hardens • Forms a shield-like mound • Volcanic islands	• Tall steep sided • Alternating layers of lava and ash • Explosive volcanoes • Small crater • Lava highly viscous does not flow far before it hardens	• Smaller than stratovolcano • Steep sides • Mainly rock and ash deposits, less lava flow • Large, bowl shaped crater

Aerial Photographs

Map: a graphic representation on the real world portraying natural and man-made features made to scale.

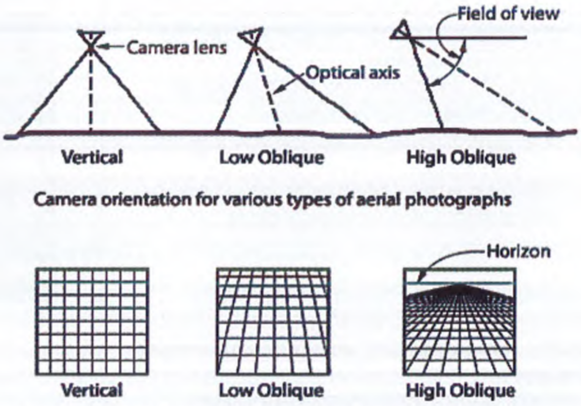
Types of aerial photographs

- These are photographs that are captured with a camera above the surface of the Earth.
- Word **"aero-"** means **air**.
- Therefore, aerial photographs are photographs of the Earth features captured (taken) from the air.
- There are **Three** types of aerial photographs used in geography.

i.e.

- Low Oblique aerial photographs
- High Oblique aerial photographs
- Vertical aerial photographs

FIG 1



Camera orientation for various types of aerial photographs

How a grid of section lines appears on various types of photos.

FIG. 2

Low Oblique aerial photographs

- These are aerial photographs taken (captured) from above the surface of the Earth with **a camera angled at 30°** to the vertical (optical) axis.
- They do not show the horizon (skyline)

Disadvantages

- They capture (cover) a small defined area.
- Features (objects) in the foreground are distorted (inaccurate), which means they appeared larger than those in the background.
- Objects on the foreground obscure (hide) objects in the background.
- It is difficult to apply **scale** to the photograph; objects are distorted (represented inaccurately).

Advantages

- Features (objects) are more recognisable.
- Heights of objects can be compared.

High Oblique aerial photographs

- These are aerial photographs taken (captured) above the surface of the Earth with **a camera angled at 60°** to the vertical (optical) axis.
- The horizon (skyline) can be seen.

Disadvantages

- Features (objects) in the foreground are distorted (inaccurate), which means they appeared larger than those in the background.
- Objects on the foreground obscure (hide) objects in the background.
- It is difficult to apply scale to the photograph; objects are distorted (represented inaccurately).

Advantages

- The area photographed is large.
- Features (objects) are more recognisable.
- Heights of objects can be compared.
- They represent features on Earth with a **bird's eye view** (view of objects from above).

Orthophoto Map

Grid Code and

FIG. 7

Less than

Scale

Orthophoto map

- It is a **rectified** vertical aerial photograph.
- The mapped area is formed of **25 vertical aerial photographs**.
- It is a **large scale** vertical aerial photograph.
- It is a photographic map with additional information.
- It is a **black, white or grey** photographic image (black and white or grey).
- It is a photograph with useful additional map information such as **grid code***, names of roads, places, route numbers and **scale**.
- It has contour lines with **5 metres** interval (***NB: check the legend information at the bottom of the orthophoto map for assurance***),
- Trigonometrical stations and spot heights and benchmarks and contour lines show relief.
- The scale is **1:10 000** which means **one centimetre on a map represents ten thousand centimetres in reality**.
- An orthophoto map represents **3 minutes' latitude by 3 minutes' longitude** – a **full orthophoto map**. It can be **55 cm x 50 cm** excluding the border information.
- This represents a ground distance of **5,5 km x 5 km** or just an **area of 25km²**.
- **25 orthophoto maps** cover **one topographic map sheet** (a **full topographic map**).
- Orthophoto maps **cover metropolitan** (urban areas) and **peri-urban** (edge of the urban areas) areas of the mapped area of the topographic map.

NB:

An extract orthophoto map will cover **less than 3' latitude x 3' longitude**.

Advantages

- It is a **rectified*** image.
- It has a **standardised*** scale.
- It is easy to read and interpret; they are photographic representations of the reality.
- Useful in planning new developments, they cover the metropolitan and peri-urban.
- It has a large scale, much details of the natural and constructed features are shown, it complements other maps.

Orthophoto Map

CONCEPTS

Rectified: It is when a photographic image of an area is scanned, digitised and manipulated (changed) so that each pixel can be accurately geo-referenced.

Grid Code/Reference: a set of latitude and longitude degrees (numbers) with letters (Big and Small block) representing the exact location of the mapped area.

Standardised: To make it the same for every South African map.

Locating exact position.

A degree expresses the exact position of a point or place on the Earth's surface. A degree of latitude (or longitude) is divided into 60 **minutes.** Minutes are divided into 60 **seconds**. The symbols used are:

Degree; °

Minutes;'

Seconds; ''

Topographic Map

- A map that accurately represents surface features i.e. human/cultural and natural (relief and drainage).
- It is a **small scale map** than the orthophoto map, objects are smaller as it represents a larger area.
- It uses symbols (conventional signs) points, lines and area symbols in colours:
  - **Blue:** water and drainage
  - **Black:** constructed human features.
  - **Red:** main roads, arterial roads, lighthouse and marine lights.
  - **Green:** vegetation, cultivation and recreational areas.
  - **Brown:** slopes (contour lines), soils/sand and rock outcrop.
- Features are **generalised** (reduced) to scale from the vertical aerial photograph or orthophoto map
- It includes information such as **names of places, route numbers, national and provincial boundaries**.
- **Elevation** (height above sea level) clues are provided **in contour lines** (brown) with an interval of 20 metres ***(NB: check the notes on the bottom edge of the map for assurance***)
- **Spot heights, trigonometrical stations** and **bench marks are also used to portray elevation**.

NB:

- New developments on updated topographic maps are represented in **purple colour**.
- It has a **1:50 000** standardised scale - which means **one centimetre on the map represents fifty thousand centimetres in reality**.
- Each topographic map sheet covers **15' latitude by 15' longitude**

ACTIVITY

1. Define the following terms related

    1.1 Map (1x2)(2)

    1.2 Map scale (1x2)(2)

2. Name 4 types of scale (1x4)(4)

3. Match the concepts on the right with definition on the left. Write ONLY the letter

3.1 Minutes	A. expresses the exact position of a point or place on the Earth's surface.
3.2 Vertical aerial photograph	B. It is a rectified vertical aerial photograph.
3.3 Degree	C. Are usually taken with a camera vertical directly above the surface at 90° to the vertical (optical) axis.
3.4 Orthophoto	D. Divide minutes on a map.
3.5 Seconds	E. Divides degree of latitude (or longitude).

(1x5) (5)

4. Identify and explain the two types of aerial photographs. (2x2) (4)

[17]