

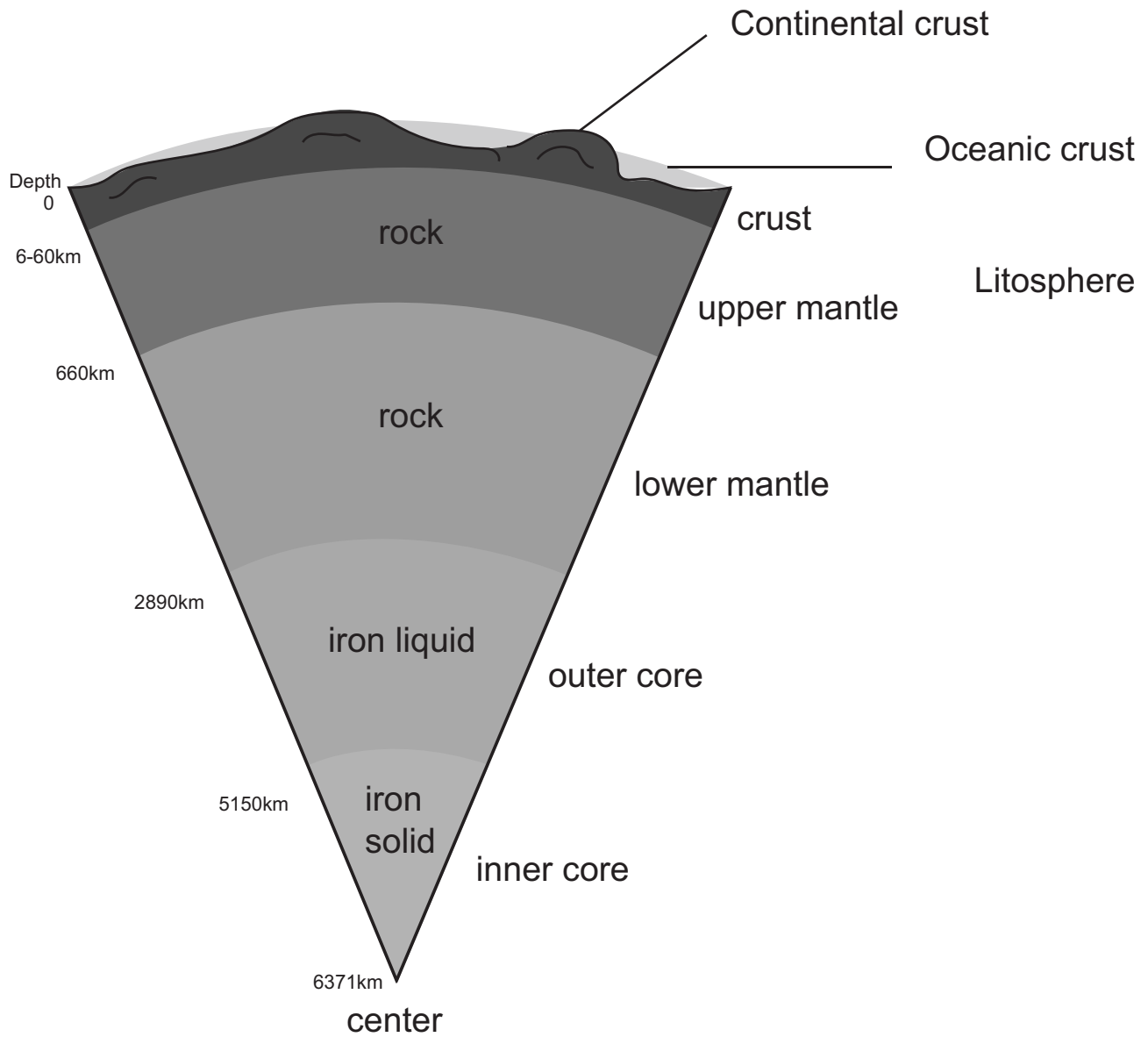
NATURAL SCIENCES

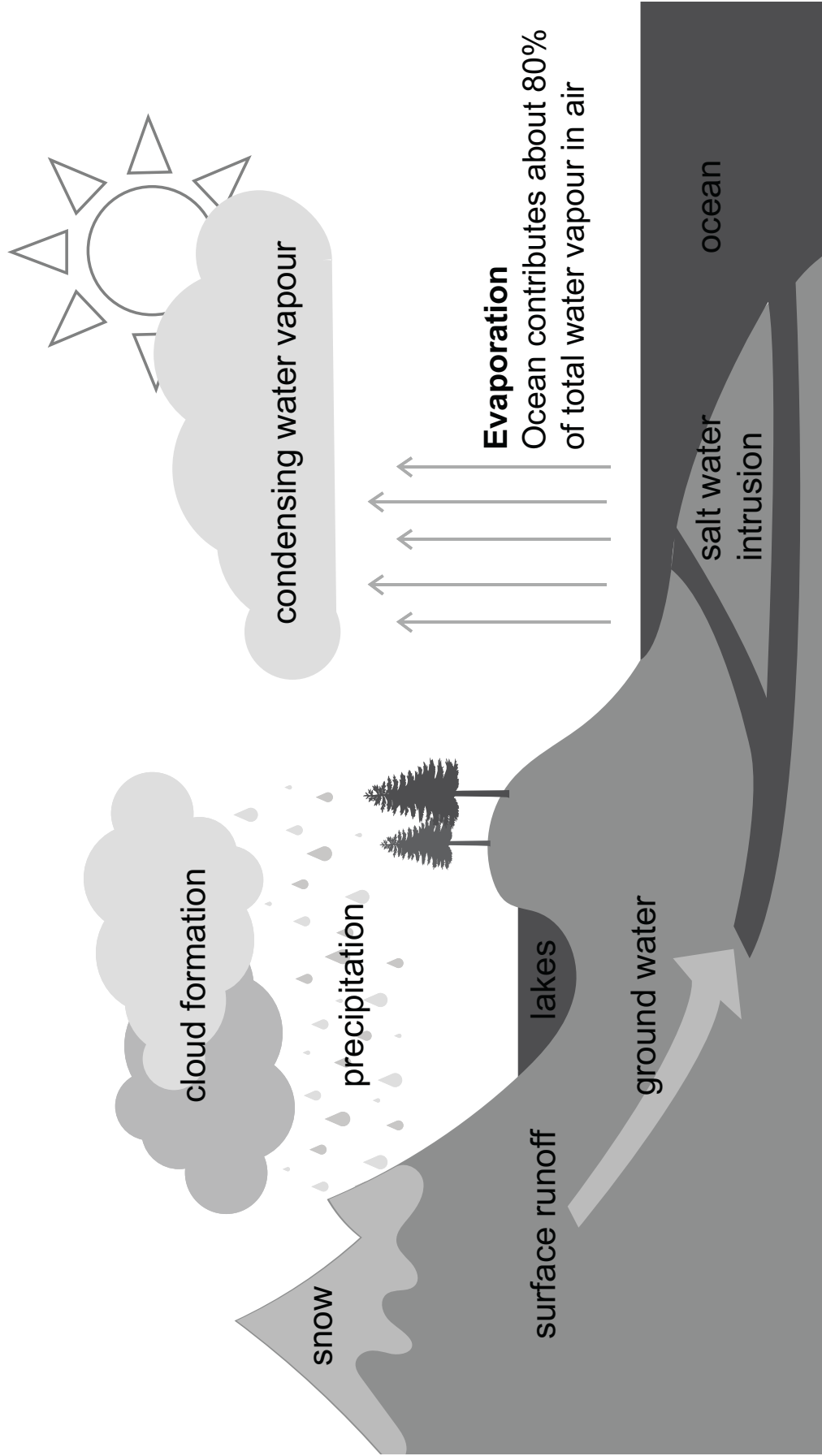
RESOURCE PACK
GRADE 9 TERM 4



RESOURCE 1

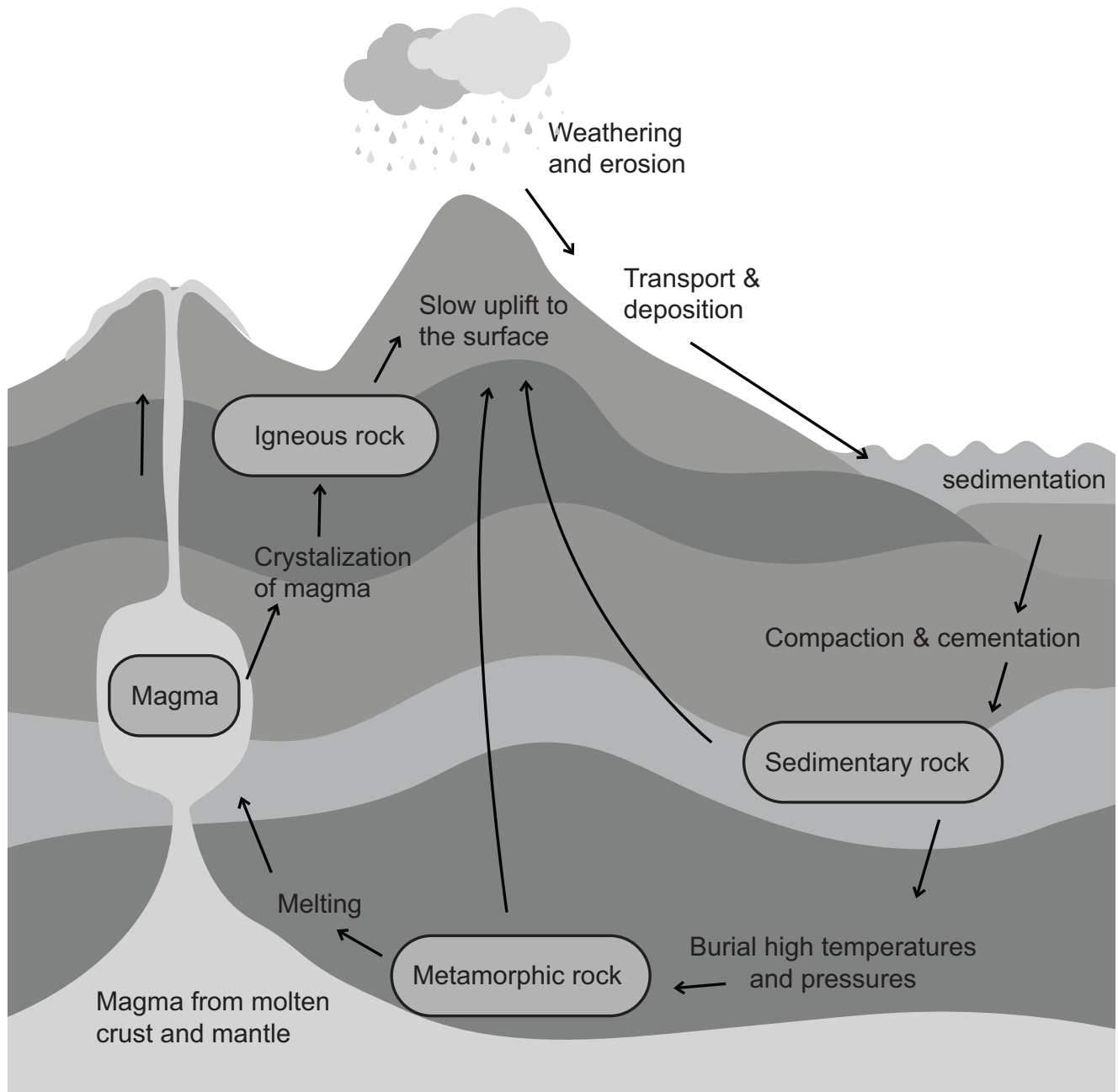
THE LAYERS OF THE EARTH





RESOURCE 3

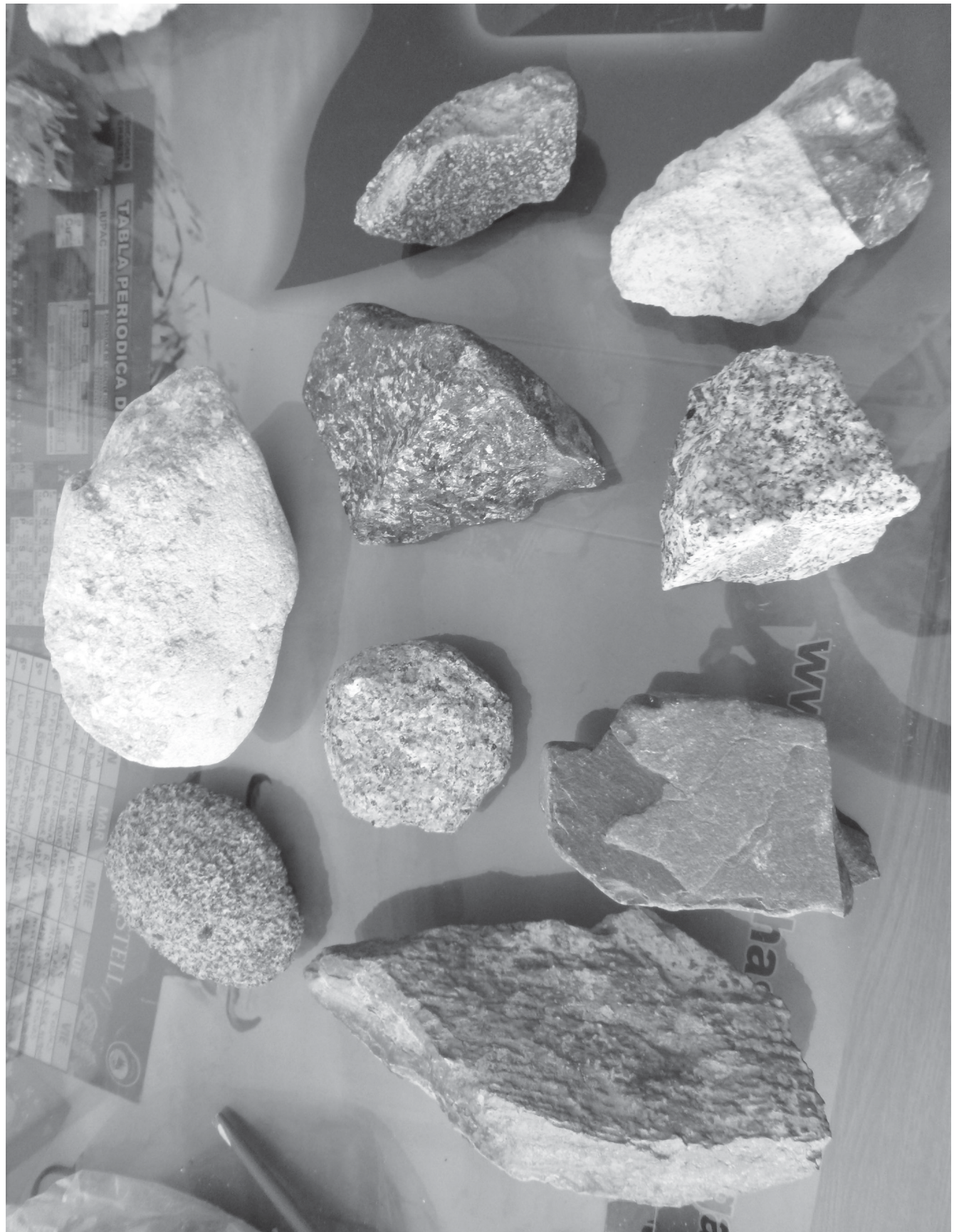
THE ROCK CYCLE



RESOURCE 4

Source: https://commons.wikimedia.org/wiki/Igneous_rock#/media/File:Rocas_Igneas.JPG

EXAMPLES OF IGNEOUS ROCK



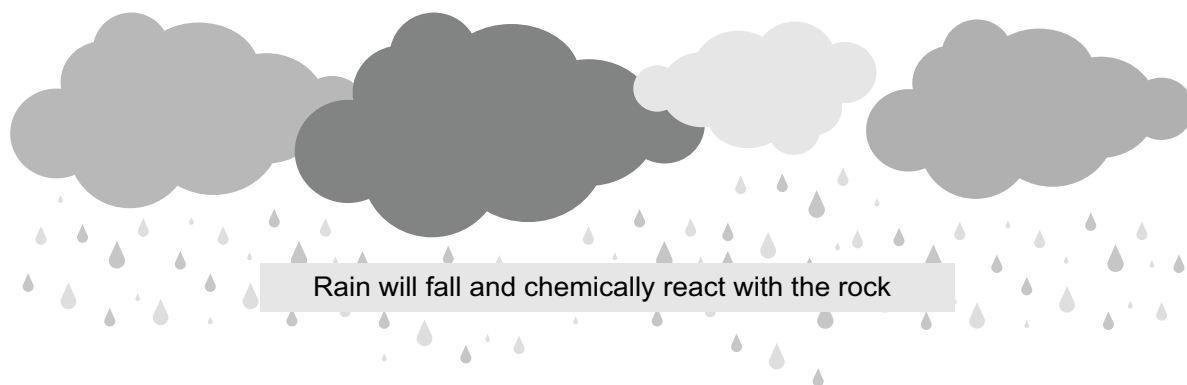
RESOURCE 5

CHEMICAL WEATHERING

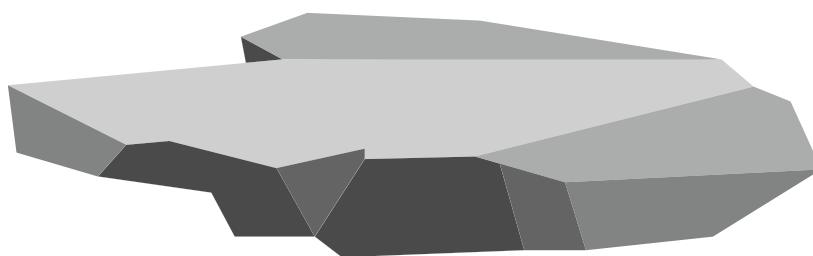
A. Chemical Weathering

Rain water is naturally acidic. It has an average pH of 4.5.

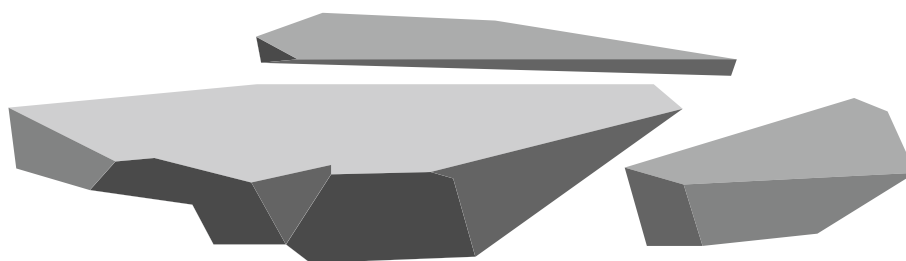
Because it is an acid, it can react with rocks on the ground and cause them to wear away.



This process repeats itself many times and the rock begins to get smaller



Eventually the rock will become lots of small pieces and may get washed away



South Africa's coal supply has very high sulphur content. South Africa generates most of its electricity by burning this coal. This releases sulphur dioxide into the atmosphere.

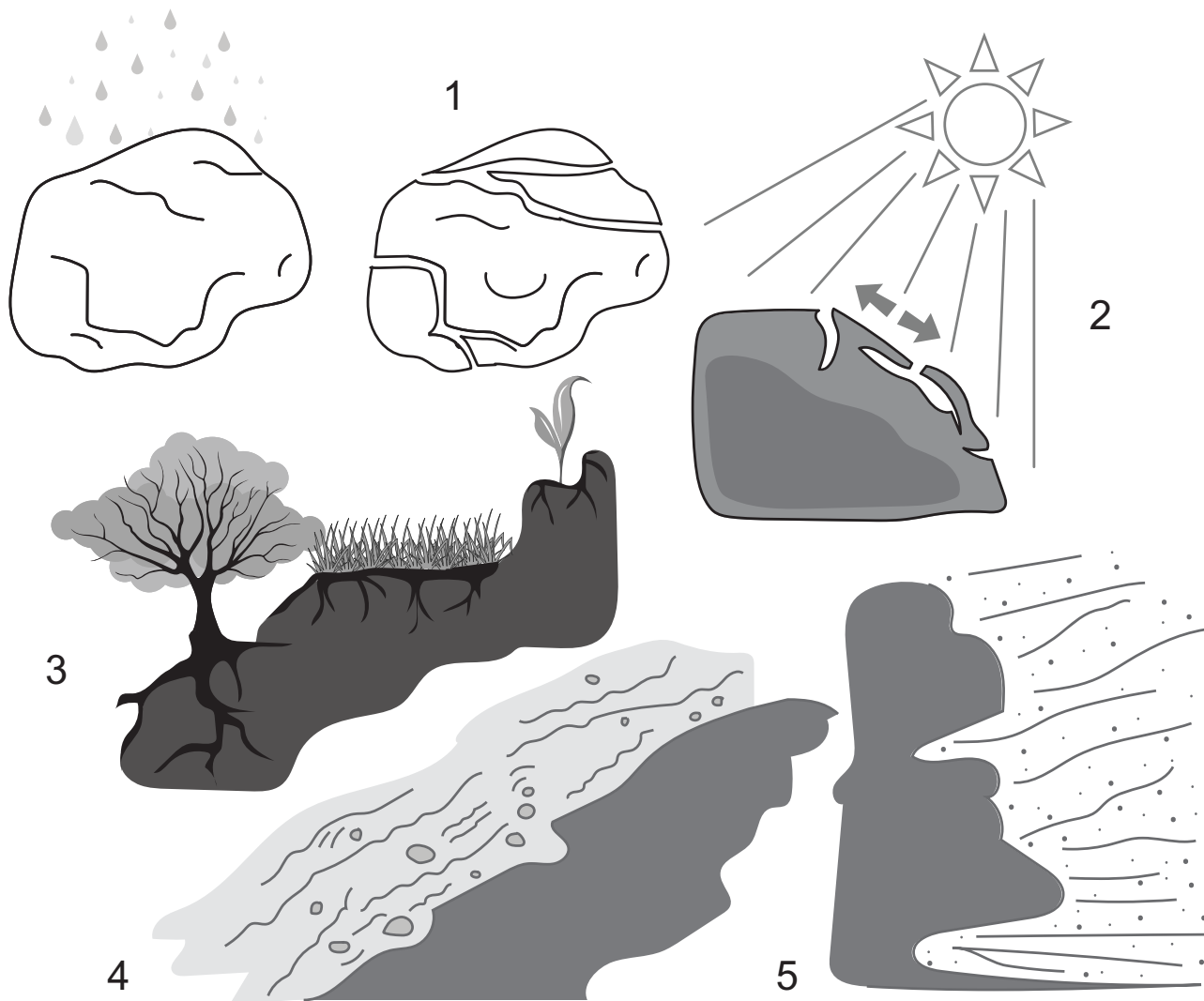
When it rains the sulphur dioxide mixes with rain water and causes the rain to become more acidic.

This will speed up the process of chemical weathering.

The Actual formation of sedimentary rocks can take millions of years.

RESOURCE 6

MECHANICAL/PHYSICAL WEATHERING

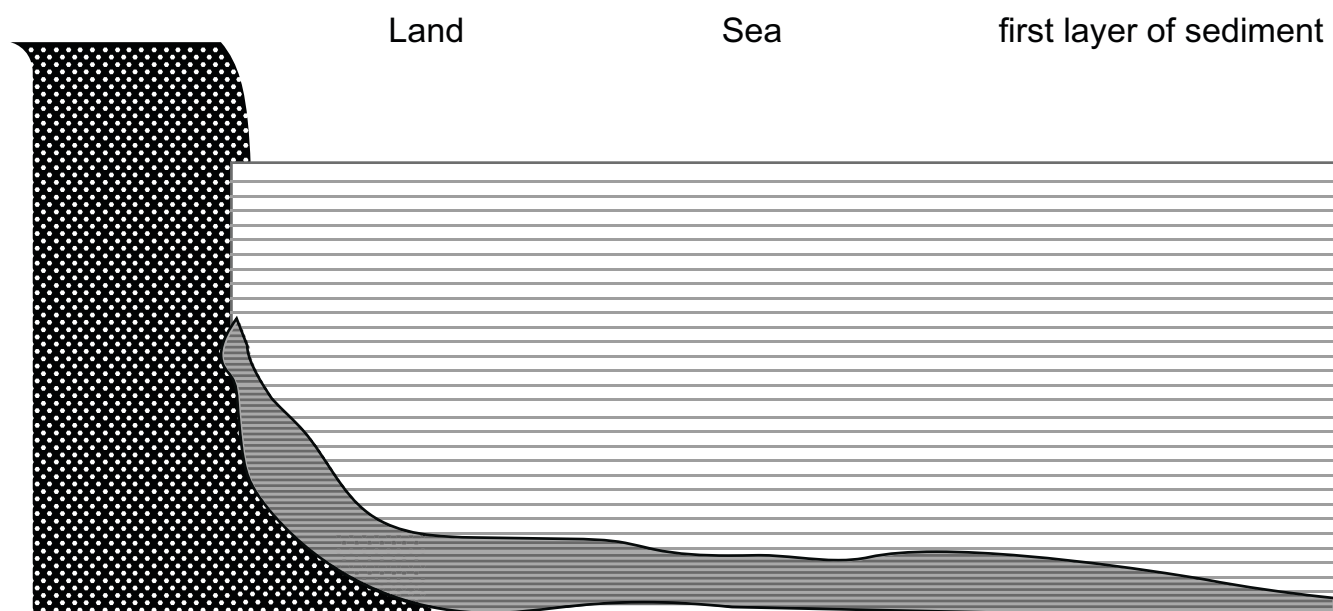


1.
 - a. Rain water collects in the rock cracks.
 - b. When the water freezes it expands.
 - c. The force of the expanding ice causes the rock to crack further into small pieces.
2.
 - a. The sun heats the surface of the rock.
 - b. The hot surface of the rock expands but the cooler inside of the rock does not expand.
 - c. The expansion of the hot rock causes the rock to crack into smaller pieces
3.
 - a. Wind disperses the plant seeds.
 - b. Plant seeds land in the cracks of rocks.
 - c. The seed germinates and starts growing.
 - d. The roots push their way into the rocks and this causes the rock to break.
4.
 - a. Streams of water constantly bombarding rocks weakens the rock.
 - b. The force of water breaks pieces off the rock.
 - c. Forces of wind can also cause bit of rock to break away.

RESOURCE 7

SEDIMENTATION

1. Pieces of eroded rocks settle on the sea floor

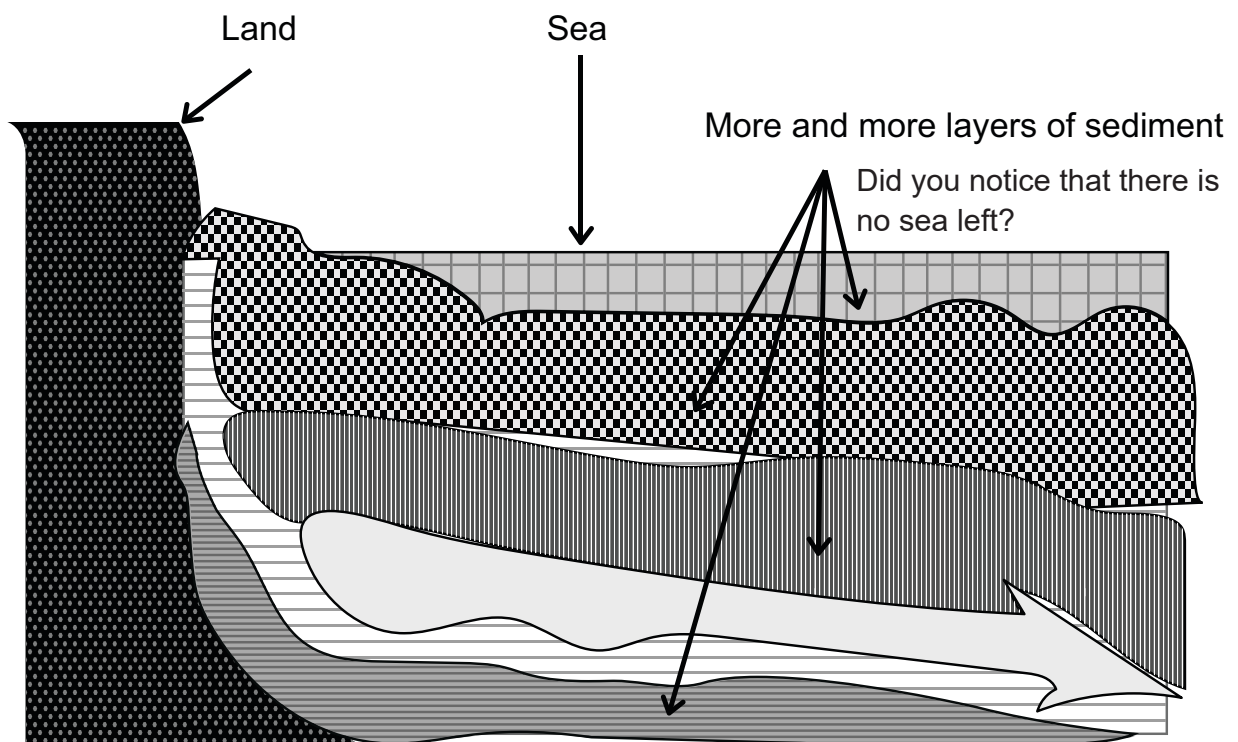
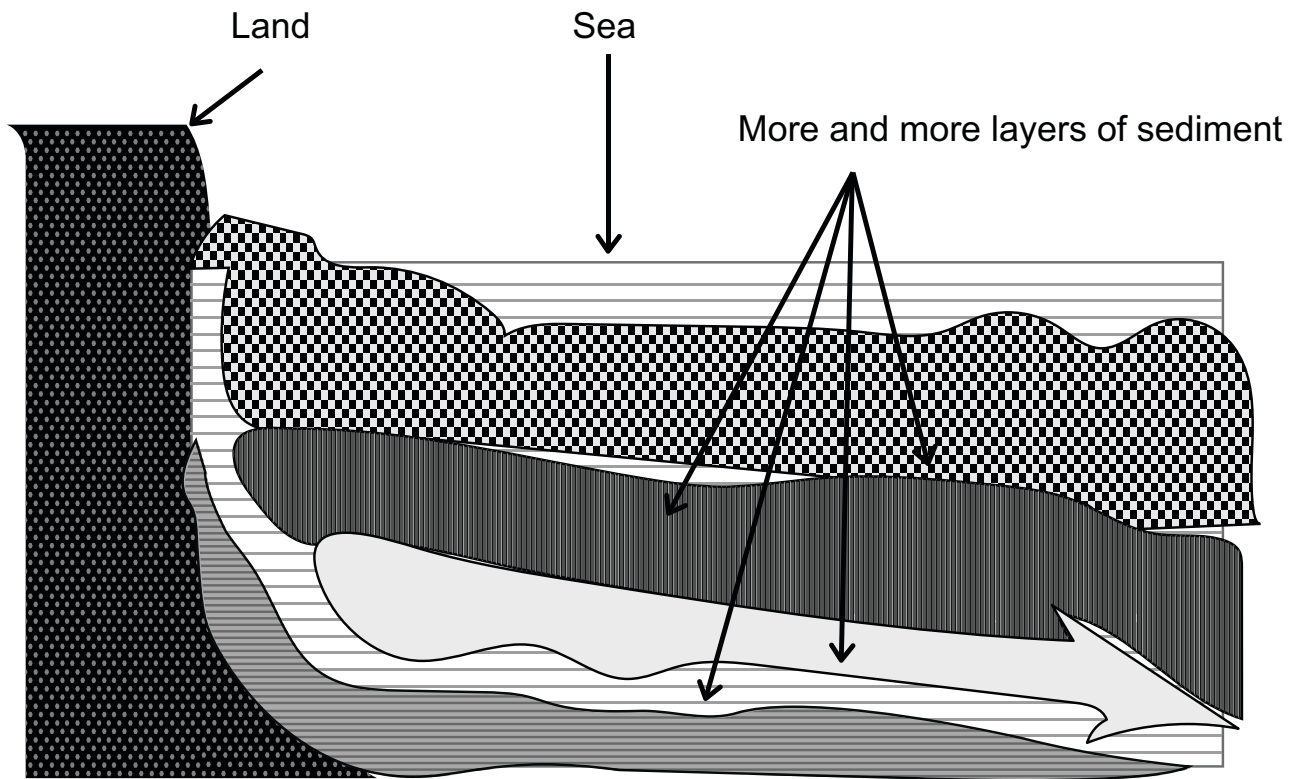


2. After time more layers of sediment settle on the sea floor and press down on the lower layers this is called compaction. This compaction forces the water out between the sediment particles

RESOURCE 8

THE PROCESS OF SEDIMENTATION AND CEMENTATION

3. The salt from the sea water glues the sediment layers together. This is cementation and a sedimentary rock mass is formed



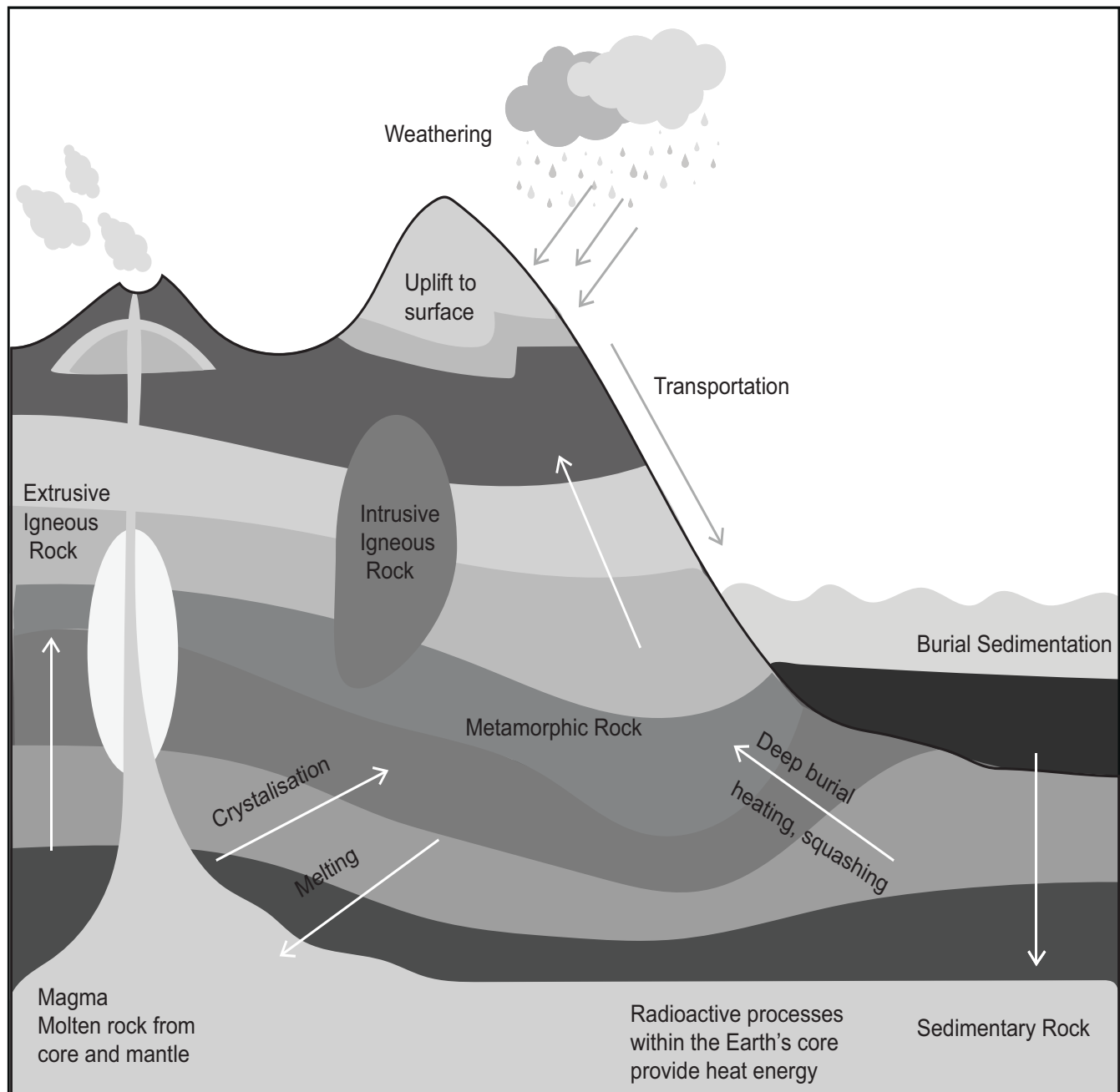
RESOURCE 9

DRAKENSBERG MOUNTAINS



RESOURCE 10

THE FORMATION OF SEDIMENTARY ROCK



There are two ways that **Sedimentary rocks** are formed:

Pressure:

- As layer after layer of sediments are deposited, the lower layers are pressed together tightly under weight of layers above.

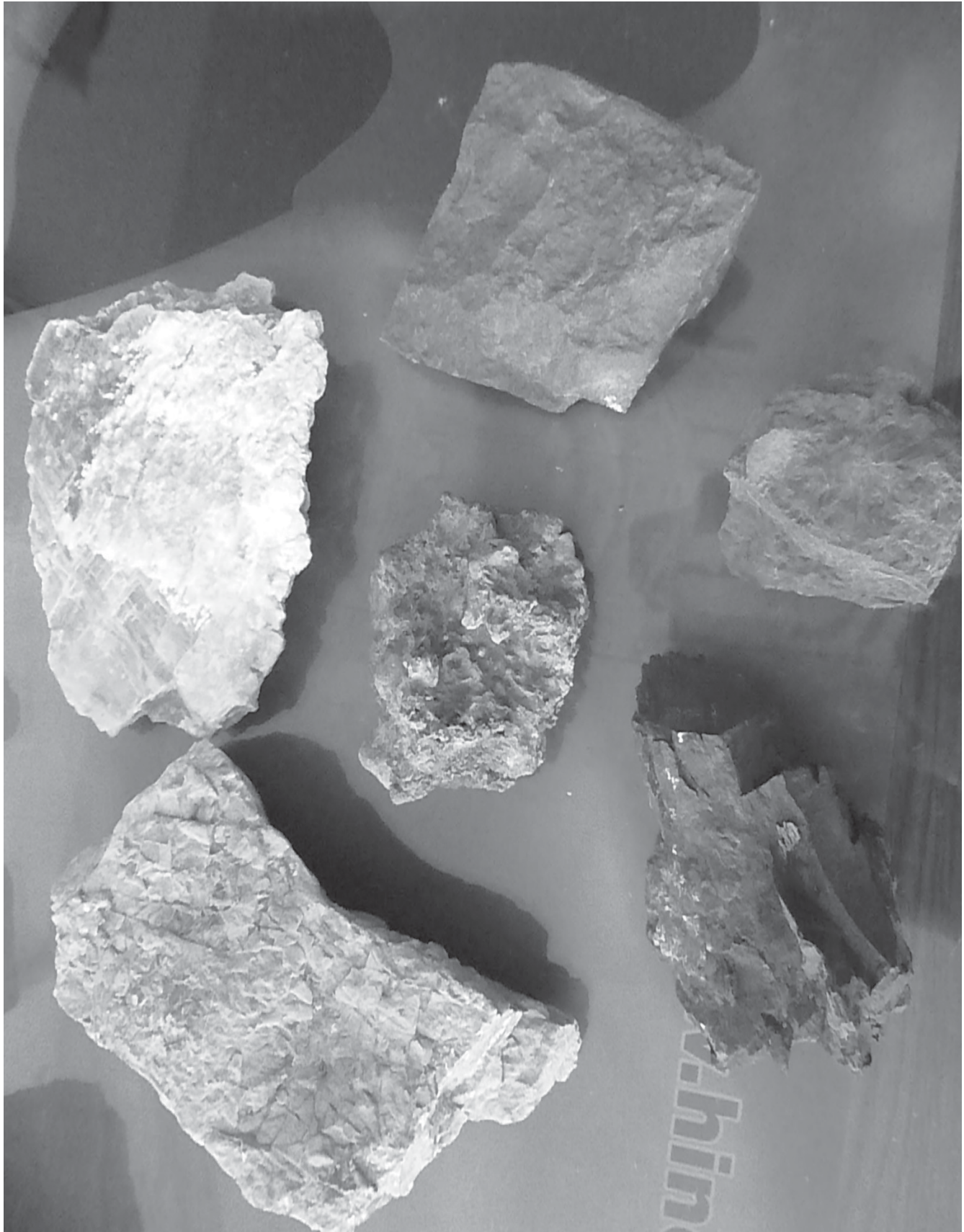
Cementing:

- Some sediments are glued together by minerals dissolved in water.

RESOURCE 11

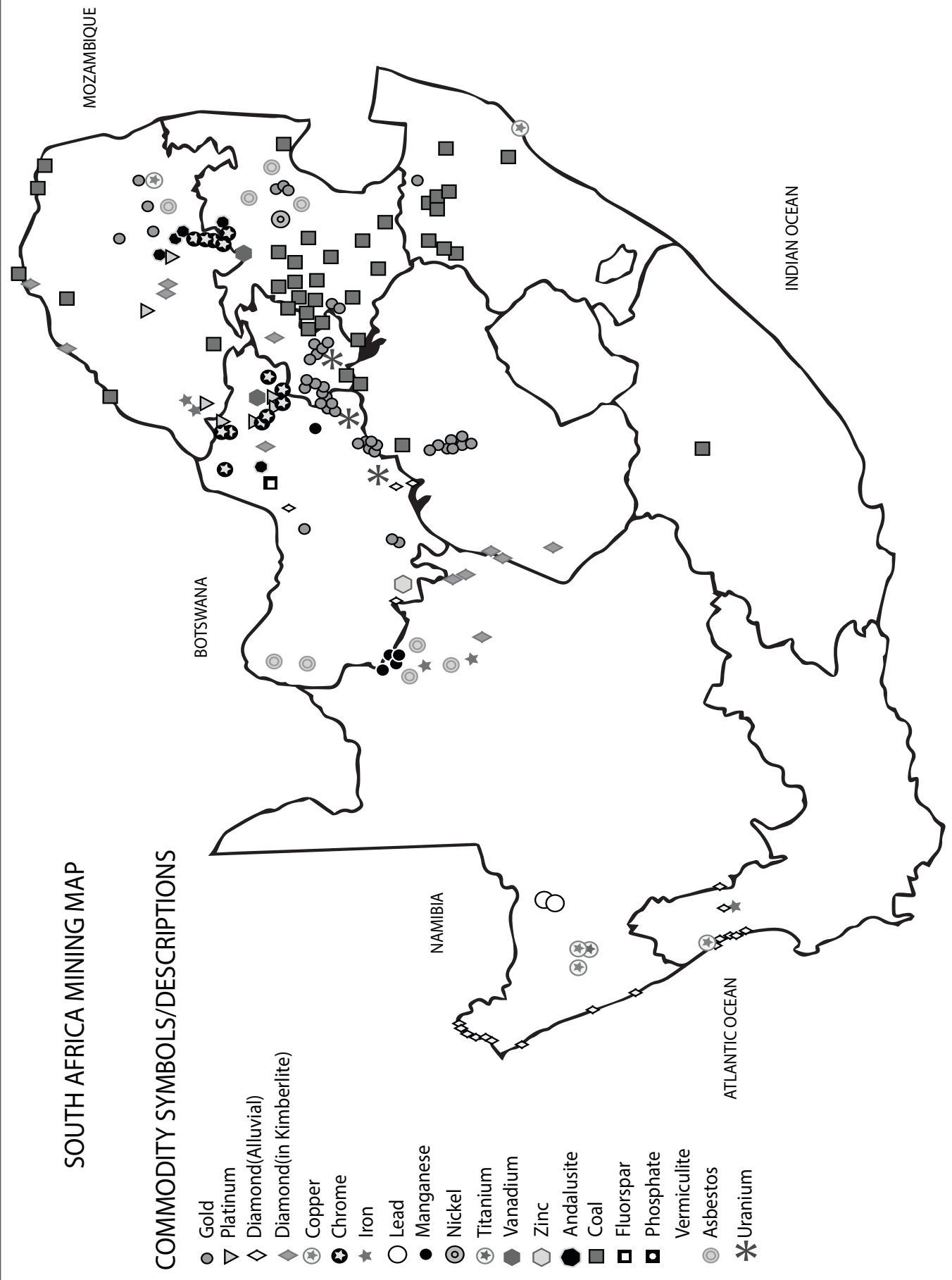
Source: https://commons.wikimedia.org/wiki/Sedimentary_rock#/media/File:Rocas_Sedimentarias.JPG

EXAMPLES OF SEDIMENTARY ROCKS



RESOURCE 12

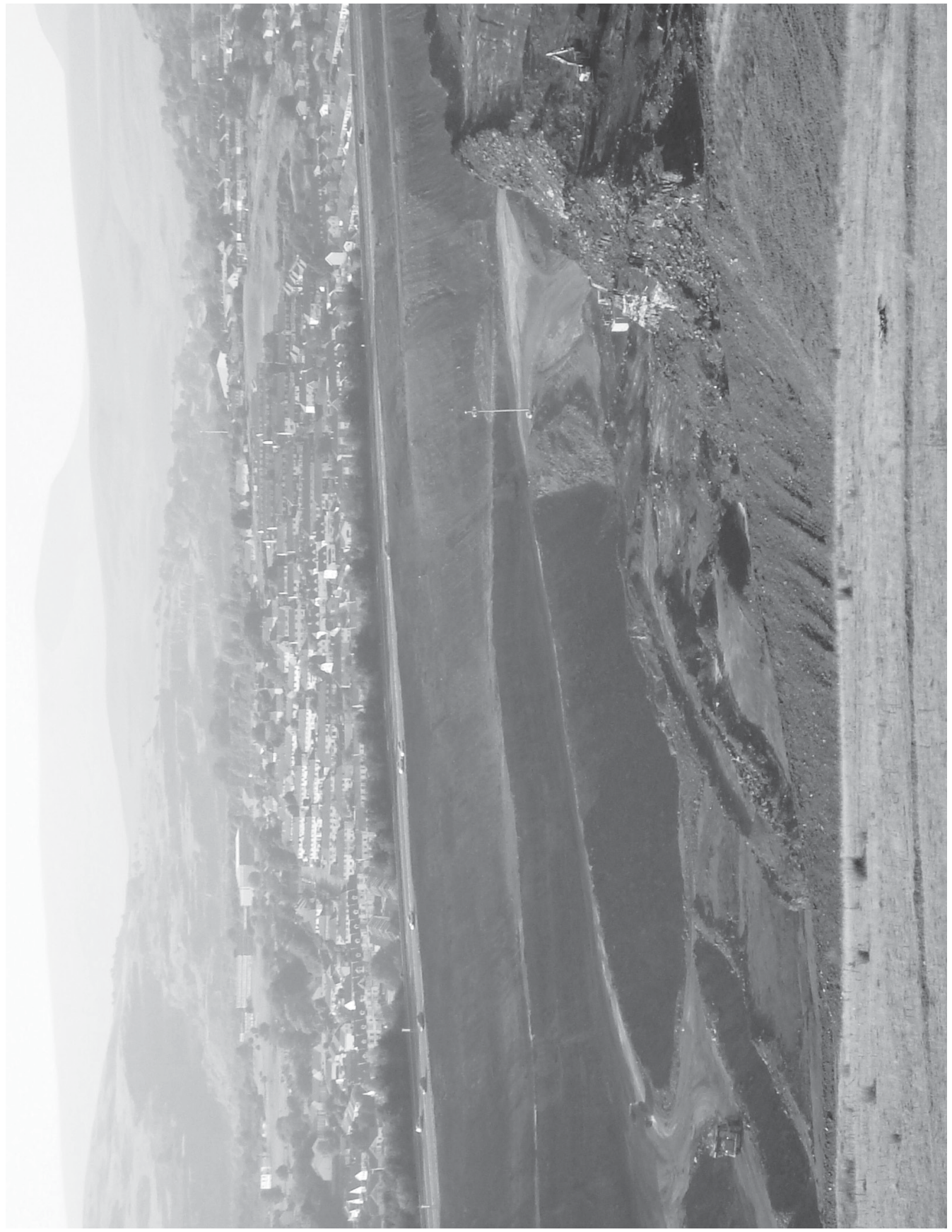
A MAP SHOWING DISTRIBUTION OF MINES IN SOUTH AFRICA



RESOURCE 13

Source: <http://www.mstworkbooks.co.za/natural-sciences/gr9/images/gr9eb03-gd-0004.jpg>

AN OPEN CAST MINE



RESOURCE 14

Source: https://commons.wikimedia.org/wiki/file:general_scene_underground_in_the_virginia-pocahontas_coal_company_mine_%5e3_near_richlands,_virginia._The_tunnel_is..._-_Nara_-_556319.tif

A TUNNEL IN AN UNDERGROUND MINE



RESOURCE 15

BIG HOLE: KIMBERLEY [Historic diamond mine]



Kimberley Hole is a disused diamond mine. The first diamond was found in 1866 in the Kimberley area in which led to a rush of prospectors to the area. The mine was closed in 1914 but not until 3 tons of diamonds had been excavated.

Kimberley hole was dug by hand. It is 240 meters deep and 463 meters wide. It is now filled with water.

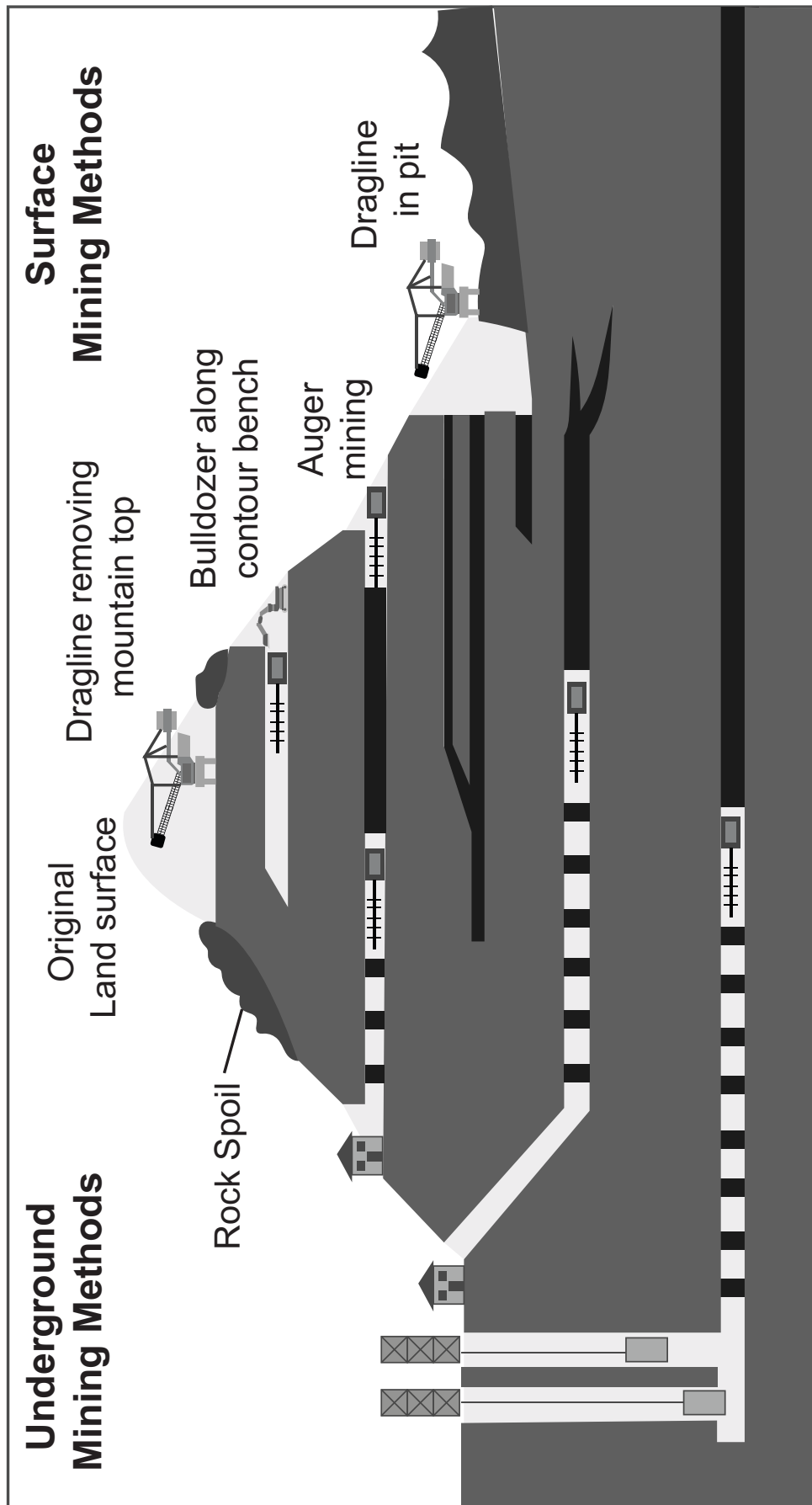
Kimberley hole is part of a large volcanic pipe made of Kimberlite. Kimberlite is an igneous rock which sometimes contains diamonds. The last diamond mine in Kimberley closed in 2005 because there are no diamonds left.

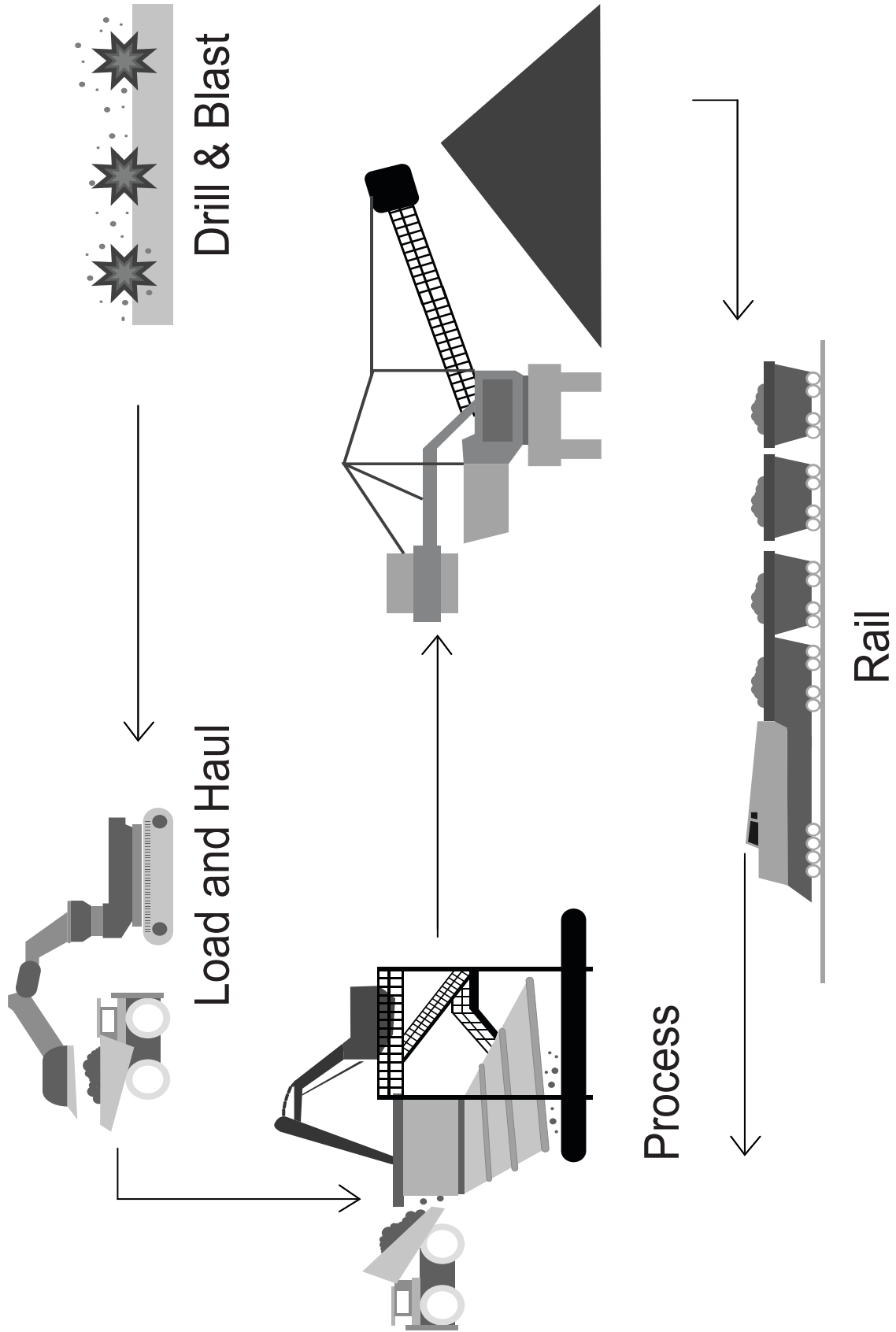
RESOURCE 16

Source: <https://www.ft.com/content/31c218dc-f110-11e1-b7b9-00144feabdc0>

MINING IS LABOUR INTENSIVE, DANGEROUS AND DIFFICULT



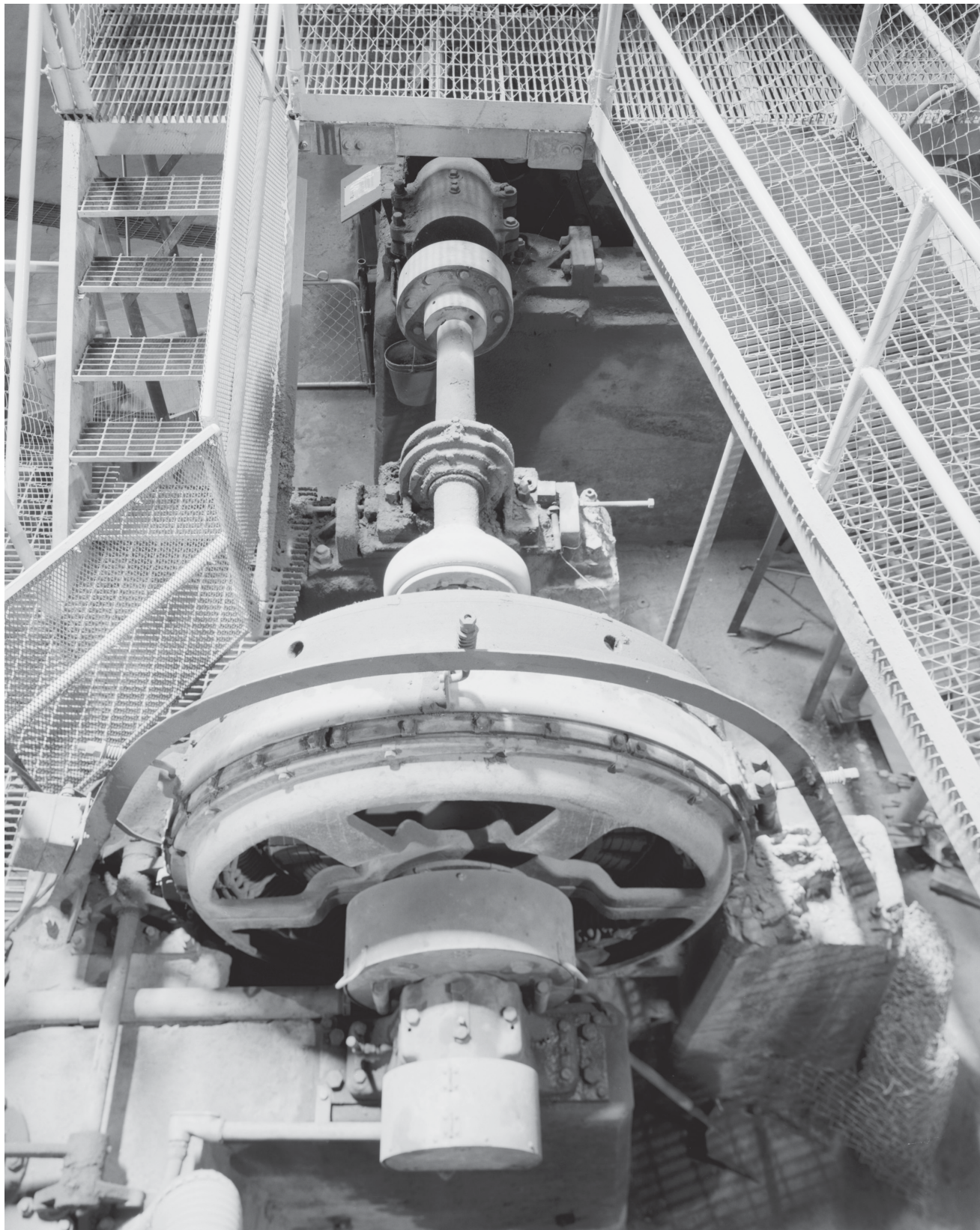




RESOURCE 19

Source: https://commons.wikimedia.org/wiki/File:GENERAL_ELECTRIC_250-HP

PHYSICAL AND CHEMICAL PROCESSING OF ORE



The ores can be crushed in a ball mill. Ball bearings inside the mill crush the ore.

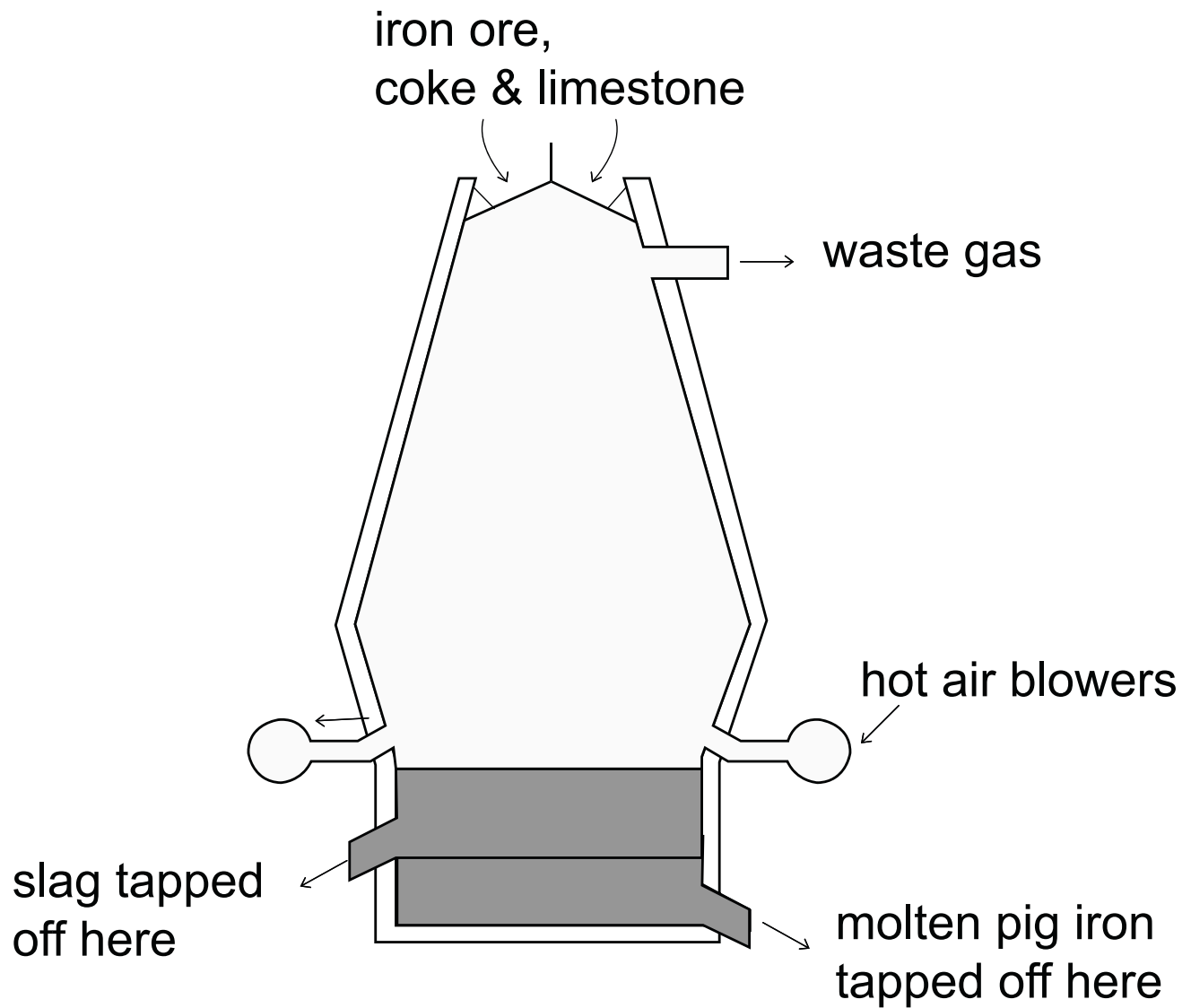
RESOURCE 20

Source: <https://mrl.ies.ncsu.edu/mineral-processing-and-analytical-equipment/>

SEPARATING MINERALS BY FLOTATION



Flotation is a type of chemical processing and works by adding chemicals to the ores with water. This makes slurry. Air bubbles are blown through the slurry. The air molecules attach themselves to the minerals which cause them to float. The minerals can be scrapped off easily from the top.



RESOURCE 22

Source: https://upload.wikimedia.org/wikipedia/commons/e/eb/Clouds_%28%E0%A6%AE%E0%A7%87%E0%A6%98%29.jpg

THE ATMOSPHERE

The Troposphere

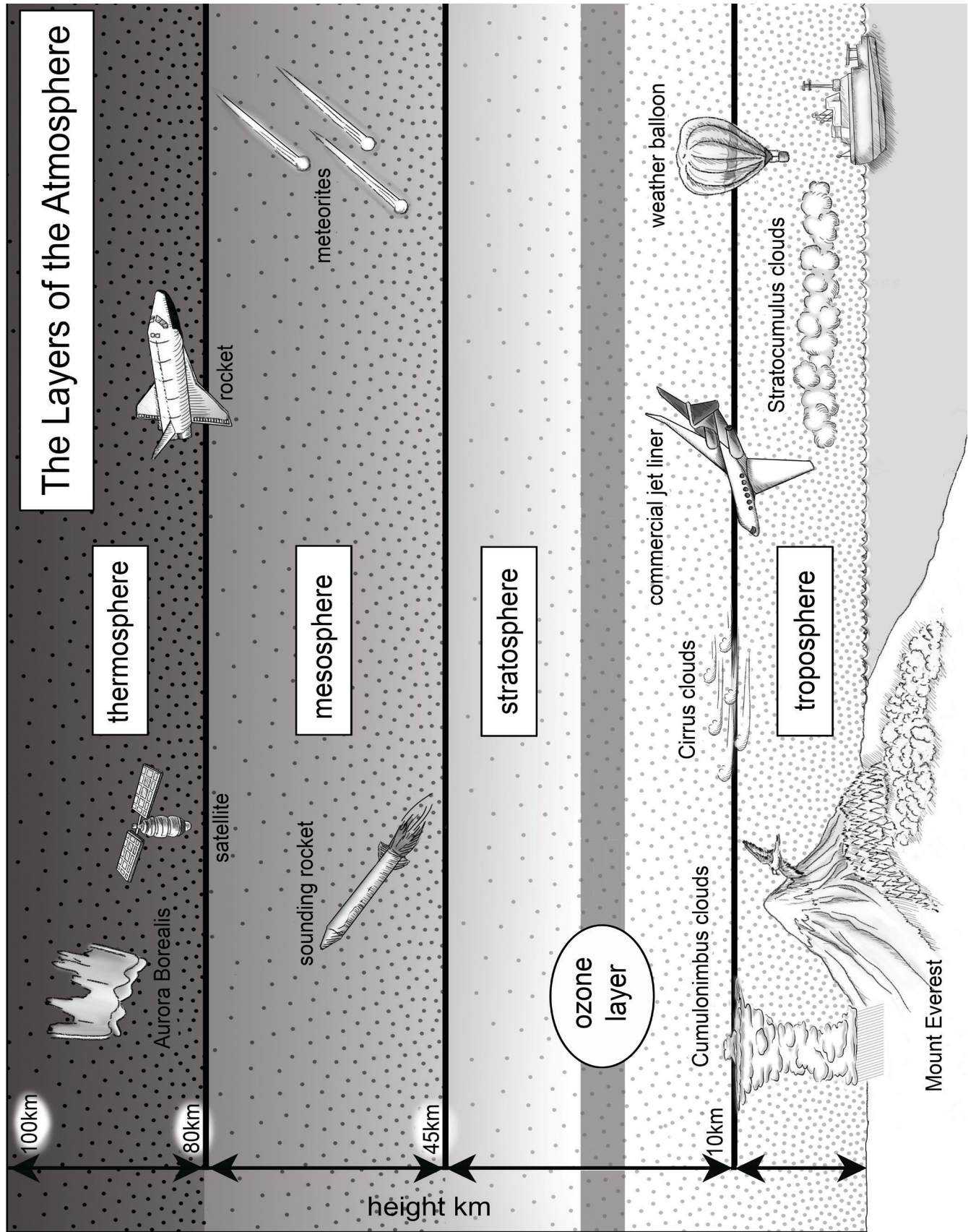


Clouds forming in the troposphere

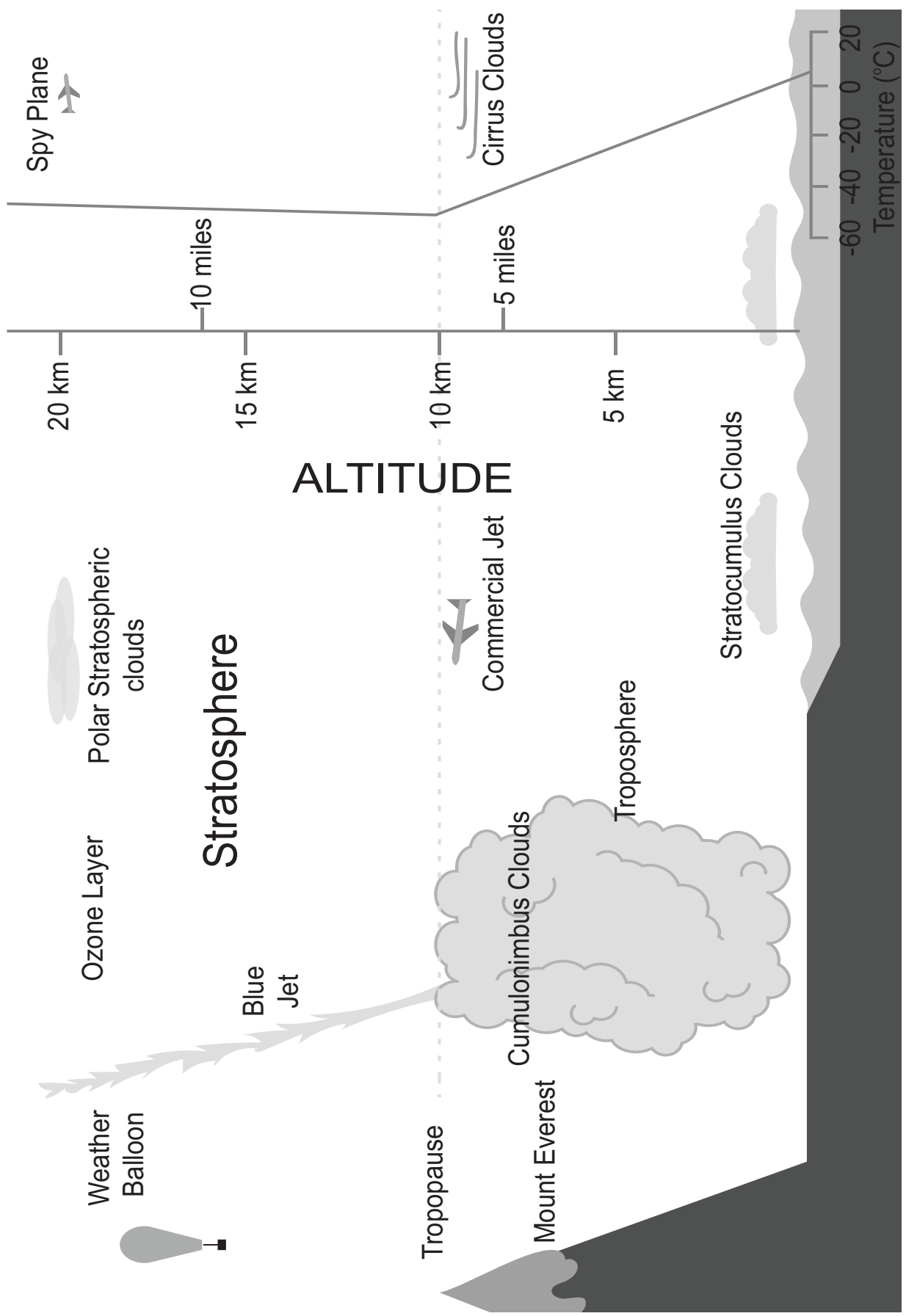
RESOURCE 23

Source: <https://qph.ec.quoracdn.net/main-qimg-0d3ab62751f4b8ae5028496e501e657>

THE ATMOSPHERE



THE FEATURES OF THE ATMOSPHERE



RESOURCE 25

Source: https://commons.wikimedia.org/wiki/Weather_balloon#/media/File:GlobusSonda.jpg

THE STRATOSPHERE

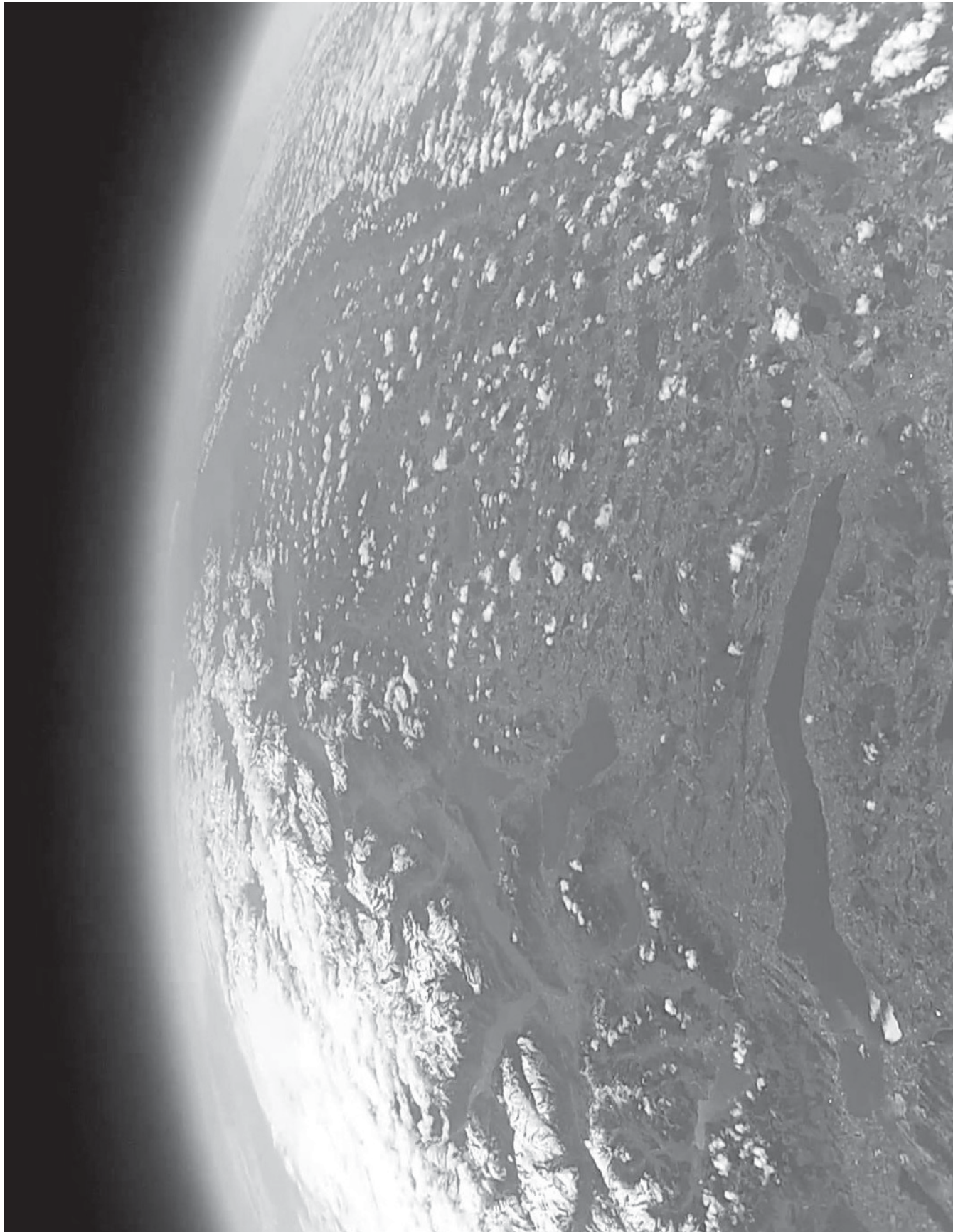


Launching a weather balloon

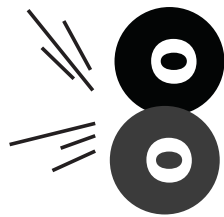
RESOURCE 26

Source: <https://www.youtube.com/watch?v=a2tPCNjFlo4>

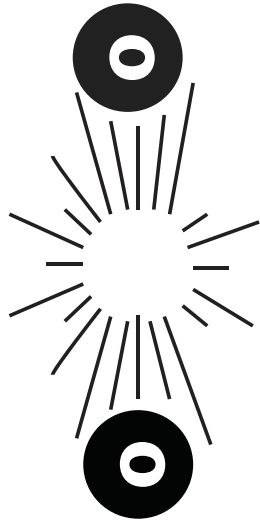
VIEW FROM WEATHER BALLOON OF EARTH



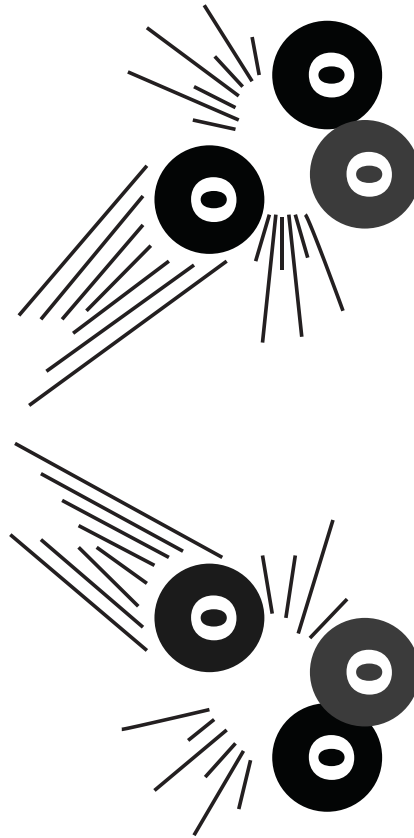
NATURAL OZONE PRODUCTION



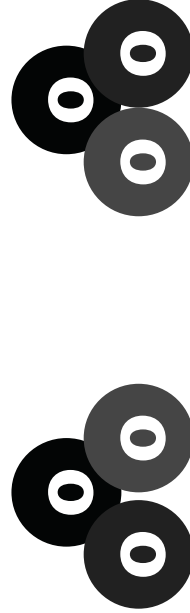
“High-energy” ultraviolet radiation strikes an oxygen molecule



...and causes it to split into two free oxygen atoms.

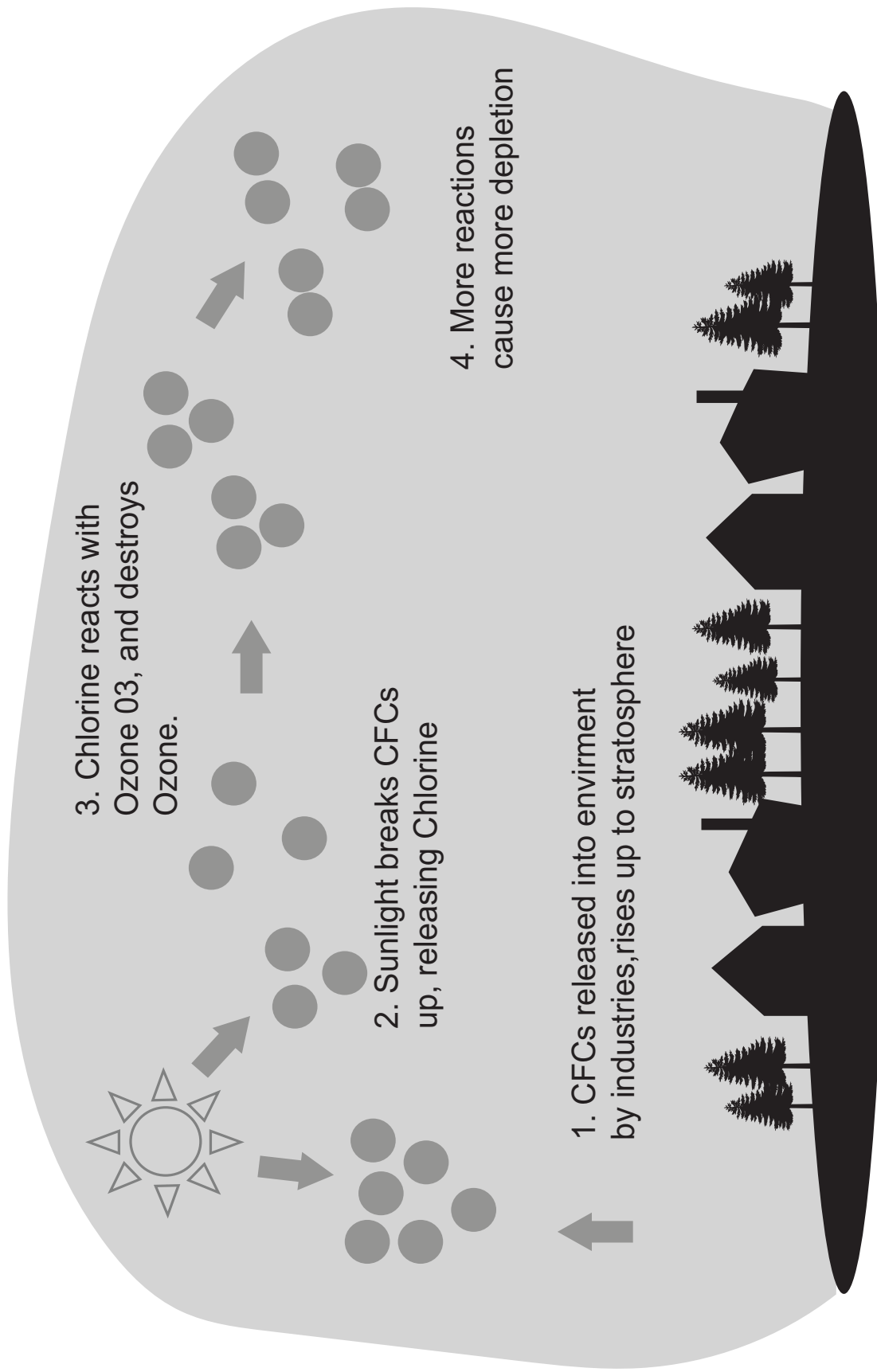


The free oxygen atoms collide with molecules of oxygen...



...to form ozone molecules.

HOW OZONE IS DEPLETED / DESTROYED



When CFC's interfere with Ozone, causing the molecules of O₃ to break down into O₂ and ClO. If this happens then a hole in the ozone layer will appear and then harmful UV radiation travels to the surface of the Earth.

RESOURCE 29

Source: https://commons.wikimedia.org/wiki/File:Meteor_Bolide.JPG

A METEOR IS A ROCK BURNING UP IN OUR ATMOSPHERE



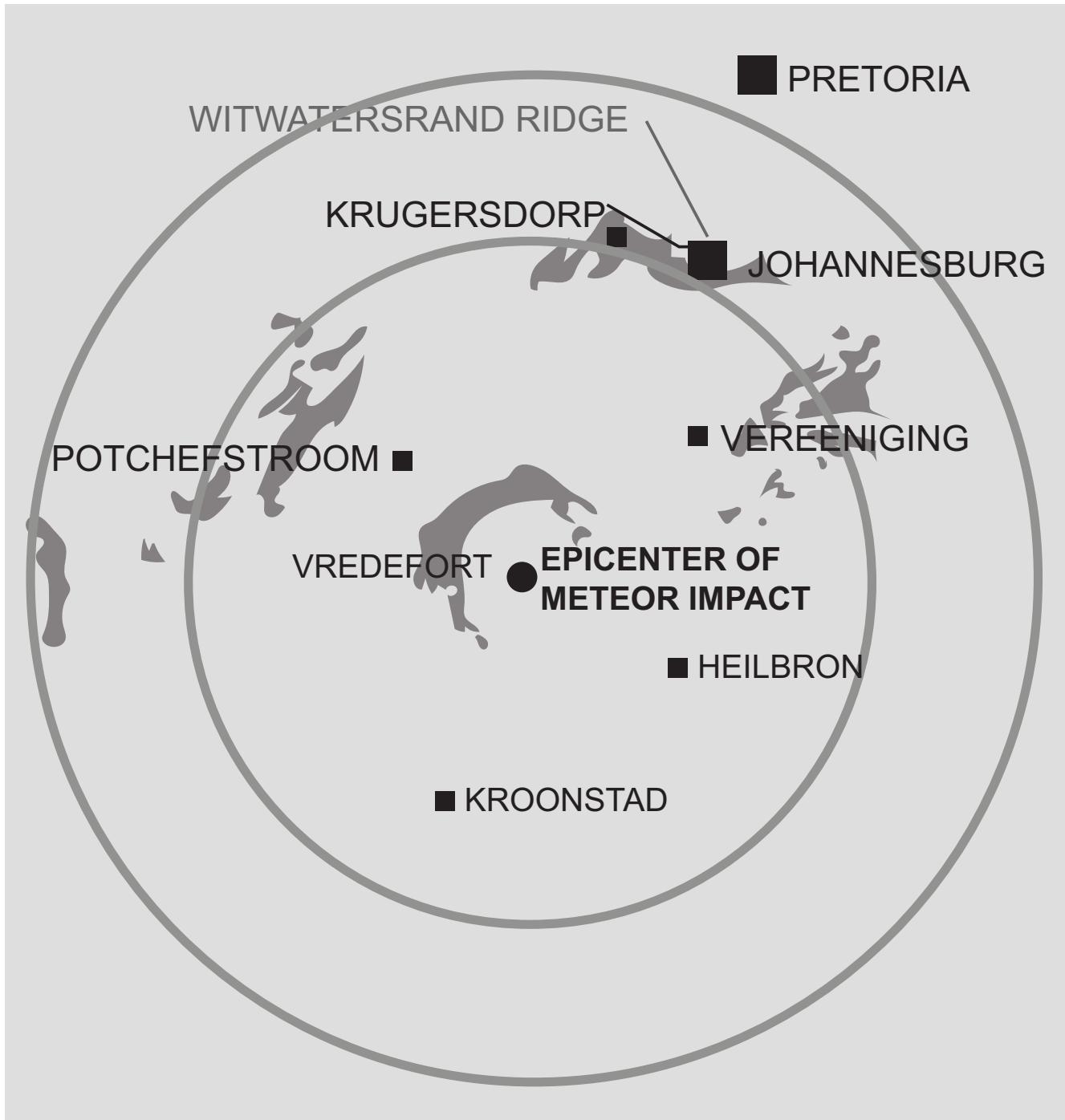
RESOURCE 30

Source: https://www.nasa.gov/mission_pages/LRO/multimedia/lroimages/20100513_instant.html

EXAMPLE OF AN IMPACT METEOR CRATER



IMPACT METEOR CRATER: VREDEFORT



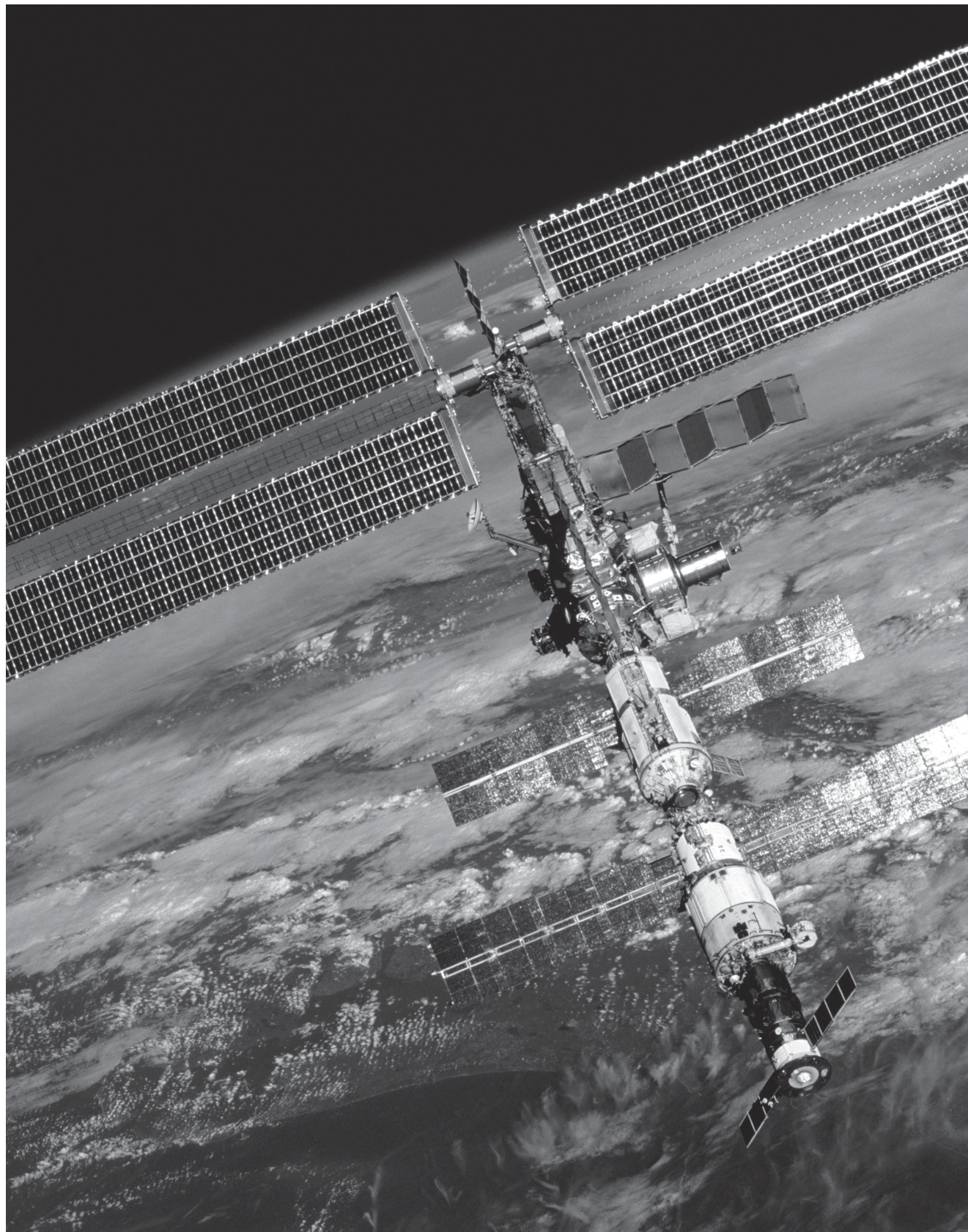
The impact crater at Vredefort in South Africa is the largest known impact crater on Earth. It has a diameter of around 300km. Impact is thought to have occurred about 2 billion years ago.

RESOURCE 32

Adapted from <https://www.thoughtco.com/the-creation-story-700209>

THE THERMOSPHERE

THE INTERNATIONAL SPACE STATION ORBITS EARTH IN THE THERMOSPHERE



RESOURCE 33

SOURCE: https://upload.wikimedia.org/wikipedia/commons/4/41/Space_Shuttle_Columbia_launching.jpg

NASA LAUNCHING A SPACE ROCKET

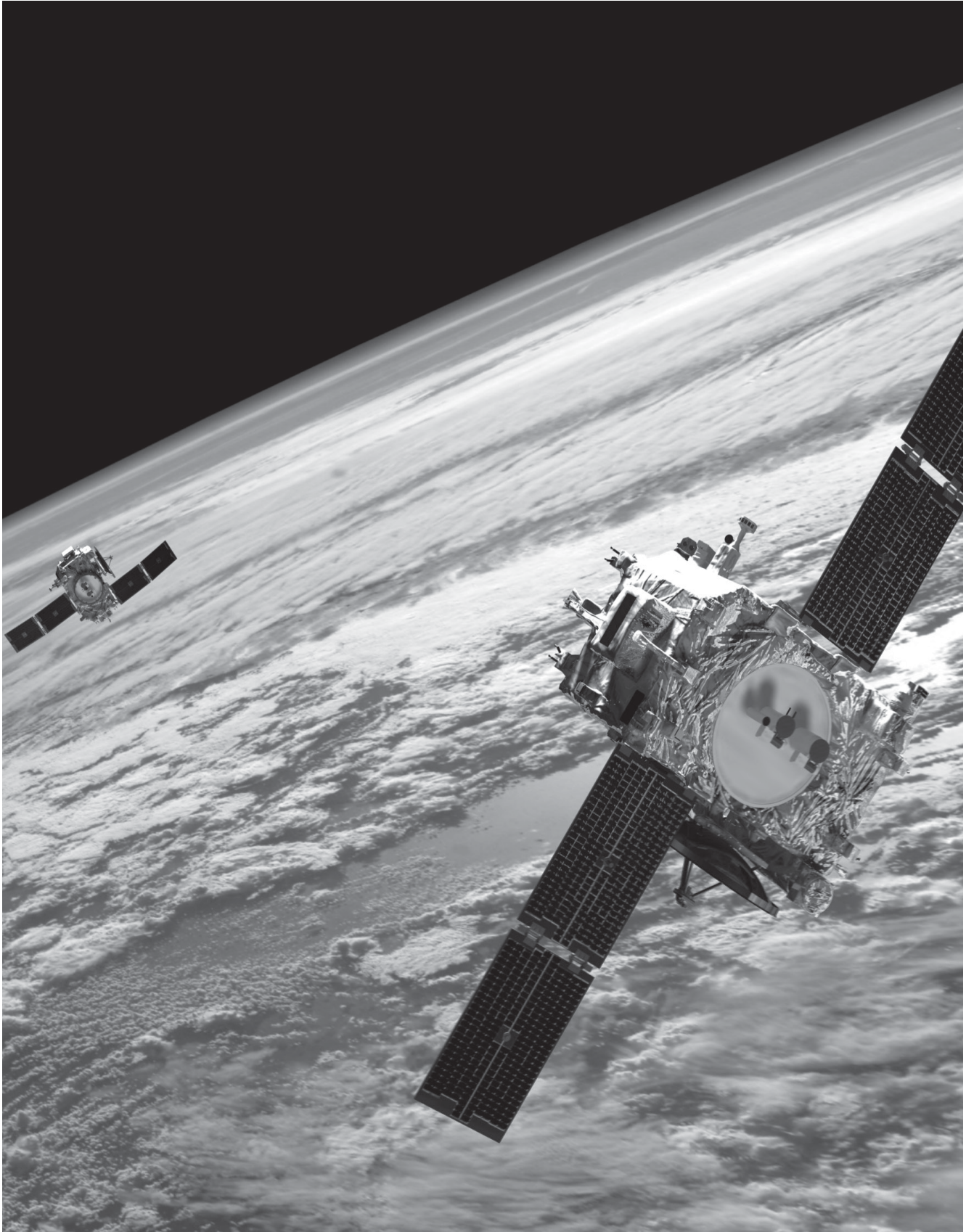


The space shuttle Colombia being launched into space

RESOURCE 34

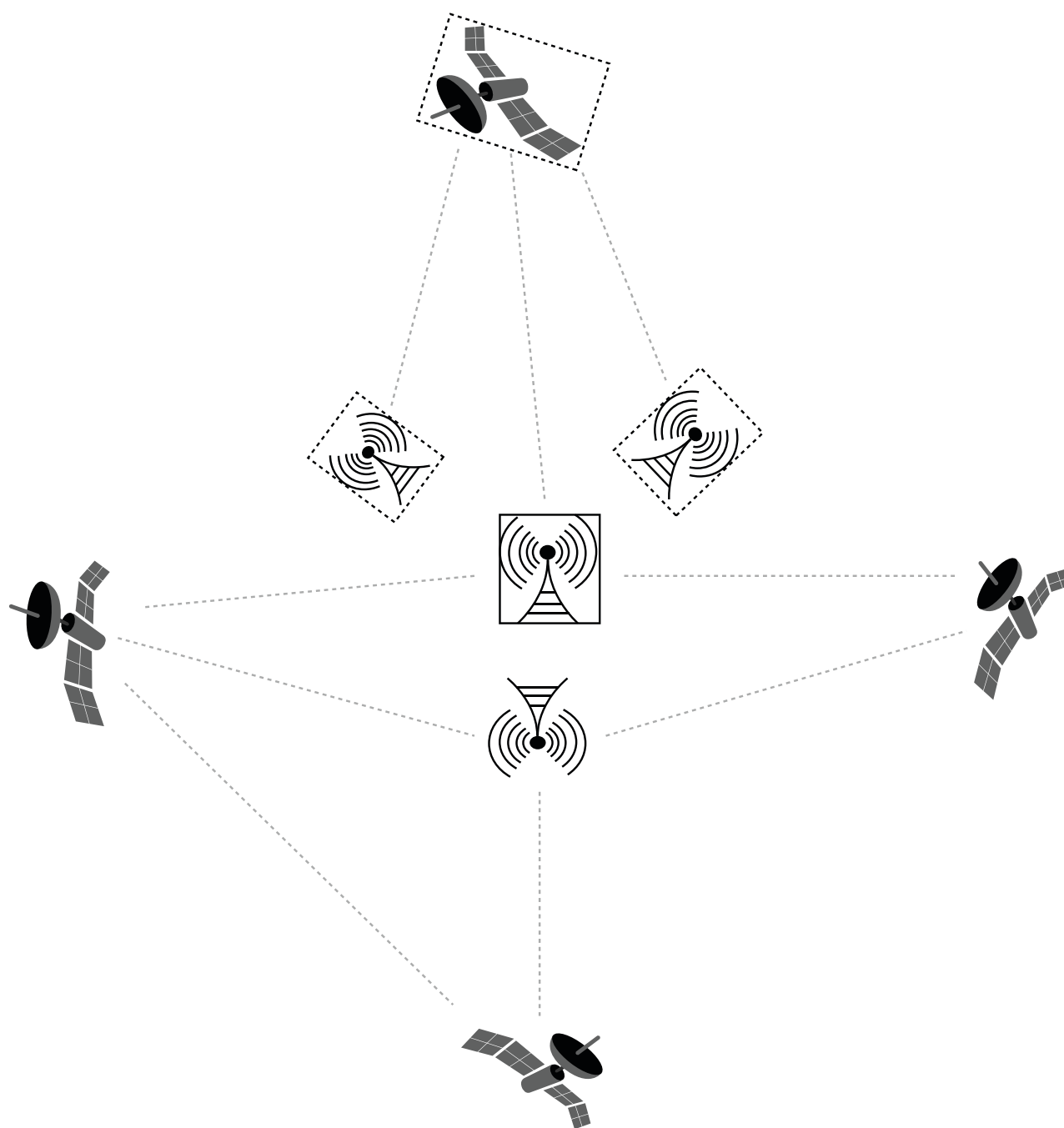
SOURCE: https://upload.wikimedia.org/wikipedia/commons/7/71/STEREO_Panels_Deploy_Vision.jpg

SATELLITES ORBITING EARTH



RESOURCE 35

HOW WE RECEIVE RADIO AND TELEVISION SIGNALS:



Satellites orbit the Earth in the Thermosphere. They constantly transmit radio waves back to the Earth so we can receive radio and TV signals. Because the Earth is round, signals cannot be transmitted over long distances. Using satellites allows signals to be sent and received instantly.

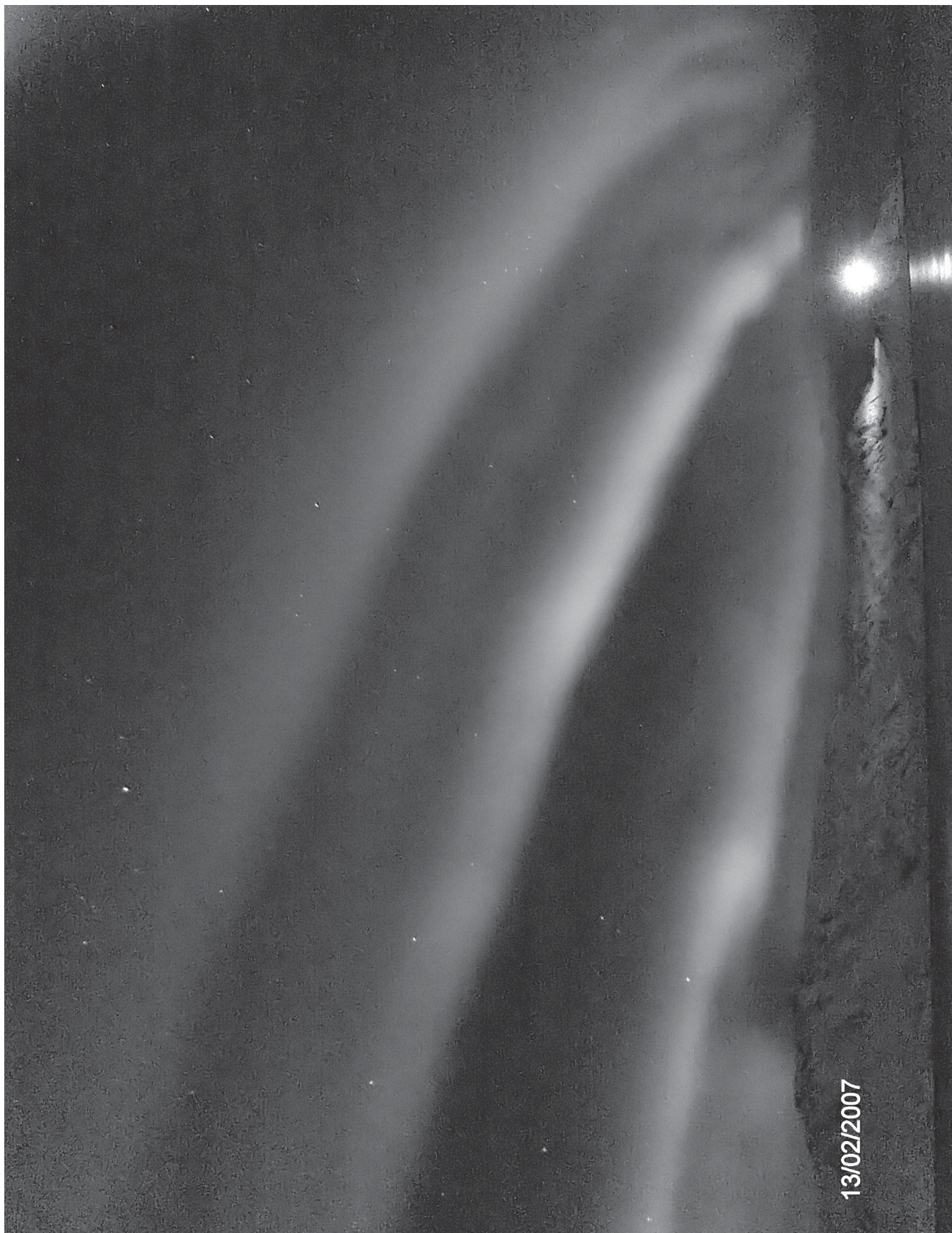
This is why you can watch Manchester United playing Barcelona whilst you are in South Africa. This is also why you can watch Ajax Cape Town playing MamelodiSundowns from the FNB Stadium in Johannesburg if you are in Umtata.

These satellites also transmit cell phone signals. So, if you wanted to, you could ring your brother who is studying in the USA

RESOURCE 36

SOURCE: https://upload.wikimedia.org/wikipedia/commons/3/35/Nordlys_2007-13-feb_6.jp

THE AURORA BOREALIS – THE NORTHERN LIGHTS



RESOURCE 37

SOURCE: https://upload.wikimedia.org/wikipedia/commons/6/6e/Veil_Nebula_-_NGC6960.jpg

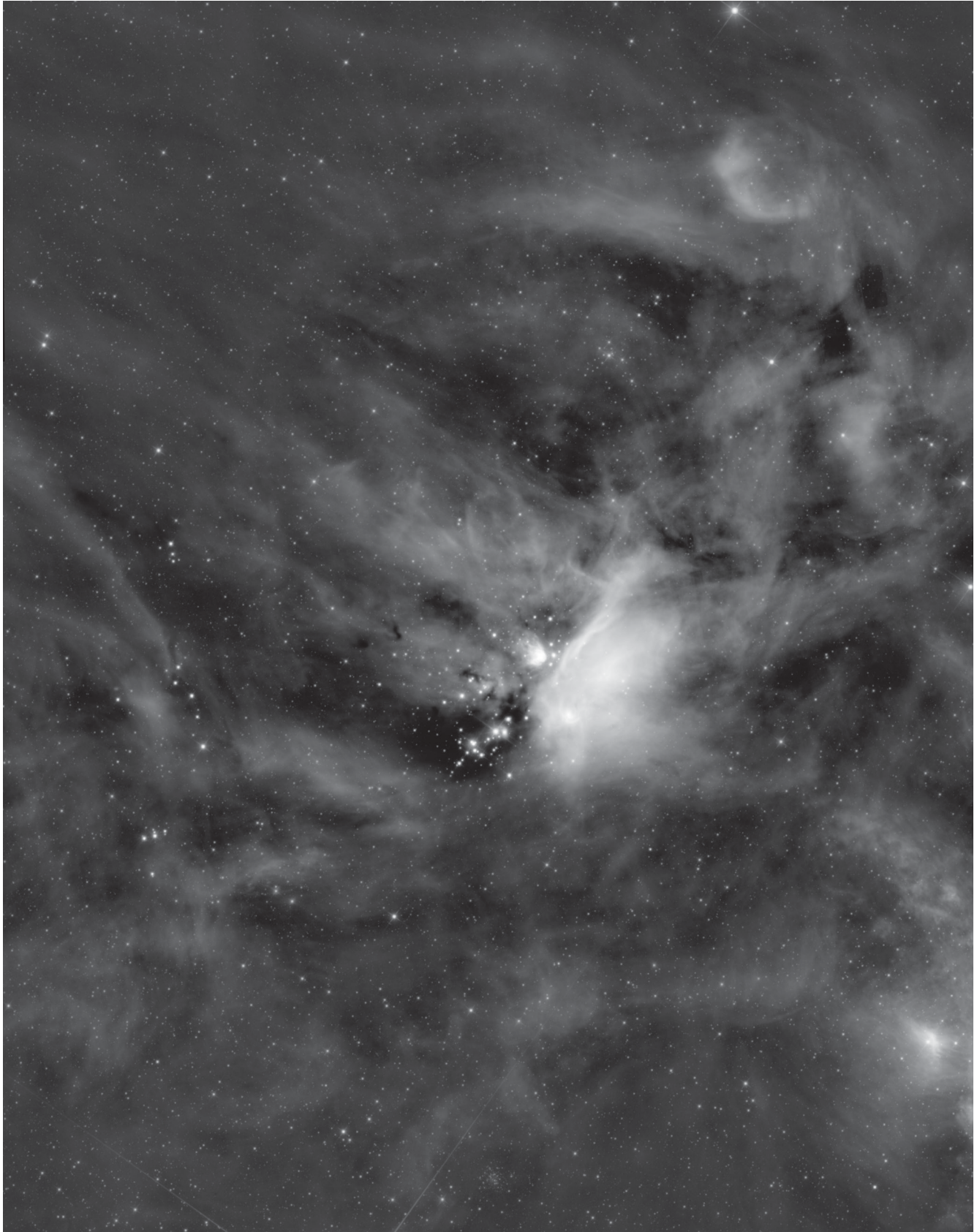
NEBULA



RESOURCE 38

SOURCE: <https://upload.wikimedia.org/wikipedia/commons/8/83/PIA18928-Protostar-HOPS383-20150323.jpg>

PROTOSTAR



THE COLOURS OF STARS

