UK Critical Minerals Intelligence Centre

CRITICAL MINERALS

KS3 lesson 1 pupil workbook: minerals in everyday life

Name _____

British Geological Survey

Department for Business & Trade

Minerals in everyday life

Introduction

Watch the video and discuss in class, then answer the following questions.

A mineral is:

The difference between a rock and a mineral is:

Activity 1

Watch the video.

In small groups, match the photos to the statement provided and then write them in the table below.

Photograph	Component	Mineral name
		
		
		
		
		

Photograph	Component	Mineral name
		
		
		
		
		
		

Photograph	Component	Mineral name
		
		
		

Activity 2

Part 1: the UK Critical Mineral Strategy

Watch the video then answer the questions on critical minerals.

What are critical minerals?

Name some of the critical minerals of the past and some modern-day critical minerals.

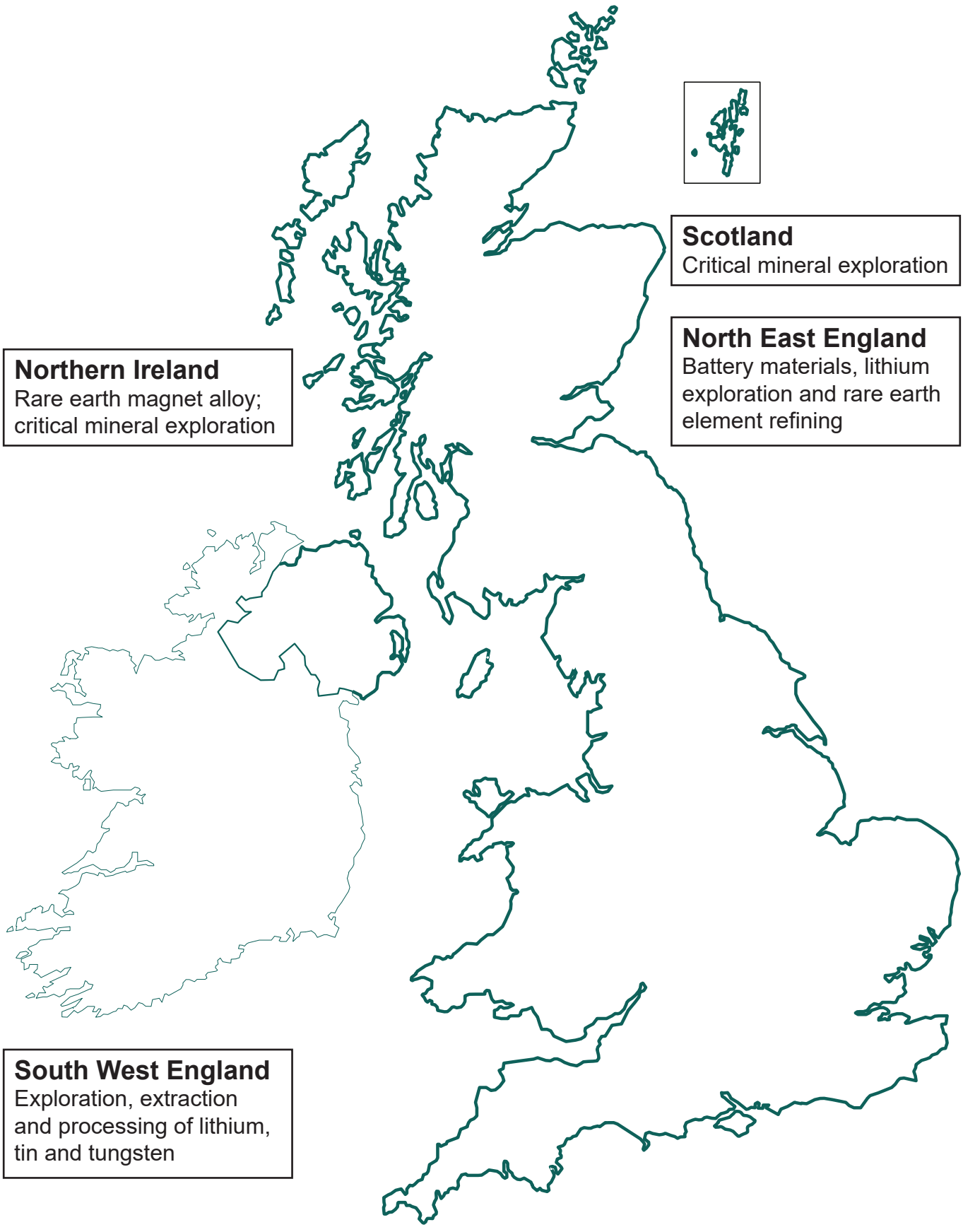
Why are critical minerals so important today?

What problems exist with the supply chain for critical minerals?

Explain the UK Government's critical minerals strategy.

Part 2: critical mineral potential in the UK

Draw a straight line from the label to the correct region and colour in that area on your map.



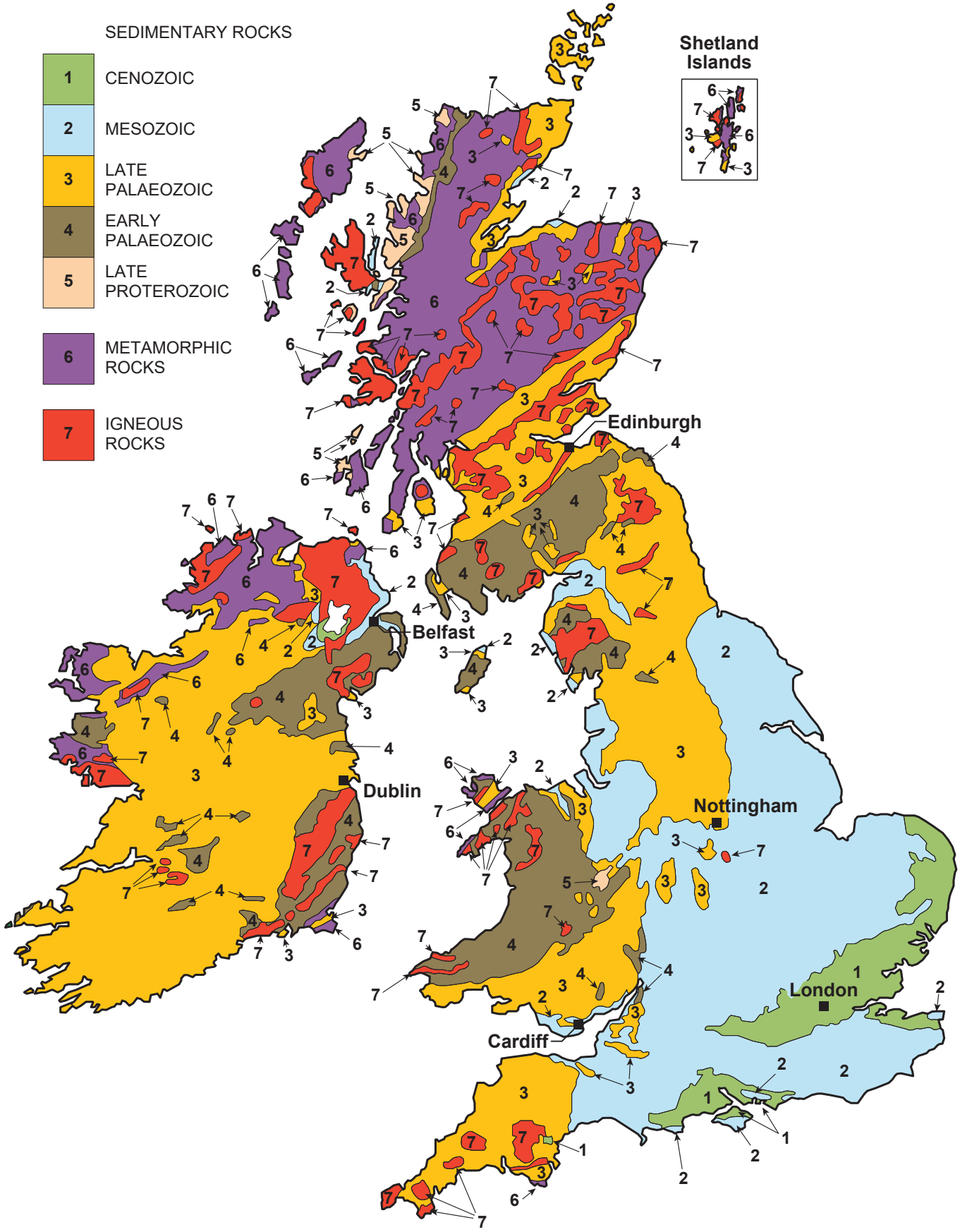
Scotland
Critical mineral exploration

North East England
Battery materials, lithium exploration and rare earth element refining

Northern Ireland
Rare earth magnet alloy; critical mineral exploration

South West England
Exploration, extraction and processing of lithium, tin and tungsten

Compare your map with the geology reference map.



Describe below any links between the rock type (geology) and where critical minerals are explored, extracted and processed in the UK.

Part 3: formation of critical minerals

Watch the video then fill in the missing words.

Graphite

Graphite occurs when _____ (increased heat and pressure from the Earth) happens to organic-rich _____ rocks, for example _____. The organic parts provide the carbon from which graphite forms. Graphite also occurs in igneous rocks and in meteorites.

Graphite is used in making the cores of pencils, lubricants like _____ as well as in paint as it is water-repellent, so provides a protective coating on surfaces. It is a common element used in the production of lithium-ion batteries as it is a good _____ of electricity. Finally, graphene sheets, which are made from graphite, are 100 times stronger and 10 times lighter than steel, making it useful in the _____ industry.

Lithium

Lithium is found in ores from _____ rocks as well as salts in brine pools. The largest producer of _____ in the world is Chile. Lithium is important in the manufacture of personal technology devices and _____ cars. It is highly reactive and easily conducts a current through batteries, allowing them to be recharged. It is also much lighter than other metals used in batteries, such as lead.

Cobalt

Cobalt is used in lithium-ion _____ and in the manufacture of high-strength magnetic alloys. Cobalt is found in _____ rocks. and is often produced as a by-product from the production of _____, nickel, _____, gold, _____ and zinc.

Tungsten

Tungsten is often extracted from _____, an igneous rock. Around half of the tungsten mined is used to produce _____ materials (tungsten carbide), with the rest being used in alloys and steels. Its high _____ point also makes tungsten suitable for aerospace and high temperature uses such as electrical, heating and _____ applications.

Rare earth elements

The term ‘rare earth elements’ refers to a group of elements that are crucial to the manufacture of many _____ products. They are found mostly in igneous rocks such as granite but also in some sedimentary rocks such as clay. An example is neodymium, which is used to make powerful _____ used in loudspeakers and _____ hard drives. Magnets containing _____ are also used in green technologies such as the manufacture of wind turbines and hybrid_____.

Activity 3: critical minerals and electric cars

Using the data in the table below, complete a bar graph to show the percentage of key minerals in an electric vehicle battery. Don't forget to label each axis and give your graph a title.

Key mineral	Percentage
Nickel	15.7
Copper	10.8
Aluminium	18.9
Graphite	28.1
Iron	2.7
Lithium	3.2
Cobalt	4.3
Manganese	5.4
Steel	10.8