KS3 Science

Earths Resources

Mark Scheme

Time available: 39 minutes
Marks available: 39 marks

1. Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should apply a 'best-fit' approach to the marking.

0 marks
No relevant content.

Level 1 (1–2 marks)
A brief reason is given against extraction or for recycling. There is little scientific terminology used.

Level 2 (3–4 marks)
Some reasons are given with clear statements against extraction and or for recycling. Some scientific terminology is used

Level 3 (5–6 marks)
Several reasons are given with a detailed explanation against extraction and for recycling. Scientific terminology is used accurately

examples of chemistry points made in the response

ignore uses and properties of aluminium. Comparative statements count for both methods

extraction:

- limited resources of aluminium oxide
- higher temperatures required

  allow quoted temperatures eg extracted at 950°C
- large amount of energy required
- expensive
- requires mining / quarrying
- process takes longer / has more stages
- produces more carbon dioxide / greenhouse gases

recycling:

- saves resources
- cheaper to recycle
- uses less energy
- only needs to be melted

  allow quoted temperatures eg melted / recycled at 700°C
- less electricity needs to be *used*
- less effect on environment
- example of *effect on environment*

  eg less destruction of habitats
- avoids need for disposal / use of landfill
- no need for quarrying
- sustainable

6

[6]

2. (a) (i) monomers

1

(ii) crude oil

1

(b) any **three** from:

- metal may not corrode away / remains
- plastic remains / does not break down (decay) / not affected by microorganisms
  accept non-biodegradable
- should recycle / conserve resources / mend the kettle / burn (plastic) as a fuel
  accept it is a waste of materials / resources
- landfill sites are limited / filling up
- water pollution
  *ignore harms wildlife / habitats **or** problems caused by burning the kettle*

3

[5]

3. (a) (i) polyethene / poly(ethene)
accept polythene / polyethylene

1

(ii) needs heat / energy / high temperature / fuel (for cracking)
ignore other processes

1

produces carbon dioxide / CO_2
*ignore use of CO_2 **or** 'produces carbon'*

1

(b) any **three** from:

- use water from local sources **or** water from close to home
- recycle bottles in the UK / close to home
  accept do not recycle in other countries / Asia
- (reduction in distance travelled) would reduce CO_2 emitted by transport
  accept use of transport with low / no carbon dioxide emissions
- use tap water
- use glass bottles / waxed cartons / metal bottles
  *do **not** accept 'do not use plastic bottles' without an alternative material*
- do not put in landfill **or** recycle more
- reuse / refill plastic bottles
- tax imported water / plastic bottles (to offset carbon cost)
- make more / all plastic bottles in UK
  answers must be about the reduction of carbon cost

3

[6]

4. Reused

- saves raw materials / crude oil
  - *unable to reuse many times*
  - *bags easily split*
- saves energy / fuel / transport
- fewer bags needed / made
- reduces carbon / CO_2 emissions
- reduces use of landfill
- saves cost of a new bag
- no waste

1

Recycled

- saves raw materials / crude oil
    - *has to be collected / transported / washed / separated / melted*
- saves energy / use of fuel
- reduces carbon / CO_2 emissions
- reduces use of landfill
- can be used for new products

    ignore uses energy

1

Burned

- heat / energy released can be used (for heating / generating electricity)
    - *has to be collected / transported*
- reduces use of landfill
    - *wastes the resource / plastic*
    - *releases harmful gases / toxic gases / CO_2*

1

Dumped

- collected / transported with household waste
    - *wastes the resource*
    - *plastic uses landfill*
- (slowly) biodegrades **or** produces methane which can be used as a fuel
    - *produces methane which is a greenhouse gas / could cause explosions*
- (not biodegradable so) does not release CO_2 / green house gas into the air
    - *not biodegradable / take years to decompose*

ignore cost / litter / waste / global warming / habitats unless mentioned above

1

[4]

5. (a) *allow answers referring specifically to the naphtha fraction*

crude oil is <u>evaporated/vaporised</u> (by heating)

1

the vapours are <u>condensed</u> (by cooling)

1

(fractions condense) / boil at different temperatures

allow fractions have different boiling points

1

(b) any **four** from:

answer yes or no does not gain credit

ignore references to volume of milk held / number of bottles used / biodegradability / habitats / pollution / mining / dust

each marking point must be a comparison

milk bag points

- uses (75%) less **crude oil** to make (than a plastic milk bottle)

  allow eg uses 75% less

  poly(ethene) which is made from crude oil

- uses less **energy** / fuel to make (than a plastic / glass milk bottle)

- produces less **carbon dioxide** to manufacture (than a plastic / glass milk bottle)

  allow produces less greenhouse gases / causes less global warming

  allow produces less CO_2 on burning

- produces less **waste** (than a plastic / glass milk bottle)

  allow takes up less landfill (space)

  allow an argued case for more waste eg milk bags are discarded / cannot be reused

- less fuel used for **transport** than glass milk bottles

- (produces waste because) milk bags are only used once whereas glass bottles can be **re-used**

  allow milk bags are discarded but glass bottles can be reused (24 / many times)

  allow glass bottles can be reused but milk bags can't

poly(ethene) points

- uses a limited **raw material** / crude oil whereas the raw materials for glass are almost unlimited

- **less** (5%) poly(ethene) is **recycled** (compared to glass (35%))

  allow (35%) glass is recycled or (5%) poly(ethene) (bottles) recycled BUT milk bags aren't / are discarded

  or

  recycled poly(ethene) is not used to make new bags whereas recycled glass is used to make new bottles

4

[7]

6. (a) (i) C_2H_4

1

(ii) poly(ethene)

1

(b) (i) is not biodegradable

1

(ii) not enough landfill sites / space

*accept landfill sites are filling up **or** plastics remain for years **or** plastics not broken down*

ignore cost / waste of resources / not biodegradable / wildlife

1

(iii) recycle / burn

accept reduce the amount of packaging used

ignore reused

1

[5]

7. (a) (i) 78 %

1

(ii) A – nitrogen

allow N_2

N must be uppercase and 2 must be subscript

ignore N

1

B – oxygen

allow O_2

O must be uppercase and 2 must be subscript

ignore O

1

(b) (i) any **two** from:

- level *up* to 1900 (allow 1890 to 1910)
- increasing from 1900 to today (*allow 1890 to 1910*)

  allow increased by 90 (ppm), allow answers in the range 88 – 92
- increased more rapidly in last 50 years

  *if no other marks gained allow **1** mark for it has increased*

2

(ii) (fossil) fuels

accept coal / oil / (natural) gas / peat

allow petrol / diesel / methane

1

[6]