



Mark Scheme (Results)

January 2020

Pearson BTEC Level 3 – Applied Science

Unit 7: Contemporary Issues in Science
(31629H)

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January 2020

Publications Code 31629H_2001_MS

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Unit 7: Contemporary Issues in Science - Sample marking grid

General Marking Guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the marking grid not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks if the learner's response is not rewardable according to the marking grid.
- Where judgment is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific Marking guidance

The marking grids have been designed to assess learner work holistically.

Rows within the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band depending on how they have evidenced each of the descriptor bullet points.

Question 1: Discuss the implications of the scientific issue identified in the articles. (12 marks)

| Assessment focus | Band 0 | Band 1 | Band 2 | Band 3 | Band 4 |
|--|--|--|---|--|---|
| Understanding the impact in terms of ethical/social/economical/environmental | 0 | 1-3 | 4-6 | 7-9 | 10-12 |
| | Level of response not worthy of credit | <ul style="list-style-type: none"> Demonstrates limited knowledge and understanding of the scientific issues with generalised comments made. No or limited attempt to draw links to ethical/social/economic/environmental implications. The discussion will be unstructured and limited to basic points made. | <ul style="list-style-type: none"> Demonstrates adequate knowledge and understanding of the scientific issues by identifying and selecting relevant implications from all three articles. Attempts to draw links to ethical/social/economic/environmental implications. The discussion shows some structure and coherence. | <ul style="list-style-type: none"> Demonstrates good knowledge and understanding of the scientific issues by identifying and selecting relevant implications from all three articles. Draws some links to and between ethical/social/economic/environmental implications. The discussion shows a structure which is mostly clear, coherent and logical. | <ul style="list-style-type: none"> Demonstrates comprehensive knowledge and understanding of the scientific issues by identifying and selecting relevant implications from all three articles. Draws a wide range of links to and between ethical/social/economic/environmental implications The discussion shows a well-developed structure which is clear, coherent and logical. |

Possible indicative content for Question 1:

Learners:

- may include other valid suggestions, not listed below, which should be credited
- may cover a number of examples from the list below
- would not be expected to cover all points to get full marks.

Scientific issue

- Air pollution now kills 3.3 million people prematurely each year
- Traffic exhaust fumes are the major contributory factor and about 50% or more of vehicles are diesel-powered
- Motorists have been encouraged to buy diesel vehicles as they produce less carbon dioxide than petrol-fuelled vehicles and were considered less of a factor in relation to climate change but diesel exhausts produce more oxides of nitrogen, ozone, sulfur dioxide and small particles (PM₁₀, PM_{2.5} and some very small particles with a diameter of less than 100 nm) all of which have adverse health effects
- More is now known about PAHs and how they cause coughing
- Mayors of many major cities, where air pollution levels exceed legal limits, are introducing measures to phase out diesel vehicles from city centres
- Motorists are unhappy at the prospect but public attitudes are changing and want reduced air pollution
- Research has shown how diesel particles (diesel soot) can invade lungs, affect nerves and exacerbate respiratory conditions such as bronchiolitis, asthma and cough
- Air pollution affects the growth and function of lungs in children and children are exposed to such pollution as they travel to and from school each day; exposure to air pollution in pregnant women affects the fetus
- Air pollution also affects cognitive ability in children and adults
- Planting hedges and trees around schools and nurseries as well as reducing diesel emissions can be mitigating measures

| Comment | Implication | Factor |
|---|---|---|
| Particles from air in urban areas, inhaled directly into lungs, can lead to throat tightening and coughing, also affects cardiovascular and nervous systems | <p>Cost of treatment and days of work lost</p> <p>Cost of epidemiological research</p> <p>Effects can be long-lasting and children are particularly vulnerable and will be the adults/workforce of the future</p> | <p>Economic and social</p> <p>Economic</p> <p>Social</p> |
| Underlying mechanisms now understood – originally thought to be very small particles that get deep into lungs, recognised by cells as molecules; now thought to be the chemicals on the surface of particles that activate nerves within lungs and trigger reflex actions associated with coughing and wheezing | <p>Understanding the mechanism means we can better predict the range and extent of potential health problems and effects on people who already have an underlying respiratory problem such as asthma</p> <p>More people likely to need hospital treatment especially elderly and the very young</p> | <p>Economic/social/ethical</p> <p>Economic/social</p> |
| UK (and Europe) has many diesel-powered vehicles – encouraged as diesel was expensive | Will be difficult to persuade motorists to now abandon their diesel vehicles | Social/economic |
| <p>Pollution levels in many cities exceed the acceptable limits</p> <p>Road traffic the main source</p> | <p>Health effects on children</p> <p>Cost of treatment and days of work lost</p> <p>Half the world's population lives in or near cities so many potential health problems and related costs</p> <p>Fewer people walk or cycle – also has knock on health effect due to less exercise</p> | <p>Ethical/social/environmental</p> <p>Economic</p> <p>Social</p> <p>Social</p> |
| Need to improve air quality in UK | <p>Cost of implementation</p> <p>Benefits of improved health</p> | <p>Environmental/economic</p> <p>Economic/ethical and social</p> |
| Air pollution thought to kill more people worldwide than HIV, malaria and flu combined; diesel engine emissions are the worst | <p>Many schools and nurseries are near busy roads</p> <p>More children exposed to the harmful fumes/particles; on way</p> | <p>Environmental</p> <p>Social/ethical</p> |

| | | |
|--|--|---|
| <p>culprits</p> | <p>to and from school and when doing outdoor activities</p> <p>Increase in treatments for underlying respiratory problems such as asthma</p> <p>Exposure of pregnant women may also affect the fetus</p> <p>Evidence that exposure affects children's nervous system and brain development</p> <p>Exposure as a fetus can lead to long-term health effects in the future</p> | <p>Economic</p> <p>Ethical</p> <p>Social/ethical</p> <p>Social/ethical/economic</p> |
| <p>Government encouraged motorists to buy diesel cars for better fuel consumption and thought to be less polluting than exhaust fumes from petrol vehicles; government now realises this was wrong and they were duped by some motor companies</p> | <p>These motorist now branded as pariahs</p> <p>Fuel duty on diesel was reduced – reduces revenue to government; now diesel is more expensive than petrol – motorists who were encouraged to buy diesel feel they have been let down</p> <p>Cheating on emissions tests</p> | <p>Social/ethical</p> <p>Economic/ethical</p> <p>Ethical</p> |
| <p>Diesel produces less carbon dioxide than petrol vehicles but more oxides of nitrogen and small particles</p> | <p>Less contribution to climate change</p> <p>But diesel fumes responsible for many premature deaths</p> | <p>Environmental</p> <p>Social/economic/ethical</p> |
| <p>Plans to phase out diesel engines</p> <p>Plans for national diesel scrappage fund</p> | <p>Many motorists will have to change their cars; cost to those motorists. However more electric car production = more jobs</p> <p>If government introduces an incentive scheme it will cost the taxpayer</p> <p>Waste of resources in scrapping a lot of vehicles</p> | <p>Economic</p> <p>Economic</p> <p>Economic</p> |
| <p>Proposed low-emission zones and tolls; in some European cities there are plans to phase out diesel</p> | <p>How to finance many people having to buy new cars/will not be able to sell their diesel cars</p> | <p>Economic</p> |

| | | |
|---|---|---|
| by 2025 | Diesel car drivers feel penalised for making what they were told was a responsible choice However people are taking on board the research that shows the effects of diesel on health | Social/economic |
| Plans to ban drivers of the worst polluting vehicles for one day a week | Drivers irritated by an effective ban on their movements | Ethical/social |
| Need for improved public transport system | Cost to government/taxpayer Will have benefits as more people will use public transport, less cars on the road Persuading more people to use public transport | Economic Environment Social |
| Need to develop electric cars and public transport/lorries/taxis not fuelled by diesel | R and D costs Persuading motorists to switch Will national grid be able to cope with extra demand for electricity? | Economic Ethical/social |
| Diesel cars will become more expensive to make | Less profit for companies therefore less incentive; people will opt for cheaper cars – thereby helping to phase out diesel | Economic |
| WHO declared diesel exhaust/soot to be carcinogenic (and as dangerous as mustard gas and asbestos) and more dangerous than petrol exhaust | Re: treatment, etc. for cancer However, because something is carcinogenic does not mean it will always lead to cancer – depends on exposure levels | Ethical/social/economic |
| Dieselpgate – VW (and other manufacturers) cheated on emissions tests | Loss of confidence by public. People do not trust any subsequent research to show how clean/dirty new diesel engines are compared to petrol engines | Ethical |

Question 2: *Identify the different organisations/ individuals mentioned in the articles and suggest how they may have an influence on the scientific issue. (6 marks)*

| Assessment focus | Band 0 | Band 1 | Band 2 | Band 3 |
|--|--|---|---|--|
| Understanding the influence of different organisations / individuals | 0 | 1-2 | 3-4 | 5-6 |
| | Level of response not worthy of credit | <ul style="list-style-type: none"> Demonstrates adequate knowledge and understanding of how key organisations/ individuals can influence the scientific issue by identifying different types of organisations/individuals. A basic explanation of how the organisation/individual may have an influence is given but with general statements made and limited linkages to the articles. | <ul style="list-style-type: none"> Demonstrates good knowledge and understanding of how key organisations/individuals can influence the scientific issue by identifying different types of organisations/individuals (including any references/acknowledgments in footnotes) from all three articles. An explanation of how these organisations/individuals may influence the issue is given which is occasionally supported through linkage and application to the articles. | <ul style="list-style-type: none"> Demonstrates comprehensive knowledge and understanding of how key organisations/ individuals can influence the scientific issue by identifying and selecting different types of organisations/individuals (including any references/acknowledgments in footnotes) from all three articles. An explanation of how these organisations/individuals may influence the issue is given which is supported throughout with linkage and application to the articles. |

Indicative content for Question 2:

Learners:

- may include other valid suggestions, not listed below, which should be credited
- may cover a number of examples from the list below
- would not be expected to cover all points to get full marks.

| Government and global organisations | |
|--|--|
| Organisation | Influence on scientific issue |
| Government (1) | Along with the motor industry convinced many motorists to buy diesel cars, saying that they were cleaner, more efficient and less polluting |
| Department of Transport (3) | Must now publish updated clean air plans |
| EU (3) | Sets guidelines on acceptable levels for air quality |
| WHO (3) | World Health Organisation. Worldwide specialised UN agency concerned with international public health Has classified diesel particulates/soot as carcinogenic |
| Defra (3) | Provides information on its website re air quality Has shown that 37 out of 43 reporting zones in the UK had concentrations of oxides of nitrogen exceeding EU and WHO guidelines |
| Local councils and/or environmental groups | Could plant more trees along busy roads/by schools and educate people to plant hedges and bushes in their gardens |
| Green Party | Even if not in power can raise awareness on environmental and |

| | |
|--|---------------|
| | health issues |
|--|---------------|

Non governmental organisations

| Organisation | |
|-----------------------|--|
| VW/motor industry (1) | Cheated on emissions tests and helped drive increase in use of diesel cars |

Universities and research groups

| Organisation | |
|---|---|
| ICL – Imperial College London (2) | Prestigious university – carried out studies that showed underlying mechanisms of how diesel particles affect health |
| British Lung Foundation | Part of ICL. Provides information on measures to reduce air pollution |
| ICCT International Council for Clean Transportation (1) | Carries out research and provides data/infographics on health effects of diesel |
| Plume Labs (1) | Monitors air quality around the world so can provide data to support measures to be taken by other organisations |
| IPPR – Institute for Public Policy Research (3) | Carries out research and is a source of data for Article 3 – graphs and tables Provides evidence to estimate that phasing out of diesel powered vehicles in London would greatly reduce harmful emissions/oxides of nitrogen (by around 50%) which would lead to gain of 1.4 million life years and financial benefit of up to £800 million Advocates planting trees as a barrier to absorb some of the pollution, around schools and nurseries |
| RAC | Motoring research group. Credible organisation. Carries out research into health effects of diesel |
| YouGov/polling organisations (1) | Investigates public feelings towards diesel and supplies data on the number of people who would support a ban; can therefore influence government and local governments to introduce such bans |

Voluntary and pressure groups

| Organisation | |
|----------------|--|
| Greenpeace (1) | Carried out investigation which showed many schoolchildren in England and Wales are exposed to illegal air toxicity levels from diesel emissions. Regarded as credible |

Journals and magazines

| Organisation | |
|--------------|---|
| Guardian (1) | Carried out investigation which showed many schoolchildren in England and Wales are exposed to illegal air toxicity levels from |

| | |
|-------------------------------|--|
| | diesel emissions. Regarded as credible. Informs public online and via newspaper |
| British Medical Journal (BMJ) | Leading medical journal. Publishes peer reviewed medical research to inform policy making and work towards a healthier world |

| Individuals | |
|--|--|
| David King – former UK government Chief Scientific Adviser (1) | Admitted that government had been wrong to say that diesel was less polluting than petrol Chief Scientific Advisor – his views carry weight |
| Mayors of large cities (1) | Banning/reducing use of (oldest and most polluting) diesel vehicles from city centres. Can levy fines/taxes to encourage people to not use diesel vehicles May be able to change use of diesel-powered public transport and taxis |
| Lan Marie Nguyen Berg | Green party councillor in Oslo: raises awareness and helps implement more environmentally-friendly policies |
| Steve Gooding Director of RAC (1) | Need more accurate driving emissions testing and collation of information re types of car, when and how driven, to properly assess which diesel vehicles pose the greatest risk/hazard |
| Prof Terry Tetley (2) | NHLI. Co-lead author of investigation that shows new findings on effects of particulates and urban air pollution on health |
| Prof Maria Belvisi (2) | Head of Respiratory Pharmacology Group NHLI (National Heart and Lung Institute – part of ICL) as for Terry Tetley Says that if we can prevent the symptoms generated by diesel emission, that exacerbate symptoms in people with underlying respiratory conditions, this will mean fewer hospitalisations |
| Dr Ian Mudway from Environmental Research Group at King's College London and Dr Chris Carlsten of University of British Columbia (2) | Worked with Prof Belvisi's team to carry out key research to test exposure to diesel on animal models and human nerve tissue. Showed diesel pollutants can activate certain ion channels and stimulate nerves that are associated with coughing and wheezing |
| Norrice M Liu and Jonathan Grigg (3) | Authors of Article 3 a review/meta-analysis/study of research into effects of diesel pollution on children and respiratory disease Produces epidemiological evidence and information about the health effects of diesel emissions |
| Kulkarni <i>et al</i> (3) | Research on effect of particulates on lung function in children |
| Children's teachers and parents | Could encourage children to walk or cycle/parents walk or cycle with their children to school, to reduce number of vehicles |

Question 3: Discuss whether Article 3 has made valid judgements. (12 marks)

Indicative content for Question 3:

| Assessment focus | Band 0 | Band 1 | Band 2 | Band 3 | Band 4 |
|---|--|---|---|---|---|
| | 0 | 1-3 | 4-6 | 7-9 | 10-12 |
| Interpretation, analysis and evaluation of scientific information | Level of response not worthy of credit | <ul style="list-style-type: none"> Vague statements about the validity of article 3 are made with limited attempt to consider: <ul style="list-style-type: none"> how the article has interpreted and analysed the scientific information to support the conclusions/ judgments being made the validity and reliability of data references to other sources of information. The discussion will be unstructured and limited to basic points made. | <ul style="list-style-type: none"> The validity of article 3 is discussed which is partially supported by a consideration of: <ul style="list-style-type: none"> how the article has interpreted and analysed the scientific information to support the conclusions/ judgments being made the validity and reliability of data references to other sources of information. The discussion shows some structure and coherence. | <ul style="list-style-type: none"> The validity of article 3 is discussed which is mostly supported by a consideration of: <ul style="list-style-type: none"> how the article has interpreted and analysed the scientific information to support the conclusions/ judgments being made the validity and reliability of data references to other sources of information. The discussion shows a structure which is mostly clear, coherent and logical. | <ul style="list-style-type: none"> The validity of article 3 is discussed and is consistently supported throughout the consideration of: <ul style="list-style-type: none"> how the article has interpreted and analysed the scientific information to support the conclusions/ judgments being made the validity and reliability of data references to other sources of information. The discussion shows a well-developed structure which is clear, coherent and logical. |

Learners should consider how the article has analysed the scientific information to support the conclusions/judgements being made; the validity and reliability of data; references to other sources of information.

Learners:

- **may include other valid suggestions, not listed below, which should be credited**
- **may cover a number of examples from the list below**
- **would not be expected to cover all points to get full marks.**

General

Learners may comment on the fact that this is published in a peer reviewed journal and has many references.

They may also state that the article has drawn on many other articles (a meta-analysis) and that the various pieces of research, both epidemiological and physiological, all support the conclusions.

Conclusions/judgements

- Concludes that air pollution has the second biggest impact on public health
- Therefore diesel should be phased out
- *Evaluation:* Whilst diesel emissions contribute to over 50% of air pollution, there are other sources that are not being targeted

- Tougher regulations and scrappage systems will need to be introduced to encourage public compliance, particularly for older diesel-powered vehicles
- More Ultra Low Emission Zones in urban areas will be needed
- To phase out diesel there needs to be better public transport and development of more electric vehicles, powered by green energy
- *Evaluation*: Do governments have the resources and incentive to do this?
- Many schools and childcare providers are situated close to busy roads, therefore children are exposed on the way to and from schools and during outside activities
- There are damage limitation protocols such as strategic planting of hedges
- Gives useful information on components of diesel emissions
- Emerging evidence that air pollution, particularly the PM_{2.5} from diesel, affects children's neurological/brain development and may reduce cognitive ability and memory and may be linked to autism
- Much evidence (from many studies) that impaired fetal wellbeing (e.g. antenatal exposure) can impact on that person's health throughout their life – e.g. adult-onset cardiovascular diseases, dementia and Parkinson's disease and premature death – therefore it is relevant that the study focuses on effects on children
- However there are confounding variables; the health effects are seen more in areas of social deprivation where children may also be exposed to cigarette smoke and are less likely to receive good healthcare, as well as being more likely to live in an area where there is heavy traffic
- There is now some research into the underlying mechanisms, e.g. phagocytosis of particulates within the alveoli may be impaired so the particulates are not removed from the lungs/airways and they promote inflammation; particles may migrate into the circulatory system and affect other organs
- Such physiological evidence backs up the epidemiological evidence

Validity and reliability

- Article 3 is a review/meta-analysis of research into health effects of diesel, particularly on how it affects respiratory illness in children
- It reviews lots of research by various organisations/research teams
- Many studies have reached the same conclusions
- References cited refer to epidemiological evidence, which shows the association between air quality and its effect on respiratory, cardiovascular and neurological health and numbers of avoidable deaths per year. There are also studies giving physiological evidence
- Main focus is on UK, which is heavily dieselised, but it is also relevant to other countries where many diesel vehicles are used
- Main focus is on diesel and little information on other aspects of air pollution but gives a justification – that these levels are particularly high and its health effects are researched and that the largest contributor to urban air pollution is traffic, over half of which is diesel powered
- However at global levels only about 20% oxides of nitrogen/NO_x comes from diesel-powered vehicles
- But diesel engines emit more particulates/PM and NO_x than petrol-powered vehicles

- WHO has classified diesel soot as carcinogenic
- However because a substance is carcinogenic does not mean it will always lead to cancer – depends on frequency of exposure/concentrations of exposure
- Article does reference some other sources of particulate matter
- Does not mention sources of particulates, such as from agriculture, many of which drift into urban areas
- Few epidemiological studies look at diesel on its own so may be difficult to pick out exactly how diesel affects health
- However it is reasonable to extrapolate from studies into NO_x and particulates, as diesel produces many of both of those pollutants and is not less toxic than petrol
- Associations have been shown between antenatal exposure/exposure in pregnant women and reduced lung function in those babies later in childhood. Also risk of low birthweight
- Studies have shown children living in areas of high traffic have reduced lung function and growth and increased susceptibility to respiratory infections
- Children with existing chronic respiratory conditions are most vulnerable
- However correlation does not necessarily mean cause
- But a meta-analysis showed that new-onset asthma is linked to exposure to NO_x gases
- Testing standards have been less strict for diesel engines as governments have encouraged their use above petrol vehicles to reduce carbon dioxide emissions to try to reduce effects of global warming/climate change. However, even under these conditions, tests show diesel emissions to be more polluting than petrol engines, and to exceed EU guidelines
- But petrol emissions also contain NO_x (and some can originate from agricultural practices and move with air current into urban areas)
- Asthma exacerbations are closely associated with very small particulates (that originate from diesel)

References:

- In respected scientific journal/BMJ so should have been peer reviewed and edited
- However, peer review process is not always infallible
- From professional journals limited to children but they are the adults of the future and these exposures have long-term effects
- Text references given together with list of sources
- Many sources from recent studies (1990s to 2017 – very up to date when article was written)
- We do not know of any conflicting evidence as that would not have been included

Question 4: Suggest potential areas for further development and/or research of the scientific issue from the three articles. (5 marks)

| Assessment focus | Band 0 | Band 1 | Band 2 | Band 3 |
|---|--|--|--|--|
| | 0 | 1 | 2-3 | 4-5 |
| Interprets, analyses and evaluates articles to identify potential areas for further development and/or research | Level of response not worthy of credit | <ul style="list-style-type: none"> Areas for further development and/or research of the scientific issue are identified but these are usually vague descriptions with limited analysis/evaluation of the articles to support the statements being made. | <ul style="list-style-type: none"> A description for further areas of development and/or research of the scientific issue is given. Provides occasional evidence from the analysis/evaluation of the articles and attempts to synthesise and integrate relevant knowledge. | <ul style="list-style-type: none"> A description for further areas of development and/or research of the scientific issue is given. Consistently provides evidence from the analysis/evaluation of the articles and demonstrates throughout the skills of synthesising and integrating relevant knowledge. |

Indicative content for Question 4:

Learners:

- may include other valid suggestions, not listed below, which should be credited
- may cover a number of examples from the list below
- would not be expected to cover all points to get full marks.

Further research needed on:

- Ways to reduce emissions of diesel fumes
- Development of alternative transport, e.g. electric cars but the electricity needs to be made from green energy
- **Need to increase electricity production**
- How to convince public that nuclear power will need to be used to generate the required amount of energy but that nuclear is green and safe
- Effective ways to mitigate effects of pollutants, e.g. use of vegetation screens/ face masks/**respirators**
- Other sources of particulates (e.g. from agriculture) and how they can be reduced
- Alternatives for lorries, ships, trains, buses and taxis

Issue specific research:

- Specific effects of diesel emissions rather than all emissions
- The underlying physiological mechanisms of the effects of diesel emissions/NO_x/particulates
- Health effects on cardiovascular and neurological systems
- More on how antenatal exposure impacts on the individual's long-term health and possibly that of their children, e.g. epigenetic effects
- Health effects in adults
- More research into the carcinogenicity of diesel
- Development of more reliable methods to test diesel emissions
- More stringent regulations/more effective regulatory bodies to prevent emissions test cheating
- Scrappage schemes and other incentives to encourage motorists to change
- More research into electric cars
- More charging points for electric vehicle

- Better monitoring and regulation of pollution levels in urban areas so more are within EU guidelines
- Development of use of drones for deliveries
A new watchdog for the post-Brexit era

Wider research:

- Develop mitigation measures such as transport of goods taking place at night so pollution not exposed to children
- However shift work/night work is very bad for health so would greatly disadvantage the drivers
- Night shift work is also dangerous – humans do not function well between midnight and 5 am, so this could lead to more road traffic accidents

Credit other valid suggestions.

Schemes to encourage cycling

More research into links with autism and learning difficulties

Develop all engines so they cut out when car is stationary

Research into which types of plants are best to absorb particulates/pollution

Limestone buildings to absorb acid rain

Better filters on diesel cars

Find out about effects of diesel particles travelling on wind and landing on agricultural land – absorbed into crops? Health effects?

Research into contribution made by NO_x gases to acid rain

Improve public transport research into sources of the metals needed for electric car batteries

Question 5: *You are a journalist working for your local newspaper. Your local council wishes to ban diesel cars from your city centre next year. Write a newspaper article for about the advantages and disadvantages of banning diesel cars from your city centre. (15 marks)*

| Assessment focus | Band 0 | Band 1 | Band 2 | Band 3 | Band 4 |
|--|--|--|--|---|---|
| Synthesises content ideas and demonstrates an understanding of scientific reporting and its relationship with reporting medium and target audience | 0 | 1-4 | 5-8 | 9-12 | 13-15 |
| | Level of response not worthy of credit | <ul style="list-style-type: none"> Identifies some of the main points and evidence from the three articles with limited attempt to summarise these. Shows little awareness of audience or purpose. The article will be unstructured and limited to basic points made. | <ul style="list-style-type: none"> Summarises the main points and evidence including any supporting and conflicting statements from the three articles. Shows an awareness of audience and purpose. The article shows some structure and coherence. | <ul style="list-style-type: none"> Summarises and attempts to synthesise the main points and evidence including any supporting and conflicting statements from the three articles. Selects material to suit audience and purpose, with appropriate use of tone, style and scientific terminology. The article shows a structure which is mostly clear, coherent and logical. | <ul style="list-style-type: none"> Summarises and synthesises the main points and evidence including any supporting and conflicting statements consistently from the three articles. Consistently selects and organises material for particular effect, with effective use of tone, style and scientific terminology. The article shows a well-developed structure which is clear, coherent and logical. |

Indicative content for Question 5:

Learners:

- may include other valid suggestions, not listed below, which should be credited
- may cover a number of examples from the list below
- would not be expected to cover all points to get full marks.

Tone and style shows awareness of audience

- Broad audience of mixed levels of education
- Quite likely that the majority will have a limited scientific background
- Report needs to be structured so that it is easy to read
- Explains what the diesel issue is
- Avoid use of esoteric 'jargon'
- However some scientific terms will need to be used and need to be explained clearly
- Needs to be authoritative/fact-based opinion but not patronising
- Needs to be balanced and focus on advantages and disadvantages
- Provides sources of further reading around the subject

Advantages of banning diesel

- Diesel has been shown by the WHO to be carcinogenic
- Research shows that traffic is the main cause of air pollution in urban areas and that over half the traffic in UK is diesel-powered

- Other effects of diesel pollution include exacerbation of underlying respiratory conditions, such as asthma and wheezing
- Recent research, examples quoted, have discovered some of the underlying mechanisms of these effects
- Data quotes to show numbers of premature deaths due to air pollution/diesel
- Reference to Dieselgate/cheating on emissions tests
- Reference to consequences of antenatal exposure
- Reference to why children are affected most and how this can impact on their life-long health
- Reference to schools and nurseries being near busy roads, so major impact on children's health and how banning diesel will mitigate that risk
- Reference to jobs created as motorists may need to change their cars/buy new non-diesel cars

Disadvantages of banning diesel

- Banning diesel-powered vehicles in urban areas does not reduce the particulates, NO_x gases and other pollutants from air in rural areas produced by lorries, ships, trains and buses; these pollutants, along with those produced by agriculture, can drift into cities
- Because a substance is categorised as carcinogenic does not mean it will always lead to cancer; depends on exposure and genetic predisposition towards cancer
- People who own diesel-powered cars will be irritated by the ban and may take their custom elsewhere, reducing income/commerce/tourism in the town
- Motorist who use diesel will feel let down/punished for following previous government advice to adopt diesel as it was thought to be cleaner than petrol
- Government will have to introduce a scrappage scheme to encourage motorists to get rid of their diesel cars and buy electric or petrol cars; this will cost money and may lead to increased taxation
- Local councils will have to provide better public transport, e.g. Park and Ride facilities, and may need to increase council tax to raise the required finance; this will be unpopular and create hardship in some areas
- Government will need to spend money to encourage development of electric cars
- Local government/Defra/Department of Transport will need to make sure that electricity produced to power cars is made using green energy
- Local councils will need to provide more charging points for electric cars
- Cost of replacing buses, trains and taxis in urban areas
- Need for more windfarms and nuclear power stations to generate electricity for cars in a green and safe way

Conclusion

- Banning diesel vehicles has more advantages/disadvantages
- Use of supporting/conflicting statements from the three articles

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