



Mark Scheme (Results)

January 2021

Pearson BTEC Nationals
In Applied Human Biology (21327L)
Unit 3: Human Biology and Health Issues

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Unit 3: Human Biology and Health Issues

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.
- Mark grids should be applied positively. Learners must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark grid, not according to their perception of where the grade boundaries may lie.
- All marks on the mark grid should be used appropriately.
- All the marks on the mark 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 mark grid.
- Where judgement is required, a mark grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the mark grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The mark grids have been designed to assess learners' work holistically.

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

- Examiners should first make a holistic judgement on which band most closely matches the learner's 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.

Activity 1: Discuss how the article uses scientific information to present the pre-employment genetic screening issue.

(12 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
	0	1–3	4–6	7–9	10–12
Inter-pretation, analysis and evaluation of scientific information.	Level of response not worthy of credit.	Generalised comments about how the health issue is presented, with limited attempt to consider any of the following: <ul style="list-style-type: none"> • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data. 	The presentation of the health issue is discussed, partially supported by a consideration of some of the following: <ul style="list-style-type: none"> • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data. 	The presentation of the health issue is discussed, 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/ judgements being made • the validity and reliability of data. 	The presentation of the health issue is discussed, consistently supported throughout by the consideration of: <ul style="list-style-type: none"> • how the article has interpreted and analysed the scientific information to support the conclusions/ judgements being made • the validity and reliability of data.
		Limited discussion that contains generic assertions rather than considering different aspects.	Displays a partially developed discussion that considers some different aspects.	Displays a developed discussion that considers different aspects.	Displays a well-developed and logical discussion that clearly considers a wide range of different aspects.

Indicative content

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.**

Interpretation and Analysis

- The article is quite light on scientific evidence as the issue is primarily a sociological one.
- The fact that genetic screening technologies are advancing quickly is well illustrated by Figure 1.
- Reference is made to the unreliability of genetic screening for employment purposes, but provides no evidence to support this.
- The article provides no scientific evidence to support its statements regarding gene distribution in different populations.
- The article implies in Figure 2 that all absenteeism in the workplace is related to illnesses that could be screened for, but provides no evidence for this.

Validity and Reliability

- Article is supported with references to the WHO and respectable scientific journals.
- News media cited may be slightly less reliable as their priority is selling units and attracting visitors to their sites, often by overstating the more sensationalist aspects of the issue.
- Figure 3 does not provide any information as to who was surveyed. Different groups may have different opinions and even these may change over time.
- The article has an anti-genetic screening for employment purposes focus and may not have presented all the benefits in a fair light.
- Less peer reviewed journals in comparison with a lot of website-based citations and opinions.

Activity 2: Discuss the key factors affecting the pre-employment genetic screening issue.

(16 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
	0	1–4	5–8	9–12	13–16
Understanding the key factors that affect the health issue	Level of response not worthy of credit.	Demonstrates limited knowledge and understanding of the key factors affecting the health issue with generalised comments made.	Demonstrates adequate knowledge and understanding of the key factors affecting the health issue.	Demonstrates good knowledge and understanding of the key factors affecting the health issue.	Demonstrates comprehensive knowledge and understanding of the key factors affecting the health issue.
		Limited or no reference made to the article.	Attempts to use the article through the selection of some relevant aspects to support answer.	Sustained and logical connections made to the article through the selection of relevant aspects to support answer.	Sustained and comprehensive links made to the article through the selection of a wide range of relevant aspects to support answer.
		Limited discussion that contains generic assertions rather than considering different aspects.	Displays a partially developed discussion that considers some different aspects.	Displays a developed discussion that considers different aspects.	Displays a well-developed and logical discussion that clearly considers a wide range of different aspects.

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.**

Indicative content

Key Factors

- The increase in understanding of genes and genetic disease.
- The resultant scientific drive to develop genetic screening technologies.
- The economic impact caused by absenteeism in the workplace.
- The psychological impact of genetic screening on an individual in the workplace.
- Human right to the privacy of their own genome.
- The potential to discriminate against a group of people whose genomes preclude meaningful employment, risk of discrimination based on race.
- laws put in place to prevent discrimination against people with disabilities, including being predisposed to a genetic disease
- The influence of biotechnology and pharmaceutical industries on companies.
- The influence of public perception on the issue.
- The issue of false positives.
- Increase in genetic analysis screening.
- Improvements in technology to make screening an easier process.

Reference to article

- Reference to statistics in the article.
- Uses data from Figures 1,2 and 3.
- Summarises evidence from both sides.
- Quotes studies.
- Uses key terms that are explained in the glossary.

Activity 3: Explain how different organisations/individuals influence the pre-employment genetic screening issue.

(10 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3
	0	1–4	5–7	8–10
Understanding the influence of different organisations/individuals.	Level of response not worthy of credit.	Demonstrates isolated elements of knowledge of the influence of different organisations/individuals, on research and/or health issue, with major gaps or omissions.	Demonstrates mostly accurate knowledge and understanding of the influence of different organisations/individuals on research and health issues.	Demonstrates accurate and detailed knowledge and understanding of the influence of different organisations/individuals research and health issues.
		A basic explanation of how the organisation/individual may have an influence is given, but with general statements made and limited links to the article.	An explanation of how these organisations/individuals may influence the issue is given, occasionally supported through some linkage and application to the article.	An explanation of how these organisations/individuals may influence the issue is given, supported throughout with linkage and application to the article.

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.

Indicative content

Organisation	Influence of scientific issue
Wellcome Trust Case Control Consortium (WTCCC)	Registered charity Funds scientific research into improving health Increased our knowledge about the number of genes known to play a role in diseases
University of Oxford	Educational institute Funds studies Carries out and publishes research
Nature (inc Genetics & Education)	Scientific journal Publishes research Provides opinion
Forbes	Business magazine Provides information and opinion on finance matters
World Health Organisation	United Nations agency Provides guidance to governments, food industry and general public on health matters Funds research

Institute of Directors	<p>Business organisation</p> <p>Consists of company directors, senior business leaders and entrepreneurs</p> <p>Strong influence on government policy</p>
Health and Safety Commission (HSC)	<p>Linked to UK Government</p> <p>Consults on policy regarding health and safety in the workplace</p>
Human Genetics Commission (HGC)	<p>Linked to UK Government</p> <p>Consults on policy regarding the ethical and social aspects of genetics</p>
UK Government	<p>Duty to provide for the wellbeing of its citizens</p> <p>Publishes scientific guidelines</p> <p>Provides funding for research, organisations and media</p> <p>Decides policy on the use of genetic screening</p>
American Journal of Medicine	<p>Scientific journal</p> <p>Publishes research</p> <p>Provides opinion</p>

Genewatch UK	Not-for-profit group Provides information to the public regarding matters of genetic science Political lobbyists
House of Lords Science and Technology Committee	Government body Oversees government policy regarding scientific and technological matters
Office of the Privacy Commissioner of Canada	Government body Provides advice and information regarding the protection of individuals to the public Enforces privacy laws

Individuals	Influence of scientific issue
Professor Peter Donnelly	PhD Chair of the WTCCC
Summers, N	Head of Health, Safety & the Environment at the Energy Networks Association
Markel, H	American physician and medical historian PhD
Day, G	Wrote Directors' Views on Health Testing at Work
Craig Brierley	Head of Research Communications Wellcome Trust
Pray, L	American scientist PhD

Activity 4: Suggest potential areas for further development and/or research of the pre-employment genetic screening issue.

(6 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3
	0	1-2	3-4	5-6
Application of understanding to identify areas for further development and/or research.	Level of response not worthy of credit.	Demonstrates isolated elements of knowledge of the health issue.	Demonstrates mostly accurate knowledge and understanding of the health issue.	Demonstrates accurate and detailed knowledge and understanding of the health issue.
		limited identification of areas for further development and/or research.	A description for further areas of development and/or research is given, occasionally supported through some linkage and application to the article.	A description for further areas of development and/or research is given, supported throughout with linkage and application to the article.

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.**

Indicative content

Further research

- Further research into the relationship between genes and disease.
- More studies to investigate the link between possessing a gene that predisposes a person to a particular illness and the likelihood of them developing it.
- Conversation on the global political level on whether the money saved by genetic screening is worth the invasion of privacy that comes with mapping and analysing their genome for non-medical purposes.
- Discussion on how to prevent discrimination against a group of people who are predisposed to illnesses that might require long periods of absence/early retirement.
- Investigation into conflicts of interest between businesses/biotechnology and pharmaceutical companies and those government agencies that consult on policy.
- Further testing to reduce false positives.
- research into ways of reducing absenteeism by employers looking after their employees better
- research why absences happen (illness, stress etc) and how employers can provide their employees with strategies etc to manage this, or create a 'safer' working environment to reduce this.
- More research on how environmental factors can affect gene expression/epigenetics
- Research into pharmaceuticals that can block the expression of undesirable alleles
- Research into pharmaceuticals/strategies that alleviate effects of genetic diseases
- More research into gene therapy and other genetic manipulations e.g. CRISPR-Cas 9

Further development

- Recalculating the annual cost of lost productivity based only on illnesses that can currently be screened for.
- GDPR issues and data storage

Activity 5: A recent news headline said: 'UK employers push for pre-employment genetic screening.

You have been asked to write a letter to the House of Commons Science and Technology committee to argue against the use of Pre-employment genetic screening.

When writing your letter, you must consider:

- **who is likely to read your letter**
- **what you would like the reader to learn from your letter.**

(16 marks)

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4
	0	1–4	5–8	9–12	13–16
Synthesises content ideas and demonstrates an understanding of scientific reporting.	Level of response not worthy of credit.	Identifies some of the key information from the articles.	Summarises the key information and evidence from the articles.	Summarises and attempts to draw together key information using common elements from the articles.	Summarises and consistently draws together key information using common elements from the articles.
		Demonstrates limited understanding of audience or purpose.	Demonstrates some understanding of audience and purpose by some appropriate use of writing style and terminology.	Demonstrates good understanding of audience and purpose by using mostly appropriate writing style and terminology.	Demonstrates comprehensive understanding of audience and purpose by using appropriate writing style and terminology throughout.
		The response will be unstructured and limited to basic points made.	The response shows some structure and coherence.	The response shows a structure that is mostly clear, coherent and logical.	The response shows a well-developed structure that is clear, coherent and logical.

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.**

Indicative content

- A definition of pre-employment genetic screening.
- Familiarisation of why it may be attractive to employers.
- Familiarisation of the various groups that may apply pressure on the government to allow pre-employment screening.
- Reference to the limitations of genetic screening as a diagnostic tool and why.
- Reference to the threat to employee safety and job security.
- Reference to the implications of discrimination by genome.
- Reference to discrimination against people with disabilities, including genetic predisposition
- Reference to privacy of information about individual's genome/ DNA
- The article should be targeted at politicians who may not understand more scientific terms but would respond to facts and figures.



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

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