# GCSE to A-level progression: Scientific skills answer booklet

## Activity 3: Past paper questions (science/investigative skills)

| Question | Answers |
|---|---|
| 1. | (ii) the number of plants **or** grasses **and** the mass of plants **or** grass<br><br>**both** *answers are required for the mark*<br>*'amount of plants' is insufficient*<br><br>           **1** |
| 2. | hig<u>her</u> caffeine concentration causes short<u>er</u> reaction time.<br><br>*Allow converse*<br>*ignore 'faster/slower <u>reaction</u> <u>time</u>*<br><br>           **1** |
| 3. | (a) • concentration (of hair dye)<br><br>    *accept 'conc'*<br>    *'hair dye' is insufficient*<br>    *accept 'strength of hair dye'*<br>    *'strength' is insufficient*<br>    *accept 'percentage'*<br><br>    *do **not** accept 'force' **or** 'mass' **or** 'weight'*<br><br>           **1 (L5)**<br><br>(b) any **one** from:<br><br>    • mass needed to break the hair<br>      *accept 'force' **or** 'weight'*<br>      *accept 'mass'*<br><br>    • strength of hair<br>      *'strength' is insufficient*<br><br>           **1 (L5)** |

| Question | Answers |
|---|---|
| 4. | **(a)** any **one** from:<br><br>• size of pieces of tablet<br>*accept 'size of tablet'*<br>*accept 'whether the tablet is whole **or** crushed'*<br><br>• surface area of the tablet<br>*accept 'form of the tablet'*<br>*accept 'particle size'*<br>*accept 'mass of each piece'*<br>*accept 'number of pieces'*<br>*do **not** accept 'mass of tablet*<br><br>                                                **1**<br><br><br>**(b)** temperature of the water<br>*accept 'temperature'*<br>                                                **1**<br><br>**(c)** any **one** from<br><br>• the higher the temperature the quicker the tablet dissolves<br><br>• the lower the temperature the longer it takes to dissolve<br>***answers must include a comparison***<br>*'at the lowest temperature it takes a long time to dissolve'*<br>*is insufficient*<br>*'at the highest temperature it dissolves quickly' is insufficient*<br><br>                                                **1** |
| 5. | **(a)** • mass of salt dissolved in water<br>*accept 'the mass **or** amount of salt'*<br>*'salt' is insufficient*<br>*do **not** accept 'the type of salt used'*<br>                                                **1**<br><br>**(b)** • boiling point of salt solution<br>*accept 'boiling point'*<br>                                                **1** |

**Max marks for Activity 3:** 9

# Activity 4 – Psychology past paper questions (hypothesis, independent and dependent variables)

| Question | Answers |
|---|---|
| 1. | **(a)** |

| Whether participants worked in the morning or in the afternoon | |
|---|---|
| The 30 errors | |
| The number of errors correctly underlined | ✓ |

**1**

**(b)**

The hypothesis must be a testable statement.

Possible answer:

**There will be a difference between the number of errors correctly underlined by students working in the morning and students working in the afternoon.**

Note: Statement must contain a **sense** of both parts of the independent variable **and** the dependent variable (accept alertness), (1 mark) **and** be operational (1 mark).

Allow null, directional or non-directional hypothesis.

Note: Do not accept aims, questions, correlational statements or statements of the results.

Note: Accept Condition A and Condition B as a sense of IV BUT award MAX 1 mark for answer.

**2**

| 2. | **(a)** **(i)** Answer: Participants either seeing a flashing red light or hearing a ringing bell/saw or heard something/types of stimulus/red light or ringing bell. |

**1**

**(ii)** Answer: Reaction times (in milliseconds)

**1**

**(b)**

The hypothesis must be a testable statement.

Possible answer: **There is a difference in the reaction times when people respond to hearing a bell ring or seeing a light flash.**

Note: Both conditions of the IV must be present and a sense of the DV (1 mark). Operational (1 mark).

**2**

| Question | Answers | |
|---|---|---|
| 3. | (a) The (two or more) conditions in an experiment that are compared/changed (in an experiment) (1 mark) | **1** |
| | (b) | |
| | • The variable that is measured by the researcher (1 mark). | |
| | **OR** | |
| | • The variable that changes because of the manipulation of the independent variable (1 mark). | **1** |
| | (c) | |
| | **For 2 marks** there must be both conditions of the IV and a clear DV which makes the statement operational. | |
| | **For 1 mark** the hypothesis lacks clarity. | |
| | **There is (will be) a difference in the number of errors made when recalling numbers presented in three groups of three compared to numbers presented in one group of nine (2 marks).** | **2** |

| Question | Answers | |
|---|---|---|
| 4. | **(a)** **(i)** | |

| | |
|---|---|
| The EPI (personality test) | |
| The extraversion score for each student | |
| Whether or not the students studied drama | ✓ |
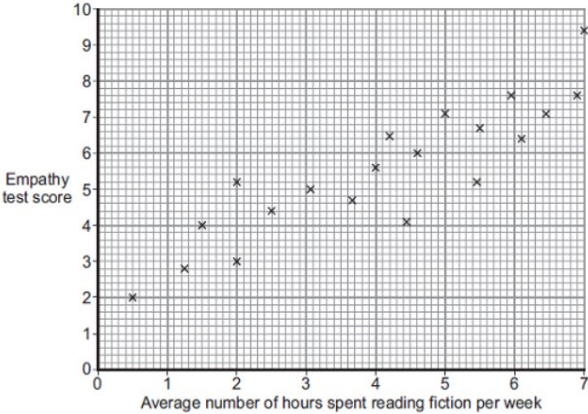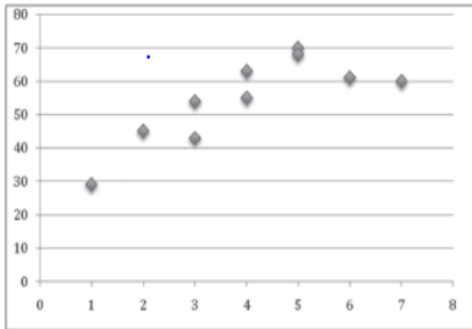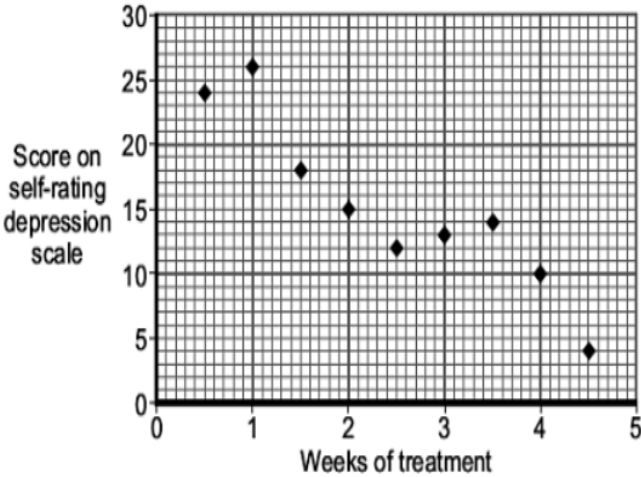
**1**

**(ii)**

| | |
|---|---|
| The EPI (personality test) | |
| The extraversion score for each student | ✓ |
| Whether or not the students studied drama | |

**1**

**(b)**

The hypothesis must be a testable statement in one sentence.

Possible answer: There will be a difference between drama students and non-drama students in their extraversion scores on the EPI.

**Note:** Statement must contain a sense of the independent and dependent variables (1 mark). Operational (1 mark).

Allow directional or non-directional hypothesis. Allow higher score.

**2**

| 5. | **(i)** | |
|---|---|---|

| | |
|---|---|
| The test containing 30 questions | |
| The number of questions answered correctly | |
| Whether the temperature was cool or warm | ✓ |

**1**

**(ii)**

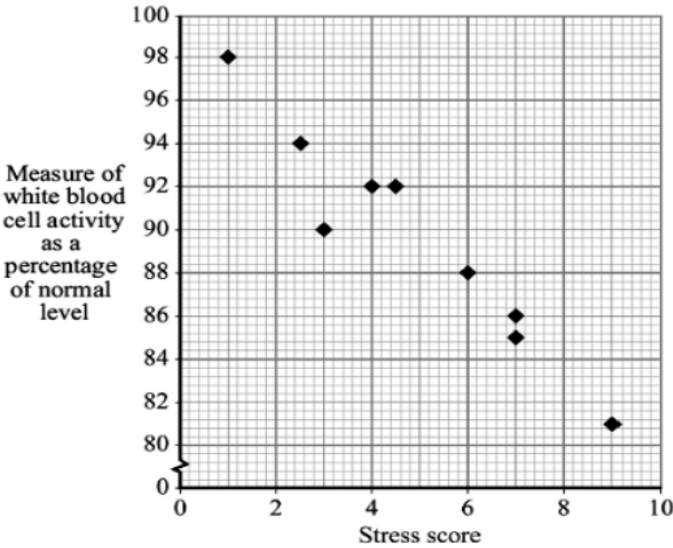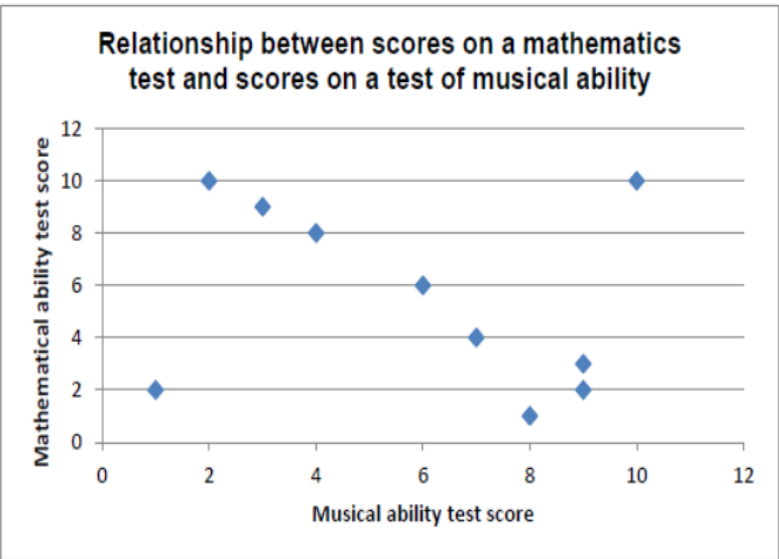| | |
|---|---|
| More will answer questions correctly when the temperature is cool compared with when it is warm. | |
| Students will answer more questions correctly when the temperature is cool compared with when it is warm. | ✓ |
| Students are more likely to answer questions better when the temperature is cool compared with when it is warm. | |

**1**

**Max marks for Activity 4**: 17

# Activity 5a

| Type of correlation | Letter |
|---|---|
| Positive | A |
| Negative | B |

# Activity 5b: Positive and negative correlations

| Scattergram | Relationship |
|---|---|
| Scattergram of children's scores on a test of empathy and the average number of hours spent reading fiction per week.<br><br>*(scatterplot: Empathy test score on y-axis 0–10, Average number of hours spent reading fiction per week on x-axis 0–7)* | Positive |
| Relationship between days off work in a year through illness and stress scores<br><br>*(scatterplot: Scores on stress questionnaire on y-axis 0–80, Number of days off work in a year through illness on x-axis 0–8)* | Positive |
| Relationship between weeks of treatment and scores on depression scale<br><br>*(scatterplot: Score on self-rating depression scale on y-axis 0–30, Weeks of treatment on x-axis 0–5)* | Negative |

| Scattergram | Relationship |
|---|---|
| **Relationship between stress and the level of activity of white blood cells**  | Negative |
|  | Negative |

# Activity 5c: Correlation questions

| Question | Answer | |
|---|---|---|
| 1. | False | **1** |
| 2. | | **2** |

| | | |
|---|---|---|
| This method provides detailed information about individuals. | | |
| This method cannot establish cause and effect. | ✓ | |
| This method allows a researcher to see if there is a relationship between two variables. | ✓ | |
| This method allows the researcher to control all variables. | | |

| Question | Answer | |
|---|---|---|
| 3. | Correlations can show the strength of a relationship between two variables. | **1** |
| 4. | Positive correlation | **1** |
| 5. | This graph shows a fairly strong negative correlation between stress and white blood cell activity/the immune system. As the stress increases the immune functioning decreases. The following can all receive a mark: direction, strength, and a description of their relationship. | **2** |

**Max marks for Activity 5**: 14

# Activity 6: Practical activity – the Stroop test

| Independent variable | Whether the word and the colour of the ink match (congruent) or do not match (incongruent). |
|---|---|
| Dependent variable | Speed (in milliseconds) in correct trails. |
| Hypothesis | Participants reaction time in milliseconds will be slower in trials where the word and ink colour do not match compared to when the word and ink colour do match. |

**Max marks for Activity 6:** 3