

# Cambridge IGCSE™

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**GEOGRAPHY**

**0460/01**

Paper 1 Physical Geography

**For examination from 2027**

MARK SCHEME

Maximum Mark: 75

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**Specimen**

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This document has **18** pages. Any blank pages are indicated.

## Generic Marking Principles

All examiners must apply these general marking principles when marking candidate responses. Examiners must apply them alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme must also comply with these marking principles.

### GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

### GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

### GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

### GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptions.

### GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however, the use of the full mark range may be limited according to the quality of the candidate responses seen).

### GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptions in mind.

**Guidance on using levels-based mark schemes**

Marking of work should be positive, rewarding achievement where possible, but clearly differentiating across the whole range of marks, where appropriate.

The marker should look at the work and then make a judgement about which level statement is the best fit. In practice, work does not always match one level statement precisely so a judgement may need to be made between two or more level statements.

Once a best-fit level statement has been identified, use the following guidance to decide on a specific mark:

- If the candidate's work **convincingly** meets the level statement, award the highest mark.
- If the candidate's work **adequately** meets the level statement, award the most appropriate mark in the middle of the range (where middle marks are available).
- If the candidate's work **just** meets the level statement, award the lowest mark.

**Assessment Objectives**

AO1: Knowledge and understanding

AO2: Skills and analysis

AO3: Evaluation and decision-making

**Levels of response****Table A**

AO1: Knowledge and understanding

AO3: Evaluation and decision-making

Use this table to give marks for each candidate response for the 7 mark part (c) item in Question 1.

Level	Description	Marks
3	<ul style="list-style-type: none"> <li>• A balanced/comprehensive answer which shows a clear understanding with developed statements which are relevant to the question.</li> <li>• Answer is supported by relevant evidence and/or examples throughout.</li> <li>• Answer contains a supported evaluation/judgement/decision on the question.</li> </ul>	6–7
2	<ul style="list-style-type: none"> <li>• An answer which shows a good understanding with developed statements which are relevant to the question.</li> <li>• Answer is supported by some relevant evidence and/or examples.</li> <li>• Answer contains a limited evaluation/judgement/decision on the question.</li> </ul>	3–5
1	<ul style="list-style-type: none"> <li>• An answer which shows limited understanding using simple statements which are relevant to the question.</li> </ul>	1–2
0	<ul style="list-style-type: none"> <li>• No creditable response.</li> </ul>	0

**Table B**

AO1 Knowledge and understanding

Use this table to give marks for each candidate response for the 7 mark part (c) item in Questions 2–4.

<b>Level</b>	<b>Description</b>	<b>Marks</b>
3	<ul style="list-style-type: none"><li>• Uses named example (when appropriate).</li><li>• A comprehensive answer with developed statements showing detailed knowledge and understanding which is relevant to the question.</li><li>• Answer includes specific details about place or process.</li></ul>	6–7
2	<ul style="list-style-type: none"><li>• Developed statements showing good knowledge and understanding which is relevant to the question.</li></ul>	3–5
1	<ul style="list-style-type: none"><li>• Simple statements with limited detail, showing basic knowledge and understanding which is relevant to the question.</li></ul>	1–2
0	<ul style="list-style-type: none"><li>• No creditable response.</li></ul>	0

**Section A**

Question	Answer	Marks
1(a)(i)	<p><b>In which direction is the Pacific Plate moving?</b></p> <p>AO2: Skills and analysis</p> <ul style="list-style-type: none"> <li>north-north-west (NNW)</li> </ul> <p>2 selected answers (0 marks)</p>	<b>1</b>
1(a)(ii)	<p><b>State the latitude and longitude of the earthquake labelled X in Figure 1.1.</b></p> <p>AO2: Skills and analysis</p> <ul style="list-style-type: none"> <li>67°N 147°W (allow tolerance)</li> </ul>	<b>1</b>
1(a)(iii)	<p><b>Identify the magnitude on the Richter scale of the earthquakes labelled Y and Z in Figure 1.1.</b></p> <p>AO2: Skills and analysis</p> <ul style="list-style-type: none"> <li>Y = 9.0 or larger</li> <li>Z = 7.0 to 7.9</li> </ul> <p>2 × 1 mark</p>	<b>2</b>
1(a)(iv)	<p><b>Name <u>two</u> other scales which can be used to measure earthquakes.</b></p> <p>AO1: Knowledge and understanding</p> <ul style="list-style-type: none"> <li>Mercalli scale</li> <li>moment magnitude scale</li> </ul> <p>2 × 1 mark</p>	<b>2</b>
1(a)(v)	<p><b>Describe the distribution of earthquakes shown in Figure 1.1.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>uneven/clustered</li> <li>linear</li> <li>crescent shape/curve</li> <li>close to faults/plate edges</li> <li>(especially/most) close to/within 300 km/to the north of the plate boundary</li> <li>(especially) boundary of/between North American and Pacific Plate</li> <li>west/south/SW Alaska/off south coast of Alaska</li> <li>a few in centre of Alaska.</li> </ul> <p>All valid material must be credited.</p> <p>4 × 1 mark</p>	<b>4</b>

Question	Answer	Marks
1(b)(i)	<p><b>Use Figure 1.2 to describe the location of Whakaari.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• in Bay of Plenty</li> <li>• in Taupo volcanic zone</li> <li>• 250 km offshore (allow tolerance)</li> <li>• NNE of Moutohorā/Whakatāne</li> <li>• ENE of Mōtītī Island</li> <li>• ESE of Mayor Island.</li> </ul> <p>All valid material must be credited.</p> <p>3 × 1 mark</p>	<b>3</b>
1(b)(ii)	<p><b>Use Figure 1.3 to explain why a volcanic eruption occurred on Whakaari.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• plates are converging/moving towards each other</li> <li>• subduction/one plate goes under the other/Pacific Plate goes under Indo-Australian Plate</li> <li>• Pacific Plate is heavier/more dense</li> <li>• destruction/melting of rocks/crust</li> <li>• build up of magma/creates magma/lava</li> <li>• pressure/energy build-up</li> <li>• magma/lava rises/reaches surface/pushed up to surface/moves through cracks/comes out/bursts out.</li> </ul> <p>All valid material must be credited.</p> <p>5 × 1 mark</p>	<b>5</b>

Question	Answer	Marks
1(c)	<p><b>Assess the extent to which technology can reduce the impacts of volcanic eruptions.</b></p> <p>AO1: Knowledge and understanding AO3: Evaluation and decision-making</p> <p>Use Table A to mark candidate responses to this question.</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• technology can be used to predict eruptions more accurately (measuring volcanic gases, seismic waves etc.) allowing earlier evacuation</li> <li>• technology can be used to divert/slow down lava flows</li> <li>• technology can be used to monitor the direction of ash plumes, to help pilots avoid them</li> <li>• technology relating to improved transport and medical care may also be considered.</li> </ul> <p>However:</p> <ul style="list-style-type: none"> <li>• technology cannot prevent a volcanic eruption</li> <li>• the magnitude of the eruption cannot be controlled</li> <li>• technology may be able to help divert lava, but it cannot divert ash and toxic gas</li> <li>• some forms of technology can be very expensive so not universally available.</li> </ul> <p>All valid material must be credited.</p>	<b>7</b>

**Section B**

Question	Answer	Marks
2(a)(i)	<p><b>Name the coastal landform labelled X in Figure 2.1.</b></p> <p>AO1: Knowledge and understanding</p> <ul style="list-style-type: none"> <li>• wave-cut platform</li> </ul>	<b>1</b>
2(a)(ii)	<p><b>Use Figure 2.1 to identify <u>two</u> characteristics of the landform labelled X.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• bare rock</li> <li>• horizontal</li> <li>• low height/varying heights</li> <li>• in shallow water/partially covered by water</li> <li>• ridge/ridges</li> <li>• spread over a large area.</li> </ul> <p>All valid material must be credited.</p> <p>2 × 1 mark</p>	<b>2</b>
2(a)(iii)	<p><b>Use Figure 2.1 to describe the features of the bay. Do <u>not</u> refer to landform X.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• divided into three sections</li> <li>• open/exposed/not sheltered</li> <li>• presence of pebble/sand beach</li> <li>• presence of offshore rocks</li> <li>• gently sloping/low cliffs</li> <li>• gently sloping beach.</li> </ul> <p>All valid material must be credited.</p> <p>3 × 1 mark</p>	<b>3</b>



Question	Answer	Marks
2(a)(iv)	<p><b>Explain why bays and headlands form along discordant coastlines.</b></p> <p>AO1: Knowledge and understanding</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• alternate bands of rock of different resistance at right angles to coast/ reach the coast</li> <li>• differential erosion occurs</li> <li>• less resistant rocks eroded rapidly</li> <li>• by hydraulic action/abrasion/corrosion</li> <li>• and form bays</li> <li>• more resistant/harder rocks resists erosion</li> <li>• and form headlands.</li> </ul> <p>All valid material must be credited.</p> <p>4 × 1 mark</p>	<b>4</b>
2(b)(i)	<p><b>Use Figure 2.2 to compare the average monthly frequency of tropical cyclones on India's west and east coasts. Refer to data in your answer.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• frequency is higher on east coast/lower on west coast</li> <li>• 22 on west coast and 33 on east coast</li> <li>• east coast is affected by cyclones for 10 months compared with the west being affected for 7 months</li> <li>• May/June/September/October/November/December both east and west have cyclones</li> <li>• in February both east and west have no cyclones</li> <li>• use of data relating to one month e.g. in November average number of cyclones is 9 on east coast but 2 in west coast.</li> </ul> <p>All valid material must be credited.</p> <p>NB: 1 mark maximum reserved for data.</p> <p>3 × 1 mark</p>	<b>3</b>

Question	Answer	Marks
2(b)(ii)	<p><b>Evaluate the different ways in which the impacts of tropical storms (cyclones, hurricanes and typhoons) can be managed.</b></p> <p>AO3: Evaluation and decision-making</p> <p>One mark reserved for evaluation such as:</p> <ul style="list-style-type: none"> <li>• tropical storms cannot be prevented</li> <li>• action can be taken to reduce the impacts of tropical storms</li> <li>• success is likely to be determined by level of economic development</li> <li>• HICs have greater technology/finance to set up warning systems.</li> </ul> <p>Accept reference to strategies such as:</p> <ul style="list-style-type: none"> <li>• provision of shelters</li> <li>• warning systems</li> <li>• evacuation planning/evacuation of people/movement to high land/inland location</li> <li>• defending at-risk coasts.</li> </ul> <p>All valid material must be credited.</p> <p>Up to 4 simple points 4 × 1 Point (1) + development (1) × 2 (any combination of the above) Reserve 1 mark for evaluation/judgement.</p>	<b>5</b>
2(c)	<p><b>Explain the importance of coral reefs to a coastal area you have studied.</b></p> <p>AO1: Knowledge and understanding</p> <p>Use Table B to mark candidate responses to this question.</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• protection of coast from erosion/storms/tsunamis</li> <li>• provision of sheltered anchorage/harbours</li> <li>• attraction for tourists</li> <li>• fishing</li> <li>• source of food</li> <li>• income for local communities</li> <li>• maintenance of marine biodiversity/ecosystems/food chains</li> <li>• extracts from coral reef flora/fauna have been used to develop cures for diseases.</li> </ul> <p>All valid material must be credited.</p>	<b>7</b>

Question	Answer	Marks
3(a)(i)	<p><b>Name the continent marked X on Figure 3.1.</b></p> <p>AO1: Knowledge and understanding</p> <ul style="list-style-type: none"> <li>• Antarctica</li> </ul>	<b>1</b>
3(a)(ii)	<p><b>Zone D on Figure 3.1 has an equatorial climate. Describe the distribution of the regions with an equatorial climate.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• on/hear/close to Equator</li> <li>• within 20 degrees (N/S of Equator)</li> <li>• extends to 30 degrees in small regions</li> <li>• South America, Africa and Asia (all needed).</li> </ul> <p>All valid material must be credited.</p> <p>2 × 1 mark</p>	<b>2</b>
3(a)(iii)	<p><b>Use Figure 3.2 to describe the main features of the equatorial climate. Refer to data in your answer.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• high temperatures</li> <li>• 25–27 °c all year</li> <li>• high rainfall</li> <li>• 165–330 mm per month</li> <li>• rainfall every month</li> <li>• slightly lower rainfall June–October.</li> </ul> <p>All valid material must be credited.</p> <p>3 × 1 mark</p>	<b>3</b>
3(a)(iv)	<p><b>Explain why temperatures are low in Antarctica.</b></p> <p>AO1: Knowledge and understanding</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• low angle of sun</li> <li>• little direct sunlight</li> <li>• low insolation</li> <li>• no daylight for 6 months of the year/in winter</li> <li>• high albedo/most of sun's rays reflected back into space</li> <li>• low atmospheric water vapour.</li> </ul> <p>All valid material must be credited.</p> <p>4 × 1 mark</p>	<b>4</b>

Question	Answer	Marks
3(b)(i)	<p><b>Use Figure 3.3 to compare the percentage of deforestation in Africa and South America for both types of agriculture. Refer to data in your answer.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• more caused by commercial agriculture in South America/less caused by commercial agriculture in Africa</li> <li>• commercial South America 66% Africa 35%/31% more in South America</li> <li>• more caused by subsistence agriculture in Africa/less caused by subsistence agriculture in South America</li> <li>• /subsistence South America 18% Africa 40%/22% more in Africa</li> <li>• overall agriculture causes more deforestation in South America/less in Africa</li> <li>• /overall South America 84% Africa 75%/9% more in South America</li> <li>• main cause is commercial in South America but subsistence is main cause in Africa.</li> </ul> <p>All valid material must be credited.</p> <p>NB: One mark reserved for data.</p> <p>3 × 1 mark</p>	<b>3</b>

Question	Answer	Marks
3(b)(ii)	<p><b>Choose the plan that you think will be most effective in sustainably managing the tropical rainforest. Justify your decision.</b></p> <p>AO3: Evaluation and decision-making</p> <p>Answers may include some of the following ideas. Credit advantages of chosen plan and disadvantages of rejected plans (any combination).</p> <p><b>Plan A</b>  <b>Advantages such as:</b></p> <ul style="list-style-type: none"> <li>• large scale destruction will be prevented</li> <li>• areas could be developed which do not contain sensitive ecosystems</li> <li>• large areas can be conserved</li> <li>• areas remain for indigenous groups/national parks</li> <li>• more trees will be planted than are removed etc.</li> </ul> <p><b>Disadvantages such as:</b></p> <ul style="list-style-type: none"> <li>• resources/production will be reduced</li> <li>• detrimental to growth of economy</li> <li>• enforcement will be almost impossible</li> <li>• many areas have already been destroyed</li> <li>• trees take a long time to grow/mature etc.</li> </ul> <p><b>Plan B</b>  <b>Advantages such as:</b></p> <ul style="list-style-type: none"> <li>• the area will be conserved/protected</li> <li>• ecosystems/food chains will not be destroyed</li> <li>• forest will regrow in areas previously exploited</li> <li>• carbon sinks will increase/be retained/not destroyed</li> <li>• many parts can be used for ecotourism.</li> </ul> <p><b>Disadvantages such as:</b></p> <ul style="list-style-type: none"> <li>• resources will not be exploited</li> <li>• detrimental to growth of economy</li> <li>• enforcement will be almost impossible</li> <li>• many areas have already been destroyed.</li> </ul> <p><b>Plan C</b>  <b>Advantages such as:</b></p> <ul style="list-style-type: none"> <li>• development can be carefully controlled</li> <li>• large scale destruction will be prevented</li> <li>• licences could be given to only develop areas which do not contain sensitive ecosystems</li> <li>• large areas can be conserved</li> <li>• areas remain for indigenous groups/national parks</li> <li>• involve local community in decision making/jobs.</li> </ul> <p><b>Disadvantages such as:</b></p> <ul style="list-style-type: none"> <li>• resources/production will be reduced</li> <li>• detrimental to growth of economy</li> <li>• many areas have already been destroyed.</li> </ul> <p>All valid material must be credited.</p> <p>Up to 4 simple points 4 × 1  Point (1) + development (1) × 2  (or any combination of the above)  Reserve 1 mark for evaluation/judgement.</p>	<b>5</b>

Question	Answer	Marks
3(c)	<p><b>Explain why many people are concerned about the destruction of the Antarctic ecosystem. Refer to examples in your answer.</b></p> <p>AO1: Knowledge and understanding</p> <p>Use Table B to mark candidate responses to this question.</p> <p>Ideas such as:</p> <ul style="list-style-type: none"><li>• damage to vegetation/vegetation takes a long time/will not regrow</li><li>• loss of fauna</li><li>• food chains disrupted</li><li>• impact on indigenous communities elsewhere in the world</li><li>• melting ice caps/sheets/glaciers</li><li>• rise in sea level</li><li>• flooding of coastal lowlands.</li></ul> <p>All valid material must be credited.</p>	<b>7</b>

Question	Answer	Marks
4(a)(i)	<p><b>Estimate the increase in global CO<sub>2</sub> emissions between 1960 and 2020.</b></p> <p>AO2: Skills and analysis</p> <ul style="list-style-type: none"> <li>• 1.8–2 (metric tonnes per capita)</li> </ul>	<b>1</b>
4(a)(ii)	<p><b>Give <u>two</u> reasons for the increase in global CO<sub>2</sub> emissions between 1960 and 2020.</b></p> <p>AO1: Knowledge and understanding</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• increased population</li> <li>• increase in vehicles/cars/road transport</li> <li>• increase in air transport</li> <li>• increased use/generation of electricity/more coal fired power stations</li> <li>• more use of fossil fuels</li> <li>• more cattle grazing/rice cultivation.</li> </ul> <p>All valid material must be credited.</p> <p>2 × 1 mark</p>	<b>2</b>
4(a)(iii)	<p><b>Use Figure 4.1 to describe the average changes in temperature between 1960 and 2020. Refer to data in your answer.</b></p> <p>AO2: Skills and analysis</p> <ul style="list-style-type: none"> <li>• overall/general increase</li> <li>• by over 1 °C</li> <li>• fluctuations/uneven rise</li> <li>• e.g. fall in early 60s followed by rise in late 60s.</li> </ul> <p>NB: One mark reserved for data.</p> <p>3 × 1 mark</p>	<b>3</b>

Question	Answer	Marks
4(a)(iv)	<p><b>Use evidence in Figure 4.1 to describe the relationship between global CO<sub>2</sub> emissions and average temperature change.</b></p> <p>AO2: Skills and analysis</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• general relationship is positive/as carbon dioxide levels increased over the period so did global average temperatures</li> <li>• however, the relationship is not perfect</li> <li>• fluctuations in temperature are not reflected by fluctuations in carbon dioxide/change in carbon dioxide seems to be more gentle than changes in temperature</li> <li>• mostly when there are spikes in carbon dioxide levels temperatures rise rapidly e.g. 1980</li> <li>• sometimes a rise in carbon dioxide levels sees a reduction in temperature e.g. 1970.</li> </ul> <p>Accept appropriate sets/pairs of data.</p> <p>All valid material must be credited.</p> <p>4 × 1 mark</p>	<b>4</b>
4(b)(i)	<p><b>State <u>one</u> reason for each of the following impacts of climate change.</b></p> <p><b>rising sea levels</b></p> <p><b>prices of food may rise</b></p> <p><b>shortage of fresh water</b></p> <p>AO1: Knowledge and understanding</p> <p>rising sea levels</p> <ul style="list-style-type: none"> <li>• melting of ice caps/glaciers/ice sheets/increased sea temperatures.</li> </ul> <p>prices of food may rise</p> <ul style="list-style-type: none"> <li>• drought/lower rainfall/lower crop yields/destruction of crops/less crops produced.</li> </ul> <p>shortage of fresh water</p> <ul style="list-style-type: none"> <li>• drought/inundation of sea water into wells/water table/more evaporation of rivers/lakes/reservoirs.</li> </ul> <p>All valid material must be credited.</p> <p>3 × 1 mark</p>	<b>3</b>



Question	Answer	Marks
4(b)(ii)	<p><b>To what extent is international cooperation essential to slow down the rate of climate change?</b></p> <p>AO3: Evaluation and decision-making</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• changes in the atmosphere do not respect international boundaries/affect all countries</li> <li>• to slow down global warming all countries therefore need to work together</li> <li>• sources of carbon created in one country may have an adverse effect on many other countries; especially low-lying islands</li> <li>• countries can only adapt to the effects of climate change individually, but not slow it down without all countries acting together</li> <li>• international agreements/protocol have been made e.g. to reduce carbon emissions</li> <li>• however, not all of the world's major industrial countries have signed up, so chances of success are limited.</li> </ul> <p>All valid material must be credited.</p> <p>Up to four simple points <math>4 \times 1</math> Point (1) + development (1) <math>\times 2</math> (any combination of the above) Reserve 1 mark for evaluation/judgement.</p>	<b>5</b>
4(c)	<p><b>For a named country you have studied, describe the strategies which have been used to reduce the problems caused by climate change.</b></p> <p>AO1: Knowledge and understanding</p> <p>Use Table B to mark candidate responses to this question.</p> <p>Ideas such as:</p> <ul style="list-style-type: none"> <li>• coastal defences</li> <li>• strengthen defences against storms/hazards management</li> <li>• home insulation</li> <li>• adaptation of agricultural practices</li> <li>• develop drought resistant varieties of crops</li> <li>• plant crops which benefit from longer growing seasons/higher temperature</li> <li>• improve water storage capacity/techniques</li> <li>• install better drainage in urban areas</li> <li>• relocation of settlements/key infrastructure.</li> </ul> <p>All valid material must be credited.</p>	<b>7</b>

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