The following tips will hopefully help raise performance in any future examinations but they are based mainly on the summer 2010 paper.

Question 3 has particular issues associated with it as:

- it is the last question and so candidates are often tired or rushed – so leave yourself time. The paper is 90 minutes, so 30 minutes for each question, leaving just 12 minutes for Q3 part (c).
- it requires specific reference to an actual investigation which has (or should have) taken place – Expect to give a brief outline of your investigation so the examiner can see how your answer relates to it i.e. the context.
- the answers will be very varied, both within centres (as individuals investigate different topics) and between centres – it helps your case to give the details which indicate that you really did conduct this investigation yourself.

Any student should be familiar with the specification (easily found on the WJEC website). Page 15 sets the scene well and outlines what candidates should be able to tackle. This is a good checklist, especially as any principal examiner (the person who sets the papers) will refer back to this to ensure that all questions are fair and clearly within the guidelines published.

The question papers and mark schemes are published shortly after each examination session and these are worth studying as they provide excellent practice materials.

**Summer 2010 Q3(c)**

Describe and assess one or more ways to represent data for an investigation into a changing physical environment that you have completed. [10]

You should state clearly the question you have investigated.

- Underlining the command words is a useful first stage i.e. **Describe and assess**. There is a list of command words on the WJEC website and their meanings are given e.g.

**Describe** requires you to ‘identify distinctive features and give descriptive, factual detail. This is one of the most widely used command words. Unless the question says ‘describe and explain’, never explain (e.g. writing ‘because’) as there will be no credit given. This is a very easy way to waste time.’

**Assess** is an evaluative question – weigh up the importance of the subject. This means there are a number of possible arguments/outcomes’. For Q3c answers, you will probably need to weigh up the positive and negative features of your chosen methods of data collection or presentation etc. depending on the question.

- Underlining the qualifications in the question is important too.
  In this case we need to consider the **ways of representing data** used in an investigation into a **changing physical environment**.

**Representation** may include a variety of ways e.g. tabulation, graphs, maps and sketches, photographs and even video. A clear description of an appropriate method(s) is asked for, along with an assessment of how it is used.

Finally, it must be linked to a **physical** investigation, so do not mix up with an investigation you undertook for G2.

**Mark Scheme**

Expect a great variety of responses according to the investigation that has taken place. Many will describe tabulation, different graphs that have been produced such as pie, bar, line, scatter etc. Other answers may refer to maps that have been drawn to show information such as located symbols, flow line, choropleth, isoline etc. Some candidates may look at the data in the form of visual representation as annotated photographs, sketches or video materials. The actual valid method is less important than the description and evaluation of the method – which again will take a variety of formats according to the investigation completed.

(Markers must be flexible in their application of the mark scheme)
The markers will be aware that your investigation can be about any changing physical environment.

The most commonly seen topics may include:
- rivers changing downstream e.g. Does River X follow the Bradshaw model?
- infiltration e.g. Does the rate of infiltration change according to surface type?
- succession e.g. Does succession occur on X sand dunes?
- flooding e.g. Does the perception of flooding change within town X.

The markers will be aware that your investigation can be about any changing physical environment.

The most commonly seen topics may include:
- rivers changing downstream e.g. Does River X follow the Bradshaw model?
- infiltration e.g. Does the rate of infiltration change according to surface type?
- succession e.g. Does succession occur on X sand dunes?
- flooding e.g. Does the perception of flooding change within town X.

**TASK**

Read the following two answers and then apply the mark scheme to each. Look for positive features i.e. ‘what went well’, as well as poorer aspects of the answers i.e. ‘even better if …’. You should then give each a level (Level 3, 2 or 1). Finally you may wish to give an actual mark out of 10.

Remember, an A grade does not need to be a perfect answer. Also, bear in mind that the candidate only had 12 minutes to complete the answer.
Script 1

My investigation was: Does the velocity change across the river at point X?

Having collected depth and velocity readings at 12 equally spaced sites across the river, I tabulated my figures (see figure A). Each site was approximately 50 cms apart and I measured the velocities at different depths.

Figure A. Table of velocity figures across the river

<table>
<thead>
<tr>
<th>Site</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (cms)</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
<td>Shallow</td>
</tr>
<tr>
<td>Velocity (m/sec at 10, 20, 30 cms)</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
<td>Slow</td>
</tr>
</tbody>
</table>

This worked very well as I used a similar table on my fieldtrip to actually book my data. It was quick and easy to complete, and it gave actual readings which could be used to compare changes across the river. The best thing was that a clear pattern could already be seen, with the fastest flow nearest the outside bend and the slowest flow on the inside bend. However, it was not very visual so I drew an isovel chart (see figure B).

Figure B. An isovel chart with choropleth shading. (This is a rough sketch of my chart)

I drew the shape of the cross-section and the velocities for each site were plotted with a dot and then interpolated, so that points of equal velocity were joined up. I then density shaded (choropleth shading) the fastest flow in the darkest blue and the slowest flow in the lightest blue. This gave a very clear pattern of the changes in velocity across the river but the interpolation took a long time to complete and I had to be very careful not to leave points out. Having more readings might have made this more accurate but would have taken more time to measure on the fieldtrip and to draw on my diagram. The choropleth shading was straightforward once I had decided on a gradation of colours. By representing my data in these ways, the interpretation was very easy as a pattern was shown. Also, the table of data was helpful for finding the figures needed to carry out a spearman's rank correlation exercise to show if my findings were statistically valid.

Script 2

We carried out an investigation into the effectiveness of flood defences at town X and what was the flood risk?

To investigate this question we had a few roots to enquiry questions we needed to find out. These were what is the land use? What are the flood defences like? What are they? Are there any future flood defences planned? So we went to X and made a list of the flood defences seen and took some photographs of them. We also noted the land use on a map using 5 categories; commercial, residential, agricultural, transport and open space. One problem encountered was that it was impossible to map the whole of the area as some places were inaccessible and it would be time consuming. To overcome this we followed a transect which gave us a representation of the land use. We divided our map into km² squares and produced a colour coded flood risk map according to the land use. This was an effective method as the map showed spatial changes in land use but this was based mostly on our own opinion about which was the most valuable land use. Secondary data gathered gave us the land use along the river and we were able to represent this in a table and pie charts so we could see proportions very clearly. The data collected from the river also allowed us to work out the discharge and hydrolic radius, so we were able to show this on cross section diagrams along the length of the river.
HOW TO IMPROVE EXAMINATION PERFORMANCE

Comments

Script 1

What went well:
• clear context given – this is a focused investigation, examining velocity changes across a river at one point
• the answer is well structured – and spelling, punctuation and grammar are excellent. These make it much easier and clearer for any reader
• a good use of terminology e.g. velocity, isovels, choropleth shading
• the answer responds to the question asked. The candidate writes about how he/she presented his/her findings, in a table and on an isovel chart. There is no drift into data collection or conclusions.
• the methods of representation were appropriate.

Descriptions:
Two ways were described – the table and the isovel chart.
• drawing the table saved the candidate writing a description of the headings on the table etc. – this is quicker and very clear. No examiner would expect a candidate to learn all the figures, but you might remember a few key ones for your conclusion e.g. fastest velocity on the outside bend was ...
• the isovel chart was roughly sketched but it gave the marker a good grasp of what was done, including the colour density key.

Assessments:
• each way was evaluated for its advantages and disadvantages e.g. ‘quick and easy to complete; showed a clear pattern but not very visual’. Also comments that the figures set out in a table made them easy to use for statistical procedure used in the interpretation. (As this is linked to the table, it is not seen as a drift away from the question).
• it was also felt that the candidate gave evidence that the investigation had been personally carried out e.g. ‘the interpolation took a long time to complete and I had to be very careful not to leave points out’.

Even better if …:
The answer could have given some figures but overall it is a fine effort.

This is a very competent answer. It is direct, answers the question appropriately and is detailed and well written. It fits well with Level 3 and would be awarded 10/10 (A grade).

Script 2

What went well:
• the topic is clearly given at the start
• the focus was mostly on representing data for a changing physical environment.

Descriptions:
• several appropriate presentational techniques were mentioned e.g. photographs, maps of land use, tables, pie charts and cross-sections but none were described.

Assessments:
• some brief assessment is given e.g. this was ‘based mostly on our own opinion’; ‘we could see proportions very clearly’.

Even better if …:
• the candidate to concentrate on just one question as there was some drifting to other issues
• there was a stronger focus on the representation of data as this examines some data collection e.g. ‘made a list of the flood defences; took some photographs; mapped the land use’
• the spelling, punctuation and grammar were fairly accurate e.g. ‘roots – routes and hydrolic – hydraulic’.

The candidate has grasped the question’s requirements but the answer lacks detail for the description expected. There is a little assessment which lifts this into Level 2. It would be awarded 5/10 (C grade).