



Answers: The Carbon Cycle

1. A = Photosynthesis B = Respiration
2. Plants take in carbon dioxide during the process of photosynthesis and convert it into carbon compounds within their biomass. On Blanket Bogs environmental conditions are cold, wet and acidic. When the plants die, they are not fully decomposed by bacteria living in the soil due to the cold, wet conditions. Carbon is therefore locked into the organic matter and can't be released via respiration by neither the plant itself nor the decomposing bacteria in the soil. Partly decayed plant matter therefore accumulates to form peat, trapping the carbon in situ.
3. An increase in rainfall would raise the water-table making more of the bog depth anaerobic, restricting decomposition further. A reduction in air temperature would also reduce bacterial activity, therefore reducing decomposition of peat.
4. A. Burning peat: Directly releases the carbon as carbon dioxide as the peat burns.
B. Wildfires: Removal of vegetation allows surface layers of peat to dry out and become exposed to erosion. As the peat erodes it decomposes and releases carbon dioxide.
C. Pollution: If Sphagnum is killed off, much of the water retaining ability of the surface layers of the bog is depleted. The peat dries out, erodes or decomposes releasing carbon dioxide.

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Statistical skills

Site	Average reading (mm)	Standard deviation	Standard error	Error bars	
				Upper value	Lower value
Joseph's patch	43.12	2.8	0.88	44.9	41.4
Trenches A	43.40	4.9	1.55	46.5	40.3
Penguins	17.50	3.5	1.11	19.7	15.3

1. Reference sites are needed as control sites. This allows ecologists to compare the results of restored sites to intact sites and confidently judge that it is the restoration that has made any significant changes and that these changes would not have happened regardless of restoration taking place.
2. Independent variable: the site
Dependant variable: water-table depth.
3. Trenches A showed the greatest variation, we know as it has the largest value for its standard deviation of 4.9 and a range of 17.72. Also Penguins has the smallest error bars therefore shows the least variation.
4. Variations in water-table from week to week may be caused by the weather conditions at the time. If there has just been a rainfall event you would expect the water-table to be higher. Sites with little or no vegetation would be expected to vary more as there are no plants to remove water when rain has just fallen, similarly the lack of plants means water drains away faster from the soil between rainfall events as there is no Sphagnum to store water.

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5. There is no significant difference in the water-tables of Joseph's Patch and Trenches A (we know because the error bars overlap). However there is a significant difference between the water-table of Penguins and of both Joseph's Patch and Trenches A (the error bars of neither site overlap with those of Penguins). This implies that the restored site (Joseph's Patch) does not yet have a higher water-table than the site which has not yet had any restorative work done to it (Trenches A: the control site). Both of these sites are significantly different from the intact site (Penguins) so we can conclude that the restoration of Joseph's Patch has not yet been successful in raising the water-table significantly. The vegetation is only just establishing and there may not yet be enough Sphagnum moss growing to help with water retention. The site should continue to be monitored.

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