

CHAPTER 4**ANSWER KEY**

The Peppered Moth Debate

Answer Key

BLM 4.2.8A

The following are simply suggestions of possible points. Any logical and well-supported ideas are acceptable.

Points and Evidence Against	Points and Evidence in Support
<p>1. The classic Kettlewell study involved the placement of moths on tree trunks. The peppered moth is rarely found resting on the trunk of the tree in nature.</p> <p>Peppered moths that are resting during daylight hours are most often found at the joint between the trunk and the branches. If the experiment did not recreate natural conditions, then its conclusions may not be relevant to natural conditions. A different result might have been found if the experiment had been performed with the moths in their natural hiding spots.</p>	<p>1. Kettlewell's study involved release of moths in polluted and unpolluted woods. In both sites, the moths were placed on the tree trunks. While the study may not have accurately modelled the natural conditions, it did maintain the same conditions for both sites, allowing a relative comparison.</p> <p>All parts of the tree may be darkened by pollution, and birds hunt in all levels of the canopy, so the experimental conditions are a reasonable model of the natural situation.</p>
<p>2. The degree to which the moths were camouflaged against their surroundings was established by human observation. Birds have greater visual perception, with the ability to see into the ultraviolet range of the spectrum.</p>	<p>2. While there are differences in the range of wavelengths that birds and humans can detect, observations of bird behaviour confirm that the moths most easily spotted by humans, whether light moths against dark tree trunks or dark moths against light tree trunks, are also the first to be eaten by the birds.</p>
<p>3. The case for industrial melanism is oversimplified. It doesn't address whether colouration is the only factor leading to differential survival rates.</p> <p>The experiment requires a control in which the birds are not able to see the moths; this would determine whether there are any non-visual cues that lead to the birds' preference among the moths.</p>	<p>3. It is possible that the colouration of the moth is linked to another trait that influences the moth's survival. However, recovery of the light coloured species is closely correlated with a reduction in pollution; as environmental regulations have reduced industrial air pollution, the frequency of the dark form of the moth has decreased.</p>