

CHAPTER 18	Thought Lab 18.3: Investigating Cancer Genes Answer Key	BLM 18.3.3A
ANSWER KEY		

Answers to Analysis Questions

1. Key points that you should have discovered are:
 - Lung cancers are strongly associated with cigarette smoking, and cigarette smoke contains a number of proven and suspected carcinogens (cancer-causing agents). In order to understand how cigarette smoke components cause lung cancer and other smoking-related cancers, it is necessary to understand the sequence of events that leads from smoke inhalation to formation of a tumour many years or decades later.
 - One of the initial crucial events is most likely damage of the genetic material (DNA) by a cigarette smoke carcinogen. This damage can, under certain circumstances, be repaired by cellular DNA repair mechanisms. However, if not repaired, cells will attempt to duplicate their DNA during normal cell division, but are impeded by the damage and will carry out an errorprone duplication process leading to gene mutations (changes in the gene). Such gene mutations are then found many years later in the DNA of lung tumours.
 - Gene mutations are particularly harmful if they occur in genes that control cell division rates or genetic stability. According to current thinking, a number of genes need to be mutated or functionally disabled before a normal cell loses all normal growth control mechanisms and is brought onto a path of uncontrolled cell division, eventually leading to a tumour. Gene mutations have been found in genes such as p53, *ras*, and p16 at a relatively high frequency in human lung cancer.
2. Your answer will depend on the amount of time the class is given to conduct research and the resources available.
3. Your answer will depend on your personal views on smoking. Possible tools could include multimedia programs, television commercials, computer games, posters, educational materials, or any other reasonable tool.