

CHAPTER 19	Thought Lab 19.1: The Spirit Bear Answer Key	BLM 19.2.2A
ANSWER KEY		

Answers to Analysis Questions

- a) The frequency of the recessive allele on Gribbell Island is 0.548 (0.5 to correct significant digits). You may choose your own notation for the recessive and dominant alleles.
 - b) The frequency of the recessive allele on Princess Royal Island is 0.316 (0.3 to correct significant digits). You should use the same allele notation as in part (a) because you are dealing with the same allele system for coat colour.
- a) The heterozygote frequency on Gribbell Island is 0.495 (0.5 to correct significant digits).
 - b) The heterozygote frequency on Princess Royal Island is 0.432 (0.4 to correct significant digits).
- There are a few correct answers. First, the populations may be small (we have no information otherwise) so genetic drift may be acting in the two populations. Because genetic drift is random, we cannot expect the same allele frequencies in two populations undergoing this process. It is also possible that there are different selection pressures on the two islands, with selection on Gribbell Island tending to favour the white allele more than on Princess Royal Island. Based on the conditions required for genetic equilibrium, you could also say that white bears tend to migrate from Princess Royal Island to Gribbell Island more than the other way around.
- Inland black bear populations would have lower frequencies of the white coat allele. If these bears migrate into the coastal bears' territory and mate with the coastal bears, the frequency of the recessive white coat allele will decrease as a result.
- If white bears tend to select white bears for mating, the rarity of white bears would reduce the intrinsic rate of growth in bear populations making them more susceptible to genetic changes due to chance events, and to extinction from disease or predators. If black bears tend to select black bears for mating, there is a risk that the white coat allele will disappear from the bear population.