These are the skills and knowledge areas required for the grade 9 biodiversity unit. Treat it as a checklist.

1. Diversity within and between species:

Can you...

- observe variation in living things, and describe examples of variation among species and within species (e.g., observe and describe characteristics that distinguish two closely related species)
- identify examples of niches, and describe the role of variation in enabling closely related living things to survive in the same ecosystem (e.g., investigate different bird species found in a local park ecosystem, and infer how each is adapted to life within that ecosystem)
- identify examples of symbiotic relationships (e.g., organisms that benefit other organisms by providing habitat, food, means of fertilization, or a source of oxygen)
- classify symbiotic relationships as mutualism, commensalism, parasitism
- identify the role of variation in species survival under changing environmental conditions (e.g., resistance to disease, ability to survive in severe environments)

2. Investigate the nature of reproductive processes and their role in transmitting species characteristics

Can you...

- distinguish between sexual and asexual reproduction
    - describe methods of asexual reproduction including binary fission, budding and the production of spores
    - describe methods of sexual reproduction (e.g., cross-fertilization in seed plants, sexual reproduction in mammals)
    - describe examples of organisms that show both sexual and asexual reproduction (e.g., yeasts that reproduce both by budding and sexual reproduction; plants that reproduce through suckering, runners or bulbs, as well as by seed production)
    - describe the formation of zygote and embryo in plant and animal reproduction
- identify examples of both discrete and continuous variation (e.g., hand clasping preference is an example of a discrete variation, the length of human hands varies on a continuum)
- investigate the transmission of characteristics from parents to offspring, and identify examples of characteristics in offspring that are:
    - the same as the characteristics of both parents
    - the same as the characteristics of one parent
    - intermediate between parent characteristics
    - different from both parents

- distinguish those characteristics that are heritable from those that are not heritable, and identify characteristics for which heredity and environment may both play a role (e.g., recognize that eye colour is heritable but that scars are not; recognize that a person's

height and weight may be largely determined by heredity but that diet may also play a role)
- identify examples of dominant and recessive characteristics and recognize that dominance and recessiveness provide only a partial explanation for the variation of characteristics in offspring

3. Describe, in general terms, the role of genetic materials in the continuity and variation of species characteristics; and investigate and interpret related technologies

Can you...

- Describe the role and relationship of chromosomes, genes and DNA
- distinguish between cell division that leads to identical daughter cells, (binary fission and mitosis) and cell division that leads to formation of sex cells (meiosis) and describe, in general terms, the synthesis of genetic materials that takes place during fertilization
- compare sexual and asexual reproduction, in terms of the advantages and disadvantages (e.g., recognize that asexual reproduction provides an efficient means of transmitting characteristics and that sexual reproduction provides an opportunity for recombination of characteristics)
- distinguish between, and identify examples of, natural and artificial selection (e.g., evolution of beak shapes in birds, development of high milk production in dairy cows)
- describe some genetic technologies (e.g., cloning and genetic engineering); and identify questions and issues related to their application

4. Identify impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making

Can you...

- describe the relative abundance of species on Earth and in different environments (e.g., note the overall abundance of insect species; note that in harsh environments there are relatively fewer species found than in temperate and tropical environments)
- describe ongoing changes in biological diversity through extinction and extirpation of native species, and investigate the role of environmental factors in causing these changes (e.g., investigate the effect of changing river characteristics on the variety of species living in the river; investigate the effect of changing land use on the survival of wolf or grizzly bear populations)
- evaluate the success and limitations of various local and global strategies for minimizing loss of species diversity (e.g., breeding of endangered populations in zoos, development of seed banks, designating protected areas, development of international treaties regulating trade of protected species and animal parts)
- investigate and describe the use of biotechnology in environmental, agricultural or forest management; and identify potential impacts and issues (e.g., investigate issues related to the development of patented crop varieties and varieties that require extensive chemical treatments; identify issues related to selective breeding in game farming and in the rearing of fish stocks)