Learning Outcomes:

Nature of Science	Students should be able to design, plan and conduct investigations; explain how reliability, accuracy, precision, fairness, safety, ethics, and selection of suitable equipment have been considered
Biological World	• Students should be able to explain how matter and energy flow through ecosystems • Students should be able to outline evolution by natural selection and how it explains the diversity of living things
Physical World	Students should be able to investigate patterns and relationships between physical observables

You work for a video-game developer. Your boss has asked you to develop a new game that lets players "live" as an animal in the savannah ecosystem. If she likes the game, it will be expanded to other ecosystems. Your task has three parts.

1. First, you will analyse predator/prey interactions in other ecosystems.
2. Next, you will predict how predators and prey interact in a savannah ecosystem.
3. Finally, you will write an explanation for your boss on how your analysis predicts predator/prey relationships across ecosystems.

Analyse Table 1, which shows population changes caused by the interaction between a predator (lynx) and its prey (hare).

- Choose the type of graph most appropriate for displaying the data.
- Prepare your graph.
- Compare your graph to a graph of how wolf and moose populations interact in another ecosystem.

Year	Hare	Lynx	Year	Hare	Lynx
1900	3,000	400	1909	2,540	910
1901	4,720	610	1910	2,710	740
1902	7,020	980	1911	4,030	800
1903	7,740	3,520	1912	5,700	1,230
1904	3,630	5,940	1913	7,660	1,950
1905	2,060	4,170	1914	5,230	4,570
1906	1,810	1,900	1915	1,950	5,110
1907	2,140	1,300	1916	1,120	2,970
1908	2,200	830	1917	760	1,580

- Identify patterns shown by the data in both graphs. Use the patterns to answer the following questions from your boss.
- At one point in the game, a disease kills many antelope (prey).

How should the lion (predator) population change as a result?

- Players will be able to choose and set abiotic factors within the game. If a player provides plentiful water, many young lions will survive their first year.

How would the populations of both lions and antelope change if a player chooses this option?

- Present a written explanation for your boss. It should answer her questions.
- It should also explain how to use the graphs to predict interactions between a predator and its prey.
- In addition to answering the questions, suggest three ways in which the game could accurately show interactions between predator and prey populations.

Evaluate your written explanation.

- How did you use the graphs as evidence in your answers? Give an example.

- How will your answers help the game developer accurately show the cause-and-effect relationship(s) of the interactions between lions and antelope in the savannah ecosystem?

- Are your suggestions for showing interactions between predator and prey populations appropriate and scientifically accurate? Explain.