**Food Chains and Food Webs**

1. The following diagram shows the food web for an apple orchard ecosystem.

**An Apple Orchard’s Food Web**

|  |  |  |
| --- | --- | --- |
| In the right-hand column of the table indicate an organism, from the food-web shown above, that belongs to the trophic level indicated in the left-hand column. | | |
|  | | **Trophic Level** | **Organism** |
|  | | Autotroph |  |
|  | | Decomposer |  |
|  | | First-level consumer |  |
|  | | Third-level consumer |  |

**A Forest Food Web**



An animal’s habitat must be considered when determining the population density of an animal in a given area.

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| Which of the scenarios below represents an area in which the population density of the fox would be expected to increase? |

A) Several years ago a disease resulted in the reduction of the vegetation in the forest. The forest has recovered and the vegetation has grown back.

B) There has been little rain in the forest. Some of the vegetation in the forest is unable to sustain its growth.

C) Due to natural population cycling and favourable weather conditions, the owl population has increased significantly over the past year.

D) A virus that affects rabbits has entered the ecosystem and the rabbit population has decreased significantly.

3. **Something Fishy**

The grocer wants to promote the consumption of salmon because he knows about the health benefits of this fish.

Salmon is also known to contain mercury (Hg), which is dangerous to human health. As a result, Health Canada has released recommendations on the maximum amount of salmon that should be consumed per month. These recommendations are different for farmed salmon and for wild salmon.

Your task is to:

* Analyze the Health Canada Recommendations and Background information on mercury, farmed salmon and wild salmon.
* Explain why the recommendations for the maximum amount of salmon consumed per month are different for farmed salmon and wild salmon. Refer to established scientific principles in your explanation.

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| --- | --- |
| **Health Canada Advisory**  The maximum number of recommended meals per month for farmed and wild salmon is provided below. | |
| Maximum Amount of Salmon  per Month (g) | **Recommended Amounts of Salmon per Month** |
| 0  200  400  600  800  1000  1200  1400  Farmed Salmon  Wild Salmon |

|  |
| --- |
| **Mercury Contamination in the Environment**  Mercury is a highly toxic element that is found both naturally and as an industrial pollutant in the environment.   * Mercury falls from the air and can accumulate in streams and oceans where it is converted into methylmercury (CH3Hg) by some types of bacteria in the water. * These methylmercury (CH3Hg)-containing bacteria may be consumed by the next higher level in the food chain, or the bacteria may excrete the methylmercury (CH3Hg) into the water where it can quickly stick to plankton. * Fish absorb the methylmercury (CH3Hg) as they feed on organisms in these waters. |

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* Fish absorb the methylmercury (CH3Hg) as they feed on organisms in these waters.

Methylmercury (CH3Hg) can accumulate in the fatty and muscle tissues of animals, including fish and human.

**Farmed Salmon**

Farmed salmon are bred and raised in pens in the ocean. They are fed fish meal (ground-up fish) and fish oil. Farmed salmon are selectively bred to be large and are generally much fattier than wild salmon.

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| **Food Chain for Farmed Salmon**  Phytoplankton  Zooplankton  Small Fish  Medium Fish  Fish Meal  Medium fish are ground into fish meal  Farmed Salmon |

**Wild Salmon**

Wild Salmon are fished commercially and sold to the consumer. They feed on zooplankton and small fish.

|  |
| --- |
| **Food Chain for Wild Salmon**  Phytoplankton  Zooplankton  Small Fish  Wild Salmon |

4. **Diabetes is a disease affecting the insulin producing glands of the pancreas. If there is not enough insulin being produced by these cells, the amount of glucose in the blood will remain high. A blood glucose level above 140 for an extended period of time is not considered normal. This disease, if not brought under control, can lead to severe complications and even death.**

**Answer the following questions concerning the data below and then graph it.**

|  |  |  |
| --- | --- | --- |
| **Time After Eating hours** | **Glucose mg /dL of Blood Person A** | **Glucose mg /dL of Blood Person B** |
| **0.5** | **170** | **180** |
| **1.0** | **155** | **195** |
| **1.5** | **140** | **230** |
| **2.0** | **135** | **245** |
| **2.5** | **140** | **235** |
| **3.0** | **135** | **225** |
| **4.0** | **130** | **200** |

**1. What is the dependent variable and why?**

**2. What is the independent variable and why?**

**3. What title would you give the graph?**

**4. Which, if any, of the above individuals (A or B) has diabetes?**

**5. What data do you have to support your hypothesis?**

**6. If the time period were extended to 6 hours, what would the expected blood glucose level for Person B?**

