Passage II

A scientist wanted to determine the effects of different doses of an experimental drug called PCH. This drug was believed to help control weight gain. To test this hypothesis, four experimental groups of 100 rats each were all given a daily dose of sugar. Three of the four experimental groups were also given a daily dose of PCH, with each group receiving a different amount of the drug. The rats were all fed the same kind and amount of food. After four months, the percentage of rats gaining weight was determined. The results of this experiment are presented in Table 1.

Table 1: The Effects of PCH on Weight Gain in Rats		
Group	Contents of Dose	% of Rats Gaining Weight
1	5 grams of sugar	17%
2	5 grams of sugar 1 gram of PCH	23%
3	5 grams of sugar 5 grams of PCH	19%
4	5 grams of sugar 10 grams of PCH	21%

Passage XI

Insects are the most numerous group of animals on the planet, making up about 80% of all animals. They play essential roles in the balance of nature as predators, food for other animals, and scavengers. The following graph summarizes the results of a backyard inventory of five general insect populations in five different locations, each measuring five square meters.



Backyard Inventory of Insect Populations (by Location)

Passage I

An experiment was carried out to determine the effect of temperature on the heart rate of frogs. In the experiment, 100 frogs were removed from a large 25°C enclosure and separated randomly into four equal groups: A, B, C, and D. Each group was maintained in a separate container at a different constant temperature: Group A at 5°C; Group B at 15°C; Group C at 25°C; and Group D at 35°C. All other conditions, such as the size, type, age, and number of the frogs, as well as the size of the container and the amount of light, were the same for all groups of frogs.

Passage II

Sodium chloride (table salt) is a crystalline solid made up of sodium ions (Na⁺) and chloride ions (Cl⁻). Ions are atoms that are electrically charged. When sodium chloride is dissolved in water, it separates into its ions. The sodium ions and chloride ions are released from their positions in the crystal pattern, and they move about freely. Some substances, such as sugar, do not ionize when dissolved in water. These substances are called non-electrolytes. When substances react with water to form ions, they are said to be ionized. The charged ions in the water are responsible for the conduction of electricity. Substances that conduct an electrical current when dissolved are called electrolytes. Substances that do not conduct an electrical current are called non-electrolytes.

To study the electrical conductivity of sodium chloride, an apparatus that measures the ability of substances to conduct electricity was used.

Experiment 1

Solid sodium chloride was tested and found to be a non-conductor. Pure water was also tested and found to be a non-conductor. When a teaspoon of sodium chloride was added to 50 mL of water, the solution was found to be a good conductor of electricity. Sugar did not conduct electricity as a solid or when dissolved in water.

Experiment 2

When a few crystals of sodium chloride were added to 50 mL of water, the solution showed a weak conduction of electricity. As additional sodium chloride was added, the ability of the solution to conduct electricity increased. After a certain point, adding more sodium chloride to the solution did not change the conduction of electricity.

Passage III

Germination is the beginning of the growth of a seed after a period of inactivity. The following experiments were designed to compare the amount of time it takes for seeds of different vegetables to germinate.

Experiment 1

Radish seeds were soaked in water for 24 hours and then planted and kept at 25°C for 10 days. Each day the experimenters counted the total number of seeds that had germinated. The results are shown in Graph 1.



Radish Seeds Soaked for 24 Hours

Experiment 2

Bean seeds were soaked in water for 24 hours and then planted and kept at 25°C for 10 days. Each day the experimenters counted the total number of seeds that had germinated. The results are shown in Graph 2.

