Poisonous and Non-poisonous snake

A. General characteristics of Snakes:

- They are cold-blooded, limbless and carnivorous reptiles that are found in both aquatic and terrestrial habitat.
- Body is a long, narrow, cylindrical and flattened ventrally with or without a constriction behind the head.
- The body is covered by the horny epidermal scales that remove several times in the course of the year. This process is called ecdysis or molting.
- The mouth of a snake is capable of being widely opened by the free articulation of the lower jaw.
- Poisonous snakes have the long, curved, sharp, pointed and hollow maxillary teeth in upper jaw called **fangs.** They serve for injecting venom into the body of victim.
- The tongue is a long, narrow, bifid and highly mobile. It detects the odor and vibration on the earth.
- Eardrum (tympanum), tympanic cavity and Eustachian tube are absent.
- Eyelids are immovable and nictitating membranes are absent

B. Economic Importance of Snakes:

- The snake venom has been used for manufacturing the anti-venom and different medicines.
- Snakes help to maintain biodiversity.
- Many snakes are collected for the pet trade.
- The skin of snakes is used to make different accessories like belts, shoes, caps, bags and jackets etc.
- Snakes are also used as food in many countries.
- They are also worshipped as God in Hindu culture.

C. Identification of Poisonous snakes: Poisonous snakes can be identified from their morphological characters and nature of bite.

I. Morphological characters:

S.N.	Structures	Morphological Characters	Nature	Snakes
1.	Tail	a. Tail is laterally compressed or oar-like	Poisonous	Sea snake
		b. Tail is cylindrical, tapering	Poisonous or non-poisonous	Land snakes
2.	Belly scales or ventrals	a. Belly scales are small, continuous with dorsals	Non-poisonous	
		b. Belly scales are not fully broad to cover belly	Non-poisonous	Pythons

		c. Belly scales are broad and fully covering belly	Poisonous or Non-poisonous	
3.	Head scales, loreal pit	a. Head scales are small. Head is triangular shape. No loreal pit	Poisonous	Pit-less vipers
		b. Head scale are small. Loreal pit present between nostrils and eye.	Poisonous	Pit vipers
		c. Head with large scales	Poisonous or Non-poisonous	
4.	Vertebrals, 4th infra-labial, 3rd supra-labial	a. Vertebrals enlarged, hexagonal, 4th infra-labial largest	Poisonous	Krait
		b. Vertebral not enlarged, 3rd supra-labial touches eye and nostril	Poisonous	
		i. Neck with hood and spectacle mark	Poisonous	Cobra
		ii. Hood absents. Coral spots on belly	Poisonous	Coral snakes

II. Nature of bite and bite marks:

Poisonous snake's bites	Non-poisonous snake's bites
• The bite of poisonous snake is marked by two large holes or punctures of fangs with or without small marks of other teeth. • The bitten part is swell with intense plain, adjacent skin become blue or greenish.	• The bite of non-poisonous snake is marked by many small holes or punctures on the skin that made by the maxillary teeth of upper jaw

D. Difference between Poisonous and Non-Poisonous Snakes:

S.N.	Non-Poisonous Snakes	Poisonous Snakes
1.	Head is usually narrow and elongated.	Head is a long, triangular and wide due to the presence of poison glands.
2.	Neck is un-constricted. Hood is usually absent.	Neck is constricted. Hood is usually present.
3.	Fangs are absent.	Fangs are present.

4.	Scales on top of the head are usually large except in sand boas (*Eryx conicus*).	Scales on top of the head are usually small.
5.	Dorsal scales are longer but vertebral scales are neither larger nor hexagonal.	Dorsal scales are smaller but vertebral scales are larger and hexagonal in kraits.
6.	Ventral scales are either across the belly completely or may not across the belly completely.	Ventral scales are usually completely across the belly, except in sea snakes
7.	Loreal shield and loreal pit are absent	Loreal shield and loreal pit are present
8.	Tail is tapering and long.	Tail tapers abruptly and cylindrical in shape but in sea snakes, the tail is flattened to form an oar-shaped
9.	Examples− Indian Python (*Python molurus*), Sand Boa (*Eryx conicus*).	Examples− Common Krait (*Bungarus caeruleus*), Common Cobra (*Naja naja*)

E. Venom: Snake venom is a clear, sticky, pale-yellow color, tasteless, odorless and acidic secretion that secreted by the poison glands present in the upper jaw of poisonous snakes.

- **Composition of venom:** It is a complex mixture of enzymes and toxins.
- **Function of venom:** It is used to immobilize and digest the preys.
- **Types of Venom**: Types of venom according to their effects:

1. **Neurotoxic Venom**: It affects very quickly to the nervous system and causes paralysis of muscles specially the respiratory muscle and loss of consciousness. Examples; Venom of King Cobra and Kraits.
2. **Hemotoxic Venom**: It affects the cardiovascular system and causes hemorrhage, hemolysis, blood clotting and cardiovascular failure. Examples Russell's viper.
3. **Cytotoxic Venom:** It kills cells and causes the severe damage the skin and underlying tissues, often leading to disabilities in the victim. Examples; cobras.
4. **Proteolytic Venom:** It is found in all venomous snakes that causes the swelling, local pain and degradation of tissue structures. [Large amounts of proteolytic venom are found in rattlesnakes and other pit vipers.]

F. Effects of Venom or symptoms of snake bites: The effect of venom of different snakes are following:

1. **Cobra bite:** Cobra venom is a **neurotoxin,** attacking the nerve centers and causing paralysis of muscles, especially respiratory muscles. The effects of venom are observed within half an hour.

Symptoms includes:

- Piercing pain and burning sensation ending in numbness.
- Bitten part turns into the bluish or blackish.
- Giddiness, speechlessness, drooping of saliva and eyelids.

- Contraction of pupil, vomiting and labored breathing.
- Death results within a few hours due to failure of respiration or of heart activity.

2. **Viper bite:** Viper venom is a **hemotoxic,** affecting circulatory and nervous system. The effects are observed within a quarter of an hour.

Symptoms;

- Swelling, discoloration and acute burning pain of the bitten part.
- Profuse vomiting and watery discharge from rectum.
- A red fluid oozes out from wound due to massive tissue destruction.
- Dilation of pupil, eyes lose sensitivity to light and consciousness is affected.
- Death may result due to paralysis of Vaso-motor centers and exhaustion profuse bleeding and swelling spreads.

3. **Krait bite:** The krait venom is both **neurotoxin** and **hemotoxin**. Krait is dangerously poisonous snake because it bites injects a very large quantity of poison.

Symptoms

- It is very much similar to those of cobra bites, except that the victim complains of severe abdominal pain, paralysis of trunk and limbs and respiratory failure. The cause of death is asphyxia.

G. Cure of snake bite: The best treatment for snake bite is to inject the antivenin serum or **antivenin**

H. First Aid treatment of Snakebites: First-aid treatment includes emergency care of victim of snakebites before complete medical or surgical treatment can be secured.

1. **Psychological treatment**: The victim should first treat psychologically with reassuring and encouraging word; most are terrified and apprehensive.
2. **Tourniquet**:

- A tourniquet should be immediately tied on the bitten limb above the bite by any available material such as a handkerchief, piece of cloth, rubber tube, etc. This prevents or delays circulation of poison in the body.
- The tourniquet must not be applied very tightly and should be removed for a few minutes in between.

3. **Care of wound**:

- Wounded part should be washed with clean water or soap and water and covered with a clean and dry dressing.
- Avoid the application of potassium permanganate on the wound.
- Constricting cloth or jewelry should be removed because the area surrounding the bite will likely to swell.
- Avoid the slashing or cutting the wound or sucking out the venom from the wound or applying ice.

4. **Care of person**:

- Anything causing excitement or exertion to the victim should be avoided like drinking alcoholic beverages, taking pain relievers or applying electric shock etc.
- The victim should be allowed to lay down in comfortable and safe position. Prohibit the movement of victim because the movement can cause the venom to travel more quickly through the body.
- The victim should be immediately carried or transported to nearest hospital or qualified doctor for treatment with an antivenin.

I. Geographical distribution and characters of Poisonous Snakes of Nepal:

Eighty-nine different species of snakes have been recorded in Nepal. Among them, 17 species are poisonous or venomous. They are mostly found in terai region of Nepal due to warm climate. They are following;

1. Krait (*Bungarus*): It is the most venomous snakes in Nepal. It is slender, about 1m long and has small Fangs. It is distributed in lowland and lower mountains of Nepal. There are six species of krait found in Nepal. Like;

- Himalayan Krait (*Bungarus bungaroides*)
- Common krait (*Bungarus caeruleus*) [It is **highly poisonous snake** and its venom is more poisonous than a cobra.]

2. Cobra (*Naja*): It has a small head with small and relatively immovable fangs. When annoyed, it raises the front part of the body, spreads its hood and hisses through the nose. It is more deadly than that of vipers. They are usually found in the lowlands and lower mountains of Nepal where there are grasslands, forests or in residential areas as well. There are three species of cobra in Nepal. For examples;

- Indian Cobra (*Naja naja*)
- King Cobra (*Ophiophagus hannah*) [It is the world's largest poisonous snake]
- Monocellate cobra (*Naja kaouthia*)

3. Viper (*Vipera*): Viper has thick body up to 4.3 cm long. Head is large, flat, and covered with small scales. Nostrils are lateral, eyes are far forwards and there is a sensory pit between the eye and the nostril in some. Pits are sensory organs with which the snake can detect its prey. The scales on the body are keeled. Tail is short and tapers abruptly. There are seven species of viper found in Nepal. Like;

- Himalayan pit viper (*Gloyfius himalayanus*)
- Mountain viper (*Ovophis monticola*)

4. MacClelland's coral snake (*Sinomicrurus macclellandi*): It is generally found in lowlands and lower mountains from central, western to Eastern Nepal. It is usually 50-80 cm long. Head black above with a wide white, yellow or cream-colored transverse stripe behind the eye. Back of body is reddish brown with or without a black vertebral stripe.