

Animal Behaviour



Fig-1 (a) : Butterfly on a flower (b) : Gorilla at rest (c) : A bird making a nest

Observe the above figures. You must have observed all these things in your surroundings. While observing them you might have got questions like these.

- Why do fish need not learn to swim?
- How can butterfly find nectar?
- How do ants search their food and pass information to each other about this?
- Who teaches a bird how to make a nest?

In this lesson we will try to understand about why animals behave in a specific way. Is there any pattern in their behaviour? What are the factors that affect their behaviour?

What do we mean by Animal Behaviour?

Animal Behaviour is the scientific

study of the interaction of animals with each other, with other living beings, and with the environment. It explores how animals relate to their physical environment as well as to other organisms, and includes topics such as how animals find and defend resources, avoid predators, choose mates, reproduce, and care for their young ones.



Fig-2 : Weaver bird

The study of animal behaviour begins with understanding how an animal's Physiology and Anatomy are integrated with its behaviour. Both external and

internal stimuli prompt behaviours. External stimuli includes the sounds, smells, threats from other animals and weather. Internal stimuli includes hunger and fear. Scientists are drawn to the study of animal behaviour for varied reasons and the field is extremely broad, ranging from research on feeding behaviour and habitat selection to mating behaviour and social organizations.

Different types of Animal Behaviour

There are several types of behaviours in humans and other animals that have been described and investigated by researchers. The following types have been studied so far

1. Instinct
2. Imprinting
3. Conditioning
4. Imitation

1. Instinct

Instinctual behaviours are the behaviours that need not be learned. They can be complex like making nest by birds, choosing mates and forming into groups for protection etc. Observe the following figure.



Fig-3 : A Spider spinning its web

- *What is going on in the Fig-3?*
- *Will you consider spinning the web by spider as an instinct behaviour? Why or why not?*

If your hand touches something hot or sharp object, accidentally it automatically moves away. This is because of reflex action. Reflexes are also a type of instinct behaviour. We do not have to learn them.

- *Give two examples of reflexes.*

2. Imprinting

You might have observed this type of situations. Chickens and ducklings are able to walk almost immediately after hatching from the egg. Duckling can even swim after a few days. They recognise their mother because of a behaviour type called imprinting.



Fig-4 : Hen with pullets

Ducklings will follow the first moving object they meet after hatching. They become socially attached to this object and treat it as their mother. Imprinting lets young animals recognise their mother from a young age. They follow her for food and protection.

Imprinting is useful if the first moving object they see really is their mother. But ducklings will imprint on people, balls and even cardboard boxes if these happen to be the first things they see.

- Try to find out more examples of imprinting from your surrounding.

? Do you know?

Konrad Lorenz (1903 to 1989) was an Austrian scientist who studied animal behaviour. He discovered that if he reared geese (give local name of this) since they hatched; they became imprinted on him. They followed him around and preferred to be near to him even when they had grown into adult geese. He received Nobel Prize in 1973 for his contribution in physiology and medicine.

3. Conditioning

Conditioning is a type of behaviour involving a response to a stimulus that is different from the natural one. It is a type of learned behaviour.

If we take ringing of school bell as an example, student shows different types of conditioning to a school bell as per the time.

When the school bell rings in the morning, students gather for assembly.

When school bell rings at the end of break time, the students leave the playground and go to their classrooms.

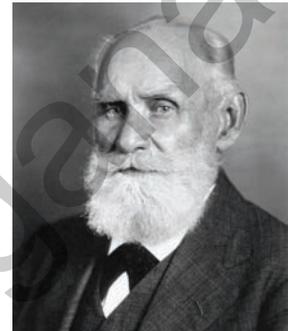
When school bell rings at the last period students rush to leave their classroom.

There is one stimulus of ringing the school bell, but students show different responses to it. It is only because, by their experiences they had learnt when to perform which function. They would be wrong sometimes.

Ivan Pavlov (1849 to 1936) was a Russian scientist who has investigated

conditioning. He discovered that dogs produced extra saliva when they were offered food. This is a natural response to a stimulus - food, which makes a dog's mouth watery. The saliva produced is needed to start digesting food and to make swallowing food easier.

Pavlov noticed that they also did the same when the person who fed them came into the room, even if the person had not brought any food.



Ivan Pavlov

Pavlov went on to ring a bell at the start of feeding time, and eventually the dogs produced extra saliva when they heard the bell, before any food was brought in. He presented a stimulus (Ex: The sound-bell) and then gave the dog food. After few repetitions, the dog started to salivate in response to the stimulus (food).

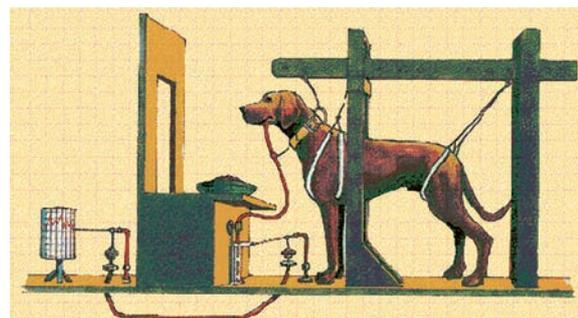


Fig-5 : Dog Experiment

A dog starts salivating when it hears a bell is not a natural response. They would not do this without being conditioned to do so. The behaviour has been learned. It's called a conditioned response.



Fig-6 : Electric fences stop grazing animals straying

People and animals can be conditioned to avoid certain things. For example, grazing animals like sheep get an unpleasant electric shock when they touch an electric fence.

They eventually avoid the fence, even when it is turned off.

Can you recall some other examples of conditioning? try to enlist at least five of them.



Fig-7 : Behaviour of Chimpanzee

Human behaviour

Humans show same types of behaviour as other animals. But human behaviour is often more complex because we are more intelligent and aware of ourselves.

Let us study about the various methods of behaviour in humans.

4. Imitation

Imitation is a type of behaviour where one animal copies another animal. Humans often imitate each other, often without realising it. When people talk to each other, they may stand or sit in a similar way, and copy each other's movements. Scientists think that this happens so that the speakers feel more at ease with other.

Some scientists think that humans are the only animals that copy each other. Other scientists have observed chimpanzees and other primates imitating each other. For example Kohler observed that, chimpanzees can use sticks to spear juicy grubs to eat. Other chimpanzees copy this behaviour. In this way they learn new skills. Do you ever heard monkey imitate us. Read and discuss about the story 'Monkey and Hat merchant.

Instinct

Humans have instincts, but it is possible for us to overcome natural urges to follow certain behaviour. For example, hungry persons might start eating immediately when they sit down at the dining table, but they have learned that good manners means they should wait until everyone is seated and ready to eat.

Imitation

People often imitate each other. This can help them learn something new and useful, such as new skill in lessons, sport or at work. It can also lead them to show less useful or harmful behaviour. For example, young people may start smoking, drinking alcohol or taking drugs as a result of copying each other to 'fit in'. But it is very dangerous to our health.

Conditioning

Conditioning can be used to change the behaviour of people. Advertisers are very skilled at this. They use pictures of their products which make them look glamorous or exciting, often by using famous actors or sports people. By associating the product with attractive images the advertisers are trying to set up a conditioned response to their product. People will respond positively and buy the product.

Investigating behaviour

Behaviour can be investigated in the 'field' or in the laboratory. It can be observed and measured, and experiments can be designed to test how it works. Human behaviour is affected by many variables. It can be more difficult to study the behaviour of other animals.

Investigations in the field

Some scientists spend many hours watching and studying the behaviour of animals. They may be interested in how the animals live alone, group into families or form large groups such as herds.

Animals can signal to each other. For example, they may call each other to warn danger. Some scientists are interested in such signals. They record and study them to work out what the signals mean, you would have observed how ants respond when they meet one another.

Tagging

You have studied about bird migration in the chapter biodiversity and its conservation. Like birds some other animals also migrate over large distances to find food or nesting sites. Animals can be 'tagged' by attaching tracking devices to them. Tagging help scientists follow the journeys the animals make.



Lab Activity

The work of Lorenz and Pavlov has been mentioned in the earlier sections. These scientists studied animal behaviour under controlled conditions.

You can also study the behaviour of cockroach. For this you will need a choice box. You can make a choice box by following the given steps-

- Take a box, and divide it into four chambers with the help of a cardboard as shown in figure-7.
- Make tiny holes in any two chambers of one side so that light can pass through these holes into the chambers. Let other two chambers as it is (Dark).
- Now create humid environment with help of moist cotton wool in one of the lightened and one of the dark chambers.

- So the box has been divided into four chambers with different conditions i.e. light and dry, light and humid, dark and dry, dark and humid. Preparations are over. Make four groups in your class. Each group will put several cockroaches into a choice of chamber with four different conditions:
 1. light and dry
 2. light and humid
 3. dark and dry
 4. dark and humid
- Cover the box and leave the setup for 15-20 minutes.
- Count the number of cockroaches in each chamber.
- In which chamber the number of cockroaches is highest?
- Compare your observations with other groups. Write down the differences if any.
- From your experiment try to write down a short note about behaviour of cockroaches regarding their living conditions.

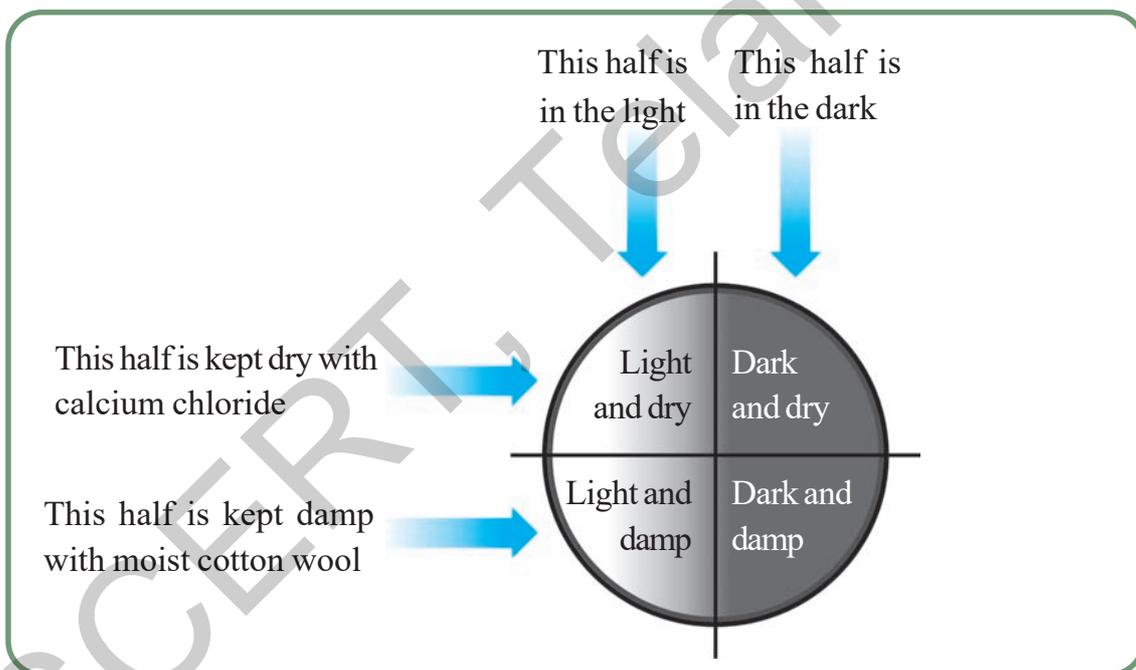


Fig-8 Choice box showing different conditions

Cockroaches prefer dark and damp conditions.

The quarter of the choice chamber with these conditions contains most or all the cockroaches.

Activity-1

Let us observe the following behaviours of different animals. Identify their imprinting, instinct, conditioning or imitation.

- Our pet dog barks only on strangers. If you train your dog not to enter your kitchen. Does it ever enter into the kitchen?
- Ants which usually go in a line reach sweet kept in a tin. How do they know the way to reach the tin?
- Mosquitoes, cockroaches come out of their places only when it is dark. How do they know the difference between light and dark?
- Bats and owl move and search for food only during night . How could they know what is a day and what is a night?
- When you untie the neck of your bull at the time of ploughing, it moves towards plough without any instructions. In the same way, it moves towards tub at the time of feeding. How does the bull respond differently?
- Birds collect material which is soft and strong to build its nest. How do they know the quality of the materials?
- Puppies, kitten fight with each other when they see a piece of cloth. They try to tear it off, why?
- In a particular season, some birds in our surroundings migrate from long distances. How do they know their way?

Offsprings (kids) of different animals, either they live on land or in water, perform activities by instinct, imprinting, imitation or conditioning. Animal behaviour is based on different bio-chemical reactions. Identifying or smelling ability of dogs and

searching and communicating nature of ants is because of pheromones. (ask your teacher about pheromones)

Let us know some interesting behaviour which reflects their intellectual abilities in animals. It is very interesting to watch them making nests. It varies from species to species. Birds build their nests in different ways. Tailor bird selects three broad leaves one for bottom, two for top and sides they also collect threads to make their nest for stitching these three leaves. Some of the birds build its nest only with leaflets.



Fig-9 : Nesting Birds

- Observe different birds building their nests in your surroundings.
- Collect material and try to build same type of nest on your own. Try to understand how the birds are so creative.

Beaver, a mammal which lives in North America builds dams across water streams. Beaver cuts big trees by its sharp teeth to



Fig-10 : Beaver carrying log

put the trees across the stream. Then the beaver construct nearly four feet wall by using twigs, stones and mud and stores water. At the centre of this artificial pond beavers construct their home.

Wasp is an intelligent bee which builds its home keeping in view of its future needs. Wasp builds its hive on the walls by using mud.



Fig-11 : Wasp making nest

They select suitable mud for constructing its hive. If it is dry the wasp makes it wet by adding drops of water. If it is wet air it for some time to make balls to build its hive. Then they search for food. They collect food material by injecting its venom (usually other larvae) and keep in its hive. Wasp lay its eggs on the food material, which is used as food for larvae of wasps.

Some experiments towards animal intelligence

Let people believe or not, cheating / bluffing, hiding are also characteristic features of intelligence. In other words, we can say that you know what others think of you and vice versa. In order to make them confused, you do something that others can not guess your plans. Not only humans, but there are some other animals also that show the same behaviour.



Fig-12 : Scrub jay bird

A bird called scrub jay hides its food. But unfortunately when it searches back its own food, it finds that another scrub jay had stolen them. An experiment proved that a scrub jay had hidden its food in presence of another bird. After some time it was found that the other bird had stolen it by fixing a plan.



Fig-13 : Squirrels

Squirrels too hide their food in a fascinating way. They always behave in such a manner that somebody is trying to steal their food. In order to misguide others they dig holes in many places and heap leaves, straw etc., to cover them. Sometimes, most of the holes does not contain any food. In this way, they cheat others to make believe that these holes contain food. Some times it forgets the place. In nature it helps in spreading of seeds.

If we think of logic, we must remember Dolphins. Dolphins have great logical thinking power.

It was proven by Hermon. Hermon studied four bottle nose Dolphins at Kavallo Basin mammal laboratory of Hawaii islands. He named them Akkikomoi, Phoenix, Allen and Hippo.



Fig-14 : Dolphins playing

He could understand by his study that Dolphins can remember their names and understand a code language if they are trained by practice. Even they could reply to complex code language. For example, the closed fist shows a tub, raised arms show a ball and one hand raised tells 'bring here'. The altogether actions are understood by the Dolphins. If we show the above actions in a sequence, the Dolphins would bring the ball from the tub. If we reverse the actions they throw the ball into the tub.

They remember their names by short and long whistles. Variety of whistles are recognised by them. If a Dolphin of particular whistle is called, all the dolphins stare at ,while the particular one comes to you.

Another wonder behaviour is remarked with Alex, an African grey parrot. In 1977, Irene Pepperberg bought a parrot and trained it. Slowly she made it learn more

than 100 words. Then she arranged the words in such a way that Alex could frame its own sentences. After some days, She showed Alex one yellow bowl and another yellow dish. The dialogues between them are:

Pepperburg: What is the similarity?

Alex: Colour

Pepperburg: What is the difference?

Alex: Shape



Fig-15 : African Grey parrot

Likewise Alex could recognise even minute similarities and differences between any two objects irrespective of colour, site, shape etc. It even tried to teach other parrots of its group. When they utter wrongly, it instructed them to say 'clear'.

Besides, wonderful thing is that it calls an apple as 'Bannery' because it tastes like a banana and look, like a big cherry. Naming in this way is a sign of creativity in language. Before Alex's death it could even learnt upto 7th table.

Every species in animal kingdom has its own standards of intelligence which reflects through their behaviour. Animals also express feelings like happiness, threat, fear, anger, sadness etc. Your pet dog is a best example to observe different types of feelings. After returning from fields in the evening cow licks its calf. It reflects its affection towards its calf. You also see this different types of behaviour in other animals.

Hissing of snakes, barking of dogs, stiffing of spike of hedgehog (Mulla Pandi), bad odour from skin of Tasmanian Devil etc, are all the expressions to protect themselves from predators.



Do you know?

Some animals spray liquid with bad smell from their body to protect themselves from predators. Tasmanian Devil is the worst smelling animal in animal kingdom. We are also familiar with a beetle with foul smell called Bombardier Beetle.

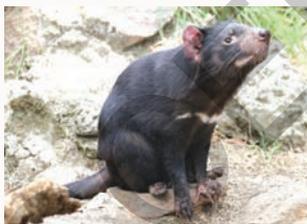


Fig-16(a)

Tasmanian Devil



Fig-16(b)

Bombardier Beetle

It has two chemicals hydroquinone and hydrogen peroxide stored in its body. Whenever the beetle feels threatened, these chemicals mix with some special enzymes and that heat up the liquids, which gives out bad smell from its body.

Activity-2

- Select any one of the animals in your surroundings. Observe how it behaves in the following situations.
 1. Name of the animal:
 2. Place where it lives
 3. How it builds its place:
 4. Way of collecting food / prey:
 5. External characters:
 6. Expressions:
(Happiness, sadness, fear, threat, quarrel, caring self / young ones)
 7. Group behaviour

Display your observations in the classroom

Animals also behave like us in most of the situations. It is very interesting and important to understand animal behaviour to conserve bio-diversity. Ethology is the scientific and objective study of animal behaviour and a branch of zoology. The focus of Ethology is on animal behaviour under natural conditions. This is the combination of laboratory and field science with a strong relation to certain other disciplines such as Neuroanatomy, Ecology and Evolution. Ethology began during 1930 with the works of Dutch Biologist Nikolas Tinbergen and by Austrian biologist Konrad Lorenz and Karl von Frisch. They got Nobel prize for their works on animal behaviour in 1973.



Key words

Instinct, Reflex, Imprinting, Conditioning, Imitation, Ethology



What we have learnt

- Animals show different types of behaviour.
- Animal behaviour is the scientific study of the ways in which animals interact with each other, with other living beings, and with the environment.
- Finding of resources and defending them, avoiding predators, choosing mates, reproduction, and taking care of their young etc are examples of some of animal behaviour.
- Scientists categorize animal behaviour into different categories like, Instinct, Imprinting, Conditioning, Imitation.
- Human behaviour is more complex because we can control our behaviour and aware of ourselves.
- Animal behaviour can be investigated in controlled conditions as well as in the field.
- The scientific study of animal behaviour is called Ethology.



Improve your learning



1. What is the advantage of reflex action? (AS 1)
(a) It has to be learned (b) It happens differently each time
(c) It does not have to be learned (d) None of them
2. If a rat is given a mild electric shock when it goes to a certain part of its cage, it eventually avoids going there. This is because of- (AS 1)
(a) Imitation (b) Conditioning (c) Instinct (d) Imprinting
3. Describe all types of behaviour discussed in the lesson with appropriate examples. (AS1)
4. Differentiate between (AS 1)
(a) Imitation and Imprinting
(b) Instinct and Conditioning
5. How human behaviour is different from behaviour of other animals? Explain with an example. (AS 1)
6. Observe ants going in a line. Ask your teacher how they communicate and write a note on this. (AS 4)
7. "Understanding of animal behaviour creates positive attitude towards animals." How do you support this statement? Explain with suitable examples. (AS 6)
8. Look at this picture. How do you feel about caring nature of animals. Have you ever seen such kind of situations in your surroundings? Explain in your own words. (AS 7)

