



GST 54 – Interaction

Formal Description

An interaction occurs when two or more entities influence one another through one or more causal relationships. Interactions involve the transfer of matter, energy or information and result in changes to the state of one or more participating entities. Interactions may be brief or continuous and form the fundamental building blocks of processes and systems.

Plain English Explanation

Entities rarely exist in complete isolation. They continually influence one another by exchanging matter, energy or information. These exchanges are called interactions.

An interaction occurs whenever one entity affects the state of another. A person pushing a bicycle transfers energy to it, causing it to move. The Sun transfers energy to the Earth, warming its surface. A conversation transfers information between people, allowing ideas to be shared. In every case, the entities are interacting because one influences the state of another.

Interactions may be simple or highly complex. Two billiard balls collide for only a fraction of a second, yet each changes the motion of the other. By contrast, the interaction between a tree and the surrounding atmosphere continues throughout the tree's life as carbon dioxide, oxygen, water and energy are continually exchanged.

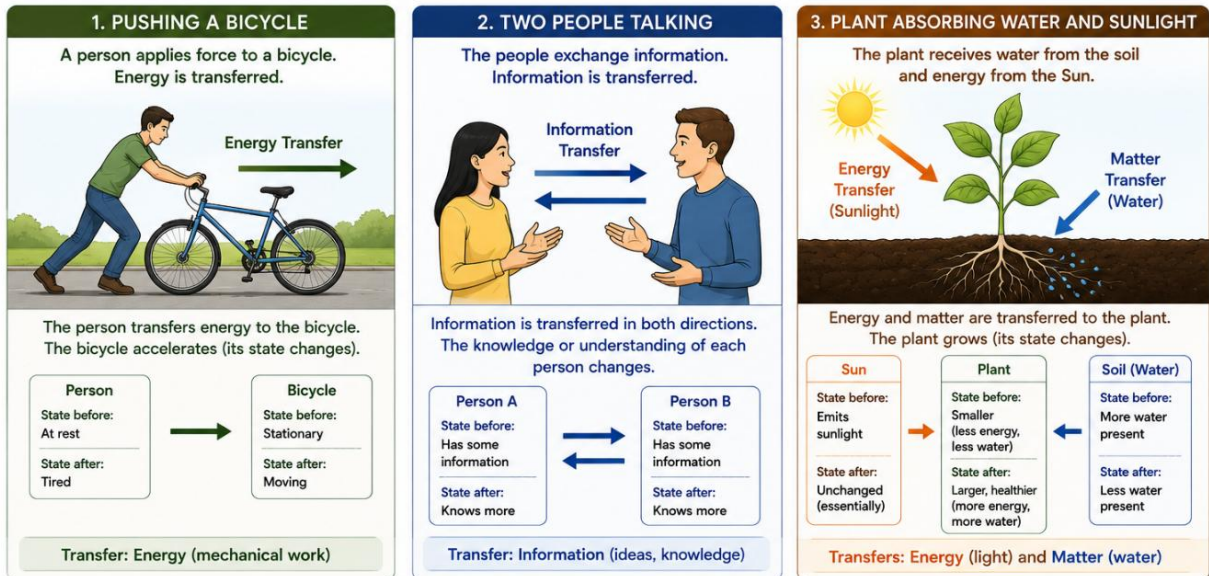
Many interactions occur simultaneously. Within a city, people, vehicles, buildings, businesses and communication systems are all interacting continuously. Some interactions are direct, while others occur through chains of intermediate entities. Together these countless interactions produce the behaviour of the city as a whole.

Understanding interactions is essential because they are the mechanisms through which change spreads throughout systems. In the next module we shall see how interactions combine to form processes, which represent organised sequences of change.



INTERACTION

Interactions are causal exchanges between entities.
They involve transfers that produce changes in the states of the participating entities.



KEY POINT

- Interactions involve causal transfers of energy, matter or information between entities.
- These transfers bring about changes in the states of the participating entities.
- Different interactions involve different kinds of transfer.

Examples

When a kettle is heated on a hob, energy is transferred from the hob to the kettle. The temperature of the kettle rises while the hob loses energy to its surroundings. The two entities therefore interact because each participates in the transfer.

Similarly, when two people hold a conversation, both speaker and listener continually exchange information. Each person's understanding may change as the conversation progresses, illustrating that interaction often influences all participating entities.

Provenance and Links

Interactions have been studied across many scientific disciplines. In physics, interactions describe the forces and energy exchanges between physical entities. Chemistry investigates interactions between atoms and molecules, while biology studies interactions between organisms and their environments. Systems theory extends this concept to all organised systems by recognising that interactions are the causal connections through which changes propagate. These interactions provide the basis for processes, organisation and system behaviour.



Practical Exercise

Observe a familiar activity, such as preparing a meal, travelling to work, working in an office or spending time in a garden.

Identify at least five interactions that occur during the activity. For each interaction, describe the entities involved, what is transferred (matter, energy or information), and how the state of one or more entities changes as a result.

Finally, consider whether any of the interactions continue over a long period of time rather than occurring as isolated events. Explain your reasoning.