1.1.1 Outline the concept and characteristics of systems
1.1.2 Apply the systems concept at a range of scales

Key words

- Inputs
- Outputs
- Flow
- Transfer
- Transformation
- Process
- Matter
- Energy
- Store/storage
- Feedback

What is a System?

- An grouping of parts (components) and the relationships between them, which together constitute an entity or whole.

Three Main Components

Three components regulate the system and ensure that it has enough to survive. The following applies to any natural system:

1. **INPUTS** - the elements that _flow_ into a system.

2. **PROCESSES** – 'activities' that occur within the system _transfer_ and/or _transform_ the inputs or they become _stores_

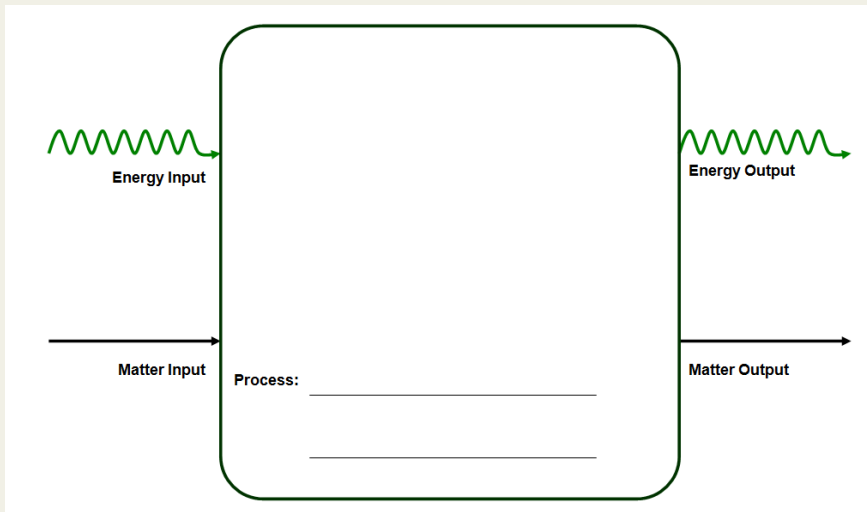3. **OUTPUTS** - that which _flows_ out of a system (waste)

System as a Diagram
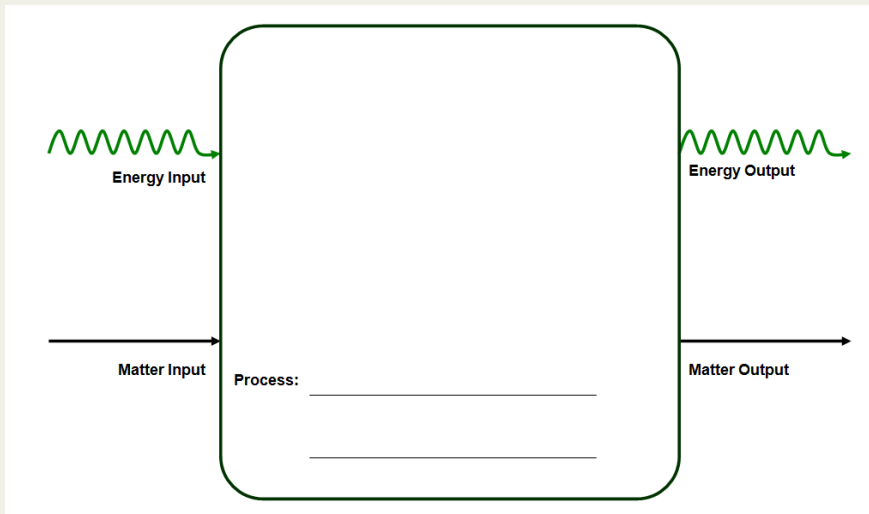
- a "system" is often represented as a flow diagram to help us understand the links between the components

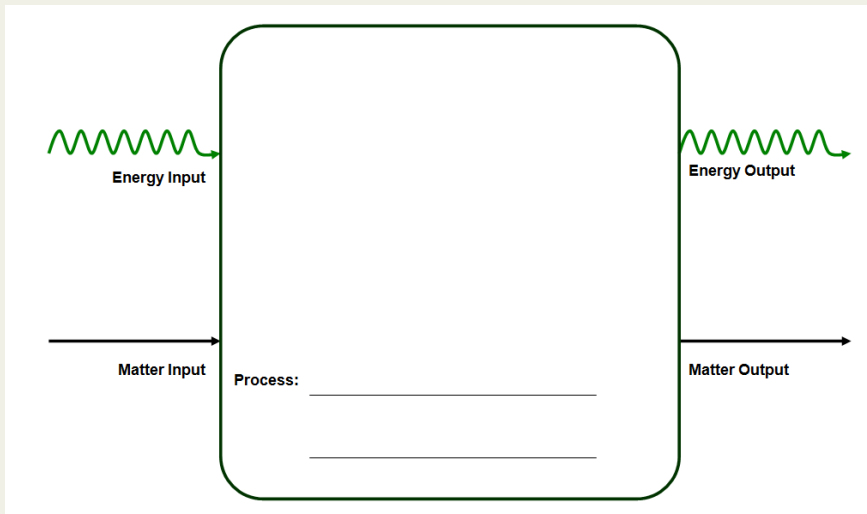- The 'flows' are represented by arrows

What Goes In?

INPUTS

Both <u>matter and energy</u> can flow through an *open* system

... but what about a *closed* system?

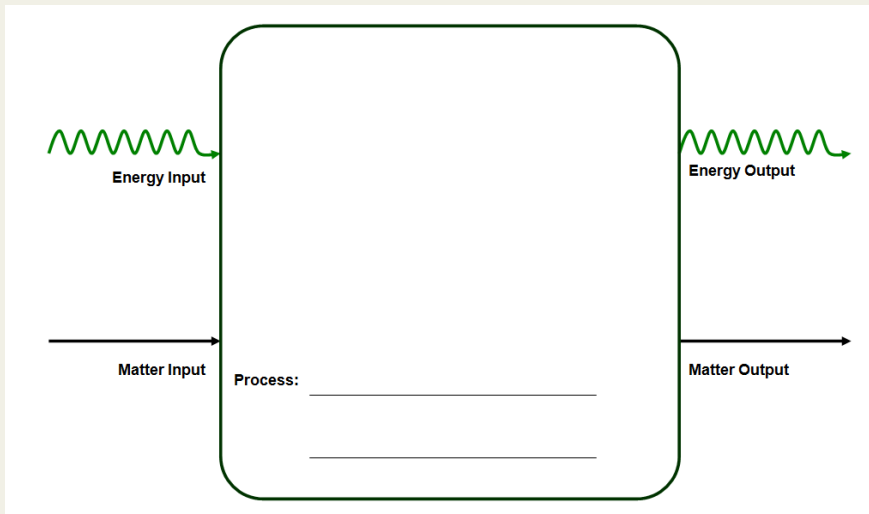# What Goes On?

PROCESSES
stores, transfers & transformation

what goes on in a system (using the inputs) - how matter & energy travel and changes along the way
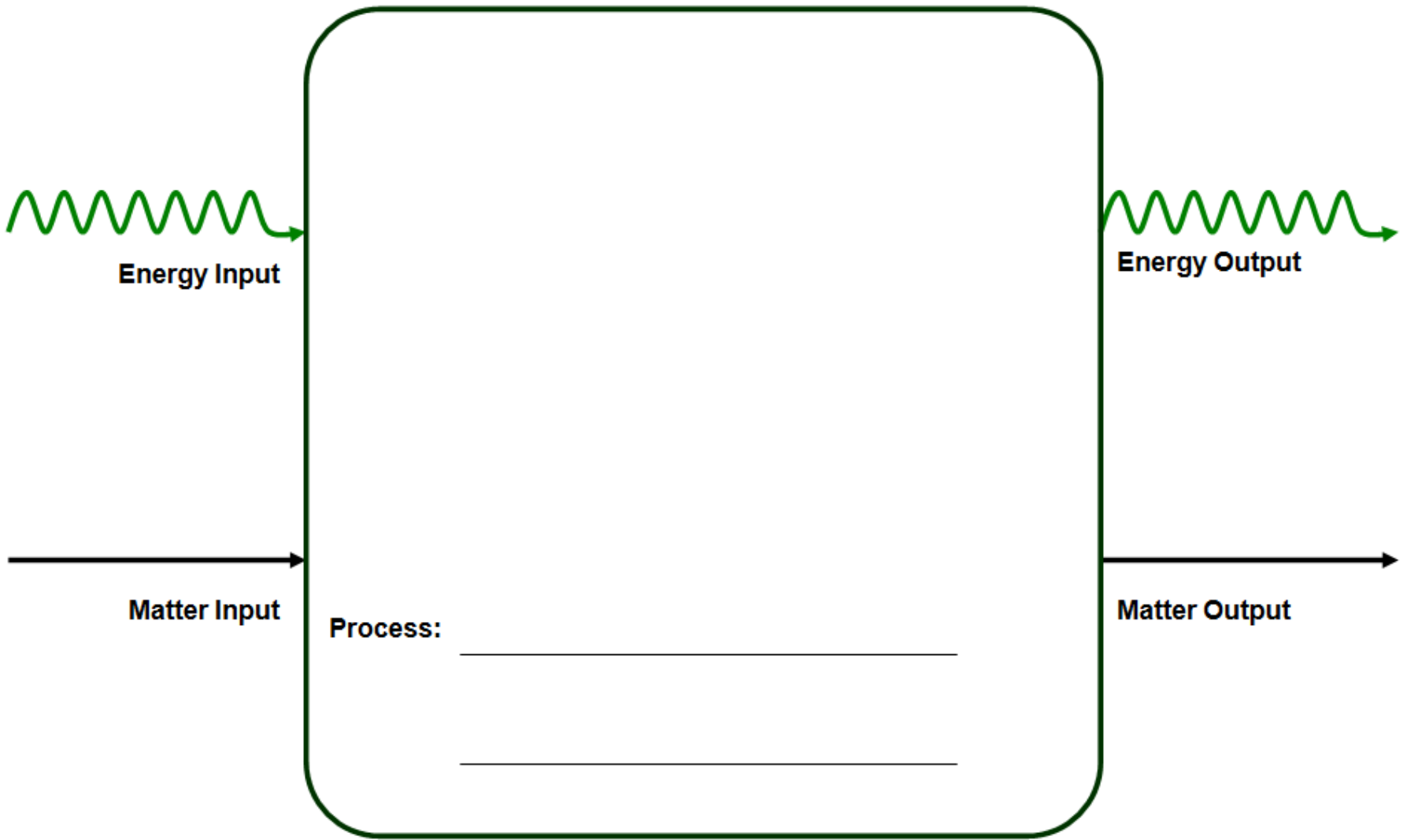
What Goes Out?

OUTPUT

Both <u>matter</u> and/or <u>energy</u> can be removed from an open system (often as waste) and can 'flow' out

…but what about a closed system?

Energy Input

Energy Output
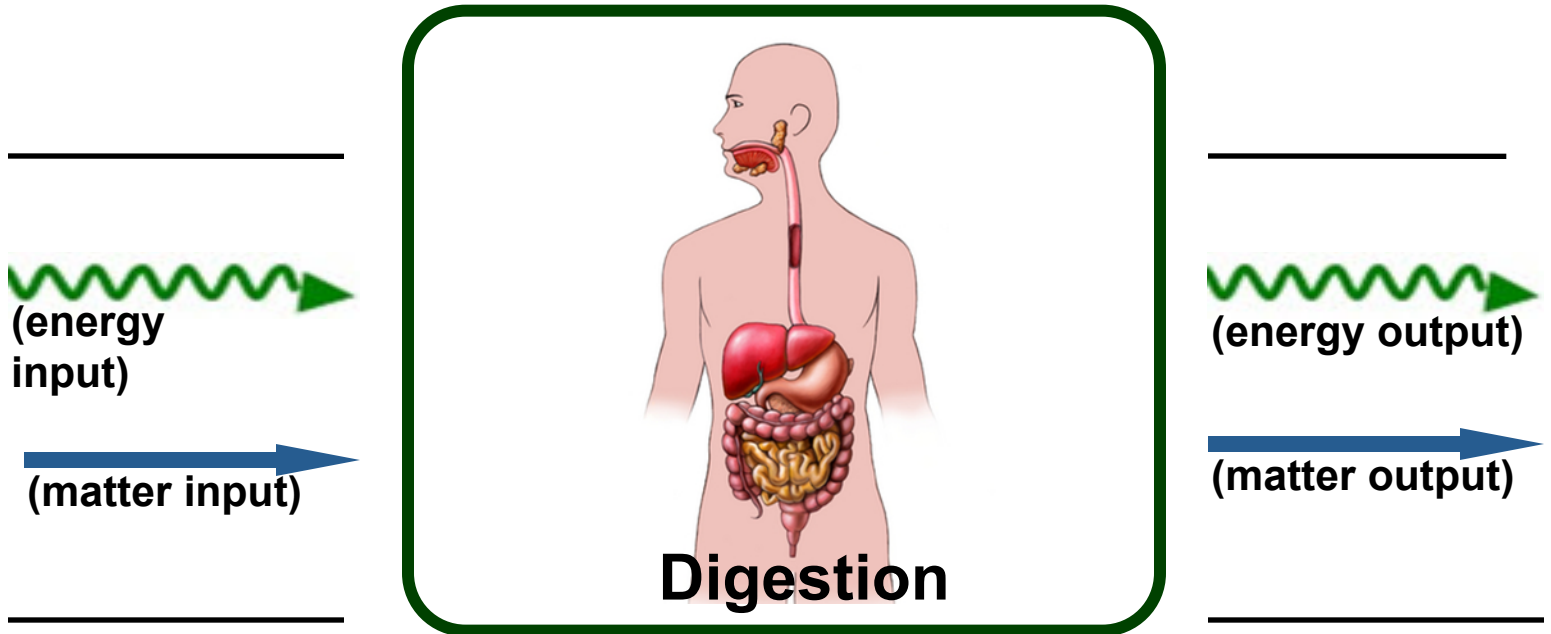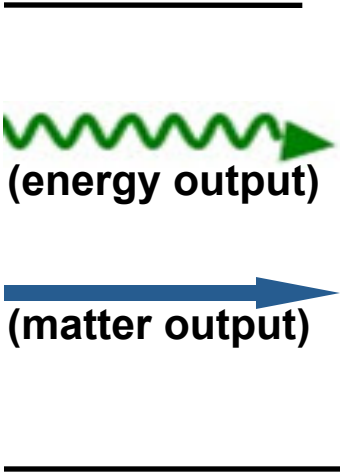
Matter Input

Process: _____

_____

Matter Output

Energy Input

Energy Output
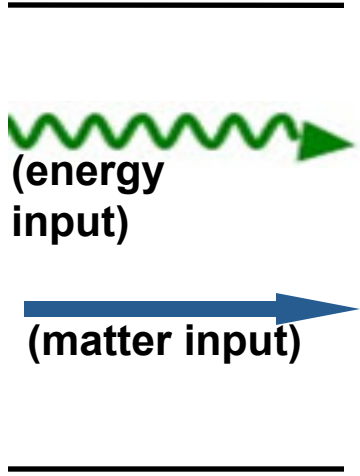
Matter Input

Matter Output

Process: _____

_____

(energy input)

(matter input)

Digestion

(energy output)

(matter output)

(energy input)

(matter input)

Photosynthesis

(energy output)

(matter output)
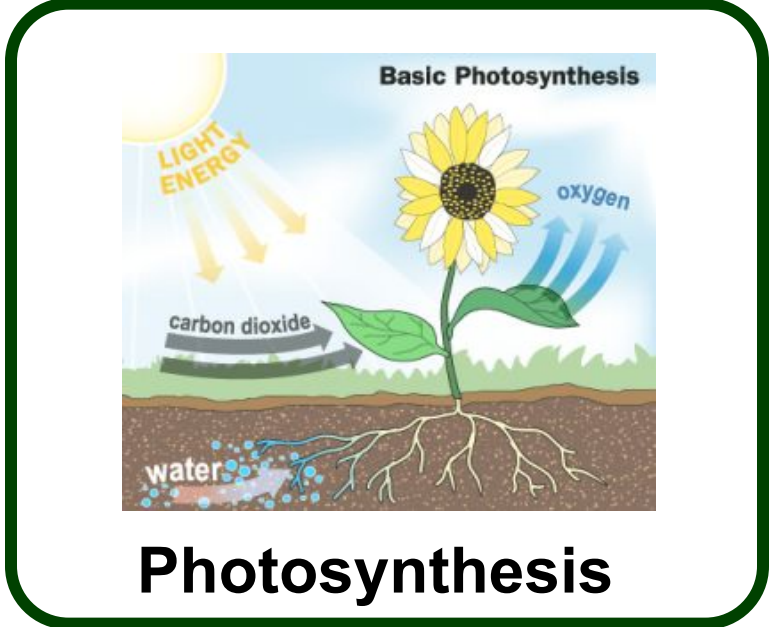
(energy input)

(matter input)

Processing

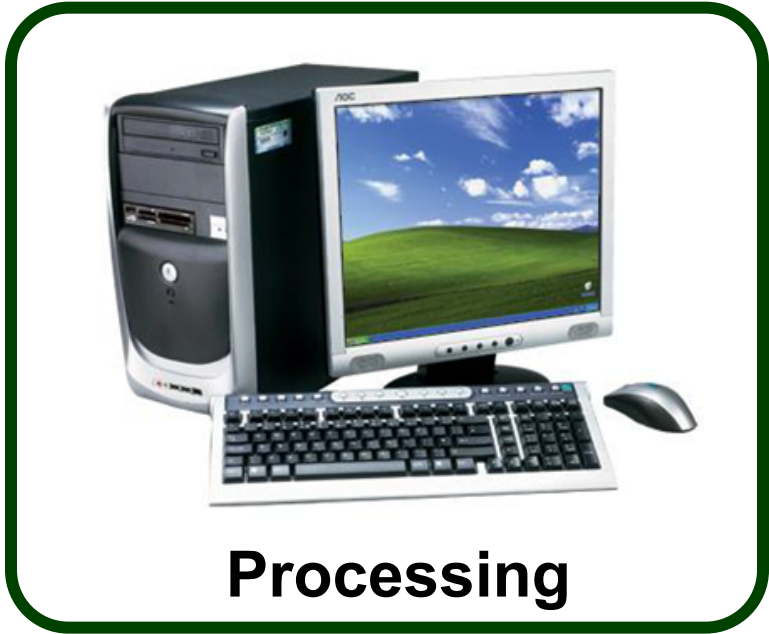**(energy output)**

(matter output)

Let's try to explain other types of systems...

- world population
- social system
- UWCSEA
- Singapore's economy

Inputs   **Processes**   **Outputs**

How would you explain a values system?

More on this a little later in the unit... but something to think about...

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Task:

- In pairs, 'model' your own systems diagram for an ecological system (ecosystem)
  - a tree
  - a sea
  - a pond
  - a farm
  - an animal population
- Use an A3 plain sheet of paper
- keep it neat (may be useful to sketch a draft)

System Exemplar:

Is the work on the following slide a good exemplar of a systems model? Justify your response with as much detial as possible.
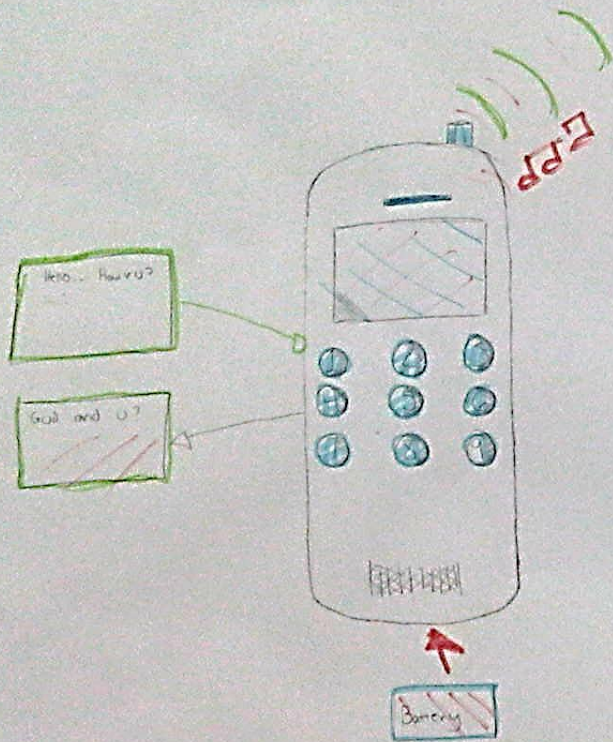
Inputs

- Battery/Charger
- Keyboard
- Screen
- Antenna
- Circuitboard

- Microfone and speaker
- Simcard

Processes

- Gives the phone its mobility
- Allows the user to type words and numbers
- Shows messages and numbers

- Reclives data and information
- Starts to link the different parts
- Creates and picks up sound for calls.

Outputs

- Provides power to phone
- Allows to text
- Allows to see the screen / visual output
- Connects to cellular network
- Lets all the parts connect to each other
- Allows people to speak and hear

- sound and music

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