

# Crosscutting Concepts

- Have application across \_\_\_\_\_ areas of \_\_\_\_\_
- Help us \_\_\_\_\_ the science we are learning

## Patterns

Patterns help us \_\_\_\_\_ what we see in \_\_\_\_\_.

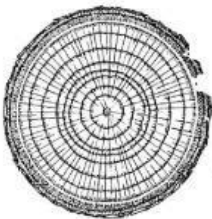
Patterns are \_\_\_\_\_ designs, structures, or events.

Patterns can be used to \_\_\_\_\_ predictions.

\_\_\_\_\_ and charts can help us identify patterns in data.

Patterns can help us identify cause & effect \_\_\_\_\_.

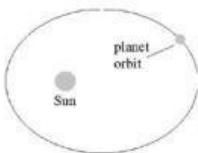
### Examples



#### Tree Rings

Scientists look at tree rings to study how \_\_\_\_\_ a tree is. One ring represents one year of \_\_\_\_\_.

Patterns can also reveal changes in climate. For example a thin ring may represent a \_\_\_\_\_ and a thick ring would mean a lot of moisture.



#### Earth Orbiting the Sun

It takes a year for the Earth to orbit the sun in an oval or elliptical \_\_\_\_\_.



#### Symmetry of a Starfish

You can often see color or shape patterns in \_\_\_\_\_.

## Cause & Effect

Why do things happen? What are the \_\_\_\_\_?

What are the \_\_\_\_\_?

A cause can be \_\_\_\_\_, or it may be complex

Some phenomena may have \_\_\_\_\_ than one cause.

Relationships are classified as \_\_\_\_\_ or correlational. Correlation does \_\_\_\_\_ mean

\_\_\_\_\_. (My birthday and winter happen at the \_\_\_\_\_ time but my birthday does not cause winter. There is a correlation but not causation.)

Correlation: events happening \_\_\_\_\_

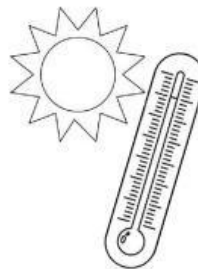
Causation: one event \_\_\_\_\_ another event.

### Examples



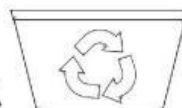
#### Bat Hitting a Baseball

The force of the bat hitting the ball causes a \_\_\_\_\_ in the ball's motion.



#### Rising Temperature

The sun's \_\_\_\_\_ heats up the Earth and the temperature \_\_\_\_\_.



#### Recycling

Recycling plastic, glass, and metal puts \_\_\_\_\_ trash in landfills.

# Crosscutting Concepts

## Scale

Looking at things \_\_\_\_\_ close or from \_\_\_\_\_ away can give different \_\_\_\_\_ of the same object or situation.

\_\_\_\_\_ can be used to observe systems that are too \_\_\_\_\_ (solar system) or too \_\_\_\_\_ (microscopic) to see.

Scientific \_\_\_\_\_ can be represented using \_\_\_\_\_ equations.

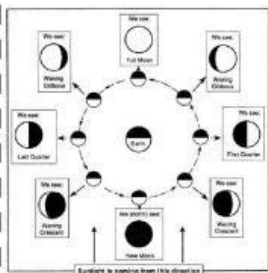
Phenomena observed at one scale might \_\_\_\_\_ be observable at another \_\_\_\_\_. (Zooming out of a photo loses the details you would see up close.)

## Examples

### Magnifying Glass



A magnifying glass can \_\_\_\_\_ us observe things we can't see with just our \_\_\_\_\_. Like tiny crystals in a rock or hairs on an insect.



### A Model of the Phases of the Moon

A \_\_\_\_\_ can help us see things that happen over a long period of \_\_\_\_\_ or things that are too \_\_\_\_\_ or too far away to observe.

### From an Ant's View



You are much bigger than an ant. You don't \_\_\_\_\_ the world the way an ant does. \_\_\_\_\_ impacts how living things \_\_\_\_\_ with their environment.

## Systems

A system is a group of \_\_\_\_\_ parts that work together to carry out functions that the individual parts \_\_\_\_\_ do on their own.

Models can be used for understanding systems and their \_\_\_\_\_ as well as predicting the behavior of systems.

Systems have \_\_\_\_\_, processes and outputs.

Systems may interact with \_\_\_\_\_ systems; they may have sub-systems and be a part of larger \_\_\_\_\_ systems.

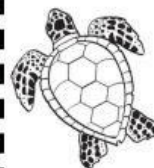
## Examples

### Heart & Circulatory System

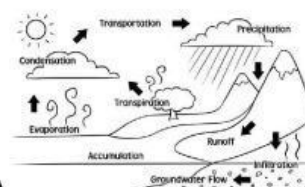


The heart is \_\_\_\_\_ of the \_\_\_\_\_ system which also includes blood, veins, and arteries. These \_\_\_\_\_ work together to move blood which delivers oxygen and nutrients to cells.

### Organisms & Ecosystems



An organism, like a turtle, has body systems that \_\_\_\_\_ together to help it survive. Organisms are also part of an \_\_\_\_\_ where they live



### Water Cycle

A model of the water cycle helps us understand the \_\_\_\_\_ and how they \_\_\_\_\_.

# Crosscutting Concepts

## Energy & Matter

Energy and matter change \_\_\_\_\_ and flow through a system. Energy and matter cannot be \_\_\_\_\_ or destroyed.

The \_\_\_\_\_ of matter means that the \_\_\_\_\_ of the substances before and after a process occurs are the \_\_\_\_\_. Matter is conserved because \_\_\_\_\_ may change form but they are not created or destroyed.

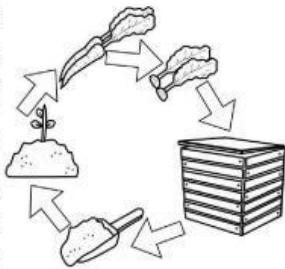
Energy may take \_\_\_\_\_ forms (thermal energy, chemical energy, energy of motion or kinetic energy, potential energy, sound energy, magnetic energy, electrical energy, etc.)

### Examples

#### Food & Energy



Food is \_\_\_\_\_ chemical energy.  
Food is changed into \_\_\_\_\_ the body can use to move and function.



#### Compost & Matter

\_\_\_\_\_ is broken down and recycled to be used \_\_\_\_\_. Composting is an example of this.

#### Converting Energy



At the top of the slide you have \_\_\_\_\_ energy.  
Potential energy is \_\_\_\_\_ into kinetic energy when you start moving.

## Structure & Function

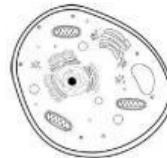
The way an object is \_\_\_\_\_ and put together determines how it \_\_\_\_\_.

Different materials have \_\_\_\_\_ that can be shaped and used to create a structure that performs a specific \_\_\_\_\_.

\_\_\_\_\_ can be used to determine how natural structures and systems function. How something functions depends on the \_\_\_\_\_, composition, and relationship of its \_\_\_\_\_.

### Examples

#### Cells & Cell Structures



Cells have organelles that are \_\_\_\_\_ that perform \_\_\_\_\_ functions.



#### Bridges

Bridges make it easier to cross difficult terrain or go over water. The properties of the \_\_\_\_\_ used are carefully considered and the \_\_\_\_\_ is designed to solve a problem and perform a specific \_\_\_\_\_.



#### Structures & Organisms

\_\_\_\_\_ and animals have structures that perform \_\_\_\_\_ functions. Many birds have wings that are specially designed for flight.

# Crosscutting Concepts

## Stability & Change

Some things stay the \_\_\_\_\_, some things change \_\_\_\_\_, and others slowly. What are the reasons things stay the same? What are the factors that cause \_\_\_\_\_?

Some systems appear \_\_\_\_\_, but over long periods of time will eventually change.

Stability might be disturbed by sudden events or \_\_\_\_\_ changes over time.

\_\_\_\_\_ changes in one part of a system might cause \_\_\_\_\_ changes in another part.

## Examples



### Volcano

A once stable mountain erupts and \_\_\_\_\_ the landscape



### Growth

Over \_\_\_\_\_, a sapling grows into a large shade tree.



### Rocks

Over time, a rock can be broken up into \_\_\_\_\_ pieces.

## Review

Read the scenario and identify a CCC and explain why you chose that CCC. There are multiple correct answers.

A volcano erupts sending lava oozing across the land and trees being burnt.

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Different parts work together to do something more complex. Digestion occurs because of the esophagus, stomach, & intestines working together.

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A family decides to look at the moon with a telescope to see details.

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A stadium is built to accommodate thousands of fans at sporting events.

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