### Patterns

Regular sequences that can be found throughout nature.

**Recurring Themes and Concepts in Science** 

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### **Cause and Effect** Relationships

Relationships between two or more variables or phenomena whereby one variable or event leads to a predictable response. Events have causes—sometimes simple, sometimes multi-faceted.

### **Recurring Themes and Concepts in Science**



# Scale, Proportion, and Quantity in Systems

It is important to consider how changes in



scale, proportion, or quantity affect a system's structure or performance. Scale refers to the size of an object in relation to another object or its environment. Proportion is the ratio of one quantity to another. Quantity is a count of a set of objects or a measurement of a substance.

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**Model the** Interdependence and Parts of a System

A system is a whole made of parts that work together. It has components and boundaries. It can interact with or be part of other systems.

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## Flow of Energy and Cycling of Matter in Systems

Matter and energy are conserved, changing forms but maintaining quantities. Energy flows within a system or between systems through transfers and transformations. Matter is cycled within systems through physical and chemical processes.

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### **Relationship Between Structure and Function**



A structure is an organized arrangement of particles, parts,



or elements in a substance, body, or entity. A function is the purpose or reason for something to exist in a system. The function of a structure depends on the shapes of and relationships among its essential parts.

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# Stability and Change

Stability describes a system that does not change at the observed scale. Stability implies that a small disturbance will die out, and the system will return to a stable state. Change in the system can come from modifying a factor or condition.

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