

UNIFYING CONCEPTS AND PROCESSES LEVELS K-12

Systems, Order, and Organization

- A system is an organized group of related objects or components. (organisms, machines, fundamental particles, galaxies, ideas, numbers, transportation, and education).
- Students should analyze in terms of systems. (mass, energy, objects, organisms, and events).
- Systems have structure and function.
- Feedback and equilibrium are associated with systems.
- Systems can be open or closed.
- The assumption of order establishes the basis for cause-effect relationships and predictability.
- Prediction can be used to explain change. Math can be used to do this through probability.
- Systems have levels of organization. (periodic table & classification of organisms).
- Living systems have levels of organization. (cells, tissues, organs, organisms, populations and communities).
- Interactions occur in systems.

Evidence, Models, and Explanation

- Evidence should be used in explanations.
- Models can be used in explanations.
- Terms such as hypothesis, model, law, principle, theory, and paradigm are used to explain scientific explanations.

Constancy, Change, and Measurement

- Interactions result in change.
- Changes vary in rate, scale, and pattern, including trends and cycles.
- Math measures change.
- Scientists use the metric system.
- Scale includes understanding that parts of a system might change as its size changes.
- Rate compares one measured quantity with another.

Evolution and Equilibrium

- Evolution is a series of changes. This includes changes in the universe.
- The present is a result of the past.
- Equilibrium is a physical state in which forces and changes occur in opposite and off-setting directions.
- Steady state, balance, and homeostasis describe equilibrium states.

Form and Function

- Form follows function.
- Students should explain function in terms of form and form in terms of function.