



inquiryHub Chemistry Curriculum

Unit 1

Driving Question

What substances should scientists look for when searching for life on other planets?

Anchoring Phenomenon

We look at images of the night sky and wonder "Are there living things out there?"

Performance Expectations

HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-3: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS2-6: Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-ESS2-5: Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

HS-ESS1-2: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.'

Unit 2

Driving Question

Why do cars run on gasoline and not rocket fuel?

Anchoring Phenomenon

We learn that carbon emissions are a huge problem, and that rocket fuel could mitigate carbon emissions; but we don't use it. Why?

Performance Expectations

HS-PS1-4: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS3-5: Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

HS-PS3-1: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

HS-ESS3-2: Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*

Unit 3

Driving Question

Why are shellfish dying at very high rates?

Anchoring Phenomenon

We see a video of oyster farmers in the Northwest US and hear that the oysters are impacted by more acidic water. Why is that happening?

Performance Expectations

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.*

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*

Unit 4

Driving Question

How could a single kilogram of nuclear material power an entire city but also destroy it? Should we use it for either?

Anchoring Phenomenon

We explore an anchoring phenomenon where Albert Einstein changes his mind about using nuclear energy to build a bomb when he sees how a milk-jug sized amount used by the US government destroyed Hiroshima. We wonder how this tremendous energy might be useful to us in peaceful ways.

Performance Expectations

HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion and radioactive decay.

HS-PS1-3: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-ESS 3-2. Evaluate or refine technological solutions that reduce impacts of human activities on natural systems.

Unit 5

Driving Question

Is there a way to stop or slow polar ice melting before sea level rises too much?

Anchoring Phenomenon

We watch videos discussing climate refugees and find out that they are having to move because sea level is rising due to polar ice melting. We wonder, if this is happening everywhere and how is ice melting at the poles causing sea levels to rise in warmer areas.

Performance Expectations

HS-PS 3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperatures are combined within a closed system results in a more uniform energy distribution among the components in the system.

HS-ESS2-2: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

HS-ESS 3-4. Evaluate or refine technological solutions that reduce impacts of human activities on natural systems.

HS-ESS 3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems.