

Demonstrates an understanding of characteristics used to classify each sphere. Incorporates how the spheres interact and impact climate on Earth. Can model an approximate scale between the spheres.

The interconnection between the living and non-living units of the model within each sphere

accurate description of the interactions between these

Includes an accurate representation of all 4 spheres (1 point per sphere)

Clearly communicates the connections

What occurs in each sphere?

Models an accurate connection between the spheres

Ability to develop a model that shows how the spheres interact

Model shows how the various spheres interact with one another.

1. Definition of individual systems - boundaries, components, etc. 2. Relationships/interactions between systems. 3. Authentic, real world applications and how they exist in own lives. Thanks Group Members!

Describe/Define each type of sphere. Give examples.

Includes descriptive information as to how the spheres interact using essential academic vocabulary. Must include all interactions of 4.

Ability to show cause and effect of system (sphere) interactions

about what to do in their classrooms.
Discussion: return to "What do we want students to be able to do" and create instructional activities for teachers to model which will lead to student strategies that students can

We will be thinking about how climate change effects our community and what people are doing about it. Then, we will figure out who is doing something about it in our neighborhood and building the unit from there.

Casual loop diagrams are a good way to focus on models.
<http://www.thwink.org/sustain/glossary/CasualLoopDiagram.htm>
<https://ncse.ngo/climate-change-101> Is a good spot to find some background information.

Teachers may need pd to support own knowledge of climate change concepts

Incorporate tasks where students become advocates of a problem. They do research, collect data, document their finding.

younger students need hands on materials. Teachers need ideas and resources in order to teach this in classroom/pd in for staff.

Looking at instructional activities to include opportunities for students to engage in debate or Socratic Seminar.

Removing the politics and home biases is an area that teachers may need exemplars in terms of how to finesse this balance.

through their own classroom behaviors. We can't preach the environment and not live it for our students. Integrating student leadership projects in our buildings is one way, but we have to show the way or the students will believe

Possibly involving the entire school district to plan an initiative/school wide project that would be grade-level appropriate for each grade.

Initiative and hope to have funding and be post-COVID with available bus drivers to take our students to trips for experiential learning to make the idea of NJ ecosystems come alive. State support

Finding a relatable cause for students to champion is key, and making it community-based is even better. It's an opportunity for Title schools like us to implement social justice through examining

Highlight importance of arguing with data and not political views

understand photosynthesis without ATP? These become the tug of war in better implementation of the standards. Vocabulary and memorization become the "rigor" in believing acceleration to HS is rigorous instead of teaching

I know my Chem teachers have expressed difficulty relating content to students' everyday lives.

engagement on a daily basis. There has been a backward slide from the independent inquiry because of lab access. Teachers are struggling to meet the science standards. Before the pandemic, we all felt that our districts were making

Science used to be memorization, not as active. Capitalize on every day experiences of students and prior knowledge to build from there.

We are adding climate change in authentic ways to our instruction and story lines.

We have been focusing on improving and integrating CER instruction and use of models.

me. I get access to the content of the class. But I also think about equity in terms of preparation for the PSAT and SAT ... so I struggle with such strong emphasis on conceptual understanding. Is there room for some

Teach practices and skills that can be used in every area.

Student centered learning. More inquiry to drive their learning. Helps figure out misconceptions. It's ok to be wrong and question more. More authentic to what scientists do. Learn and grow.

It has been a complete flip of the methodology we grew up with, which was facts then lab to demonstrate...now we first use phenomenon and observations to them build models and explanations

We have been starting to look at equity / environmental racism case studies but hope to expand into PBL actions.

For me, the most critical aspect is to use content to develop the scientific and engineering practices and thinking. **ESPECIALLY THE THINKING!!!!**

**Phenomena
or example
clearly
identified**

**Labeling of the four
spheres on the
phenomena/example**

**Includes an
accurate
representation of
what occurs in each
sphere**

**Arrows or
description of the
interactions
between the
different spheres**

