

Curriculum-Framing Questions

Curriculum-framing questions are designed to build on each other. Essential questions are posed first because they address a broad concept that may be tackled across disciplines or over time. Unit questions follow, focusing the activities and attention toward a particular topic area. Content questions are used within lessons to direct students toward the specific content, knowledge, and skills that are desired by the teacher, required by education standards and needed for understanding unit and essential questions. Information in this document about curriculum framing questions is taken from Understanding by Design and the Intel Education.

Criteria of Essential Questions:

“What types of questions might guide our teaching and engage students in uncovering the important ideas at the heart of each subject?”

Essential questions should be based on classroom, teaching team, subject area, or school goals.

Essential Questions:

Why is it important to understand carbon?

How do climate changes affect human lives?

How can we use systems thinking to understand the world?

Criteria of Unit Questions:

“The [essential] question may simply prove to be too global, abstract, or inaccessible for students...Unit questions are more subject- and topic specific, and therefore better suited for framing particular content and inquiry, leading to the often more subtle essential questions.”

Unit questions may be developed after the essential question is set, and selected based on the specific content and skills students should gain during a particular unit or course.

Unit questions have no one obvious “right” answer, but should frame a specific set of lessons. They require multiple lines of research or thinking and uncover the subject’s controversies, puzzles, and perspectives.

Unit Questions:

How is carbon an important element in the Earth system?

Does the carbon cycle in land ecosystems relate to climate change?

If climate changes, would you expect vegetation & carbon storage to change? If so, how? Globally? Locally?

How could scientists measure the total amount of carbon stored and cycled in land ecosystems?

How much carbon is stored in vegetation? Locally? Globally?

How does the uptake of carbon by schoolyard vegetation compare to the emissions of carbon (carbon footprint) by the school?



Is my school site currently a source or sink of C to the atmosphere?

Is there more carbon stored in the global human population or trees in New Hampshire?

Criteria of Content Questions:

Content questions are specific. They have “right” answers that can only be achieved when a student has gained the appropriate skills and knowledge.

Content questions align with content standards and learning objectives set out by the nation, state, school and teacher.

Content questions are designed to support unit and essential questions.

Content Questions:

Where and how is CO₂ stored in a plant?

What is biomass and how is it measured?

How do scientists measure trees?

How is allometry used to calculate forest biomass?

How much carbon is being stored in the trees near my school?

What determines the upper limit of biomass in a given ecosystem?

Here we have only listed a few possibilities for essential and unit questions that could be tackled using the GLOBE Carbon Cycle materials. Not all the GLOBE Carbon Cycle activities will be required for students to consider possible answers for each unit question; the use of the materials exclusively will not always provide students with all the information they need to fully answer the example unit questions.

References

- Wiggins, Grant, and J. McTighe. Understanding by Design. New Jersey: Prentice-Hall, Inc., 2001
- Intel Education: Designing Effective Projects: Curriculum-Framing Questions. <<http://www97.intel.com/en/ProjectDesign/Design/CurriculumQuestions>