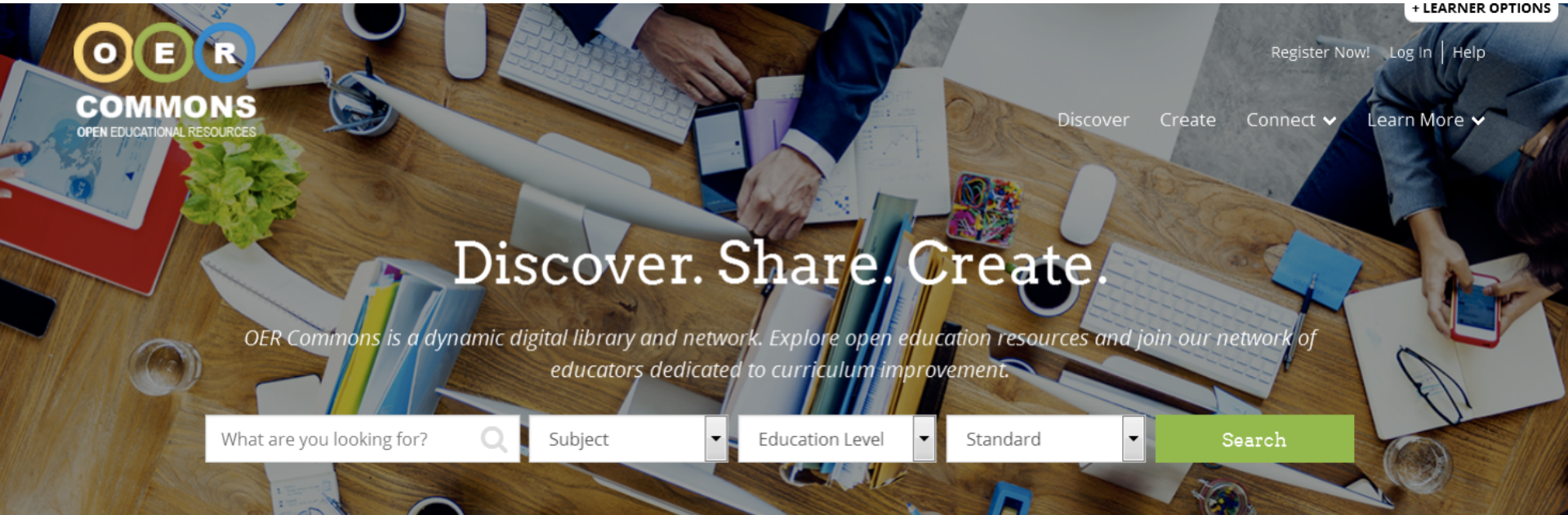
Librarians Building Cultures of Inquiry & Literacy in STEM

American Library Association, AASL Unit Annual Conference, Orlando, FL
June 26, 2016



1. Discuss with a partner how you are advancing inquiry in your work.

2. Use the post-its to sketch an image of what it looks like.

Institute for the Study of Knowledge Management in Education

Introductions

- Megan Simmons, Education Program Lead
- Letha Goger, Education & Library Consultant
- Joanna Schimizzi, Project STEM Lead
- Pam Harland, Project Fellow

#SLASL
@iskme
@oercommons
@megsimmo
@lethanow

About ISKME

Research, tools and services to advance teaching and learning

•Focused on improving the practice of continuous learning, collaboration, and change in the education sector

•Developed OER Commons (oercommons.org) as a digital public library of OER and a collaboration environment to support curriculum improvement

•Infrastructure leverages best practices in library science and interoperability

Open Educational Resources (OER)

Freely available teaching and learning resources that reside in the public domain or have an open license that allows educators to use, share, and in some cases remix to best meet their needs.

How do OER add value?

OER present a shift in teaching practice
and offer opportunities for educators
to expand our roles as **collaborators, curators, instructional designers, and leaders**
in our local education communities and beyond.

What is Open Education Practice?

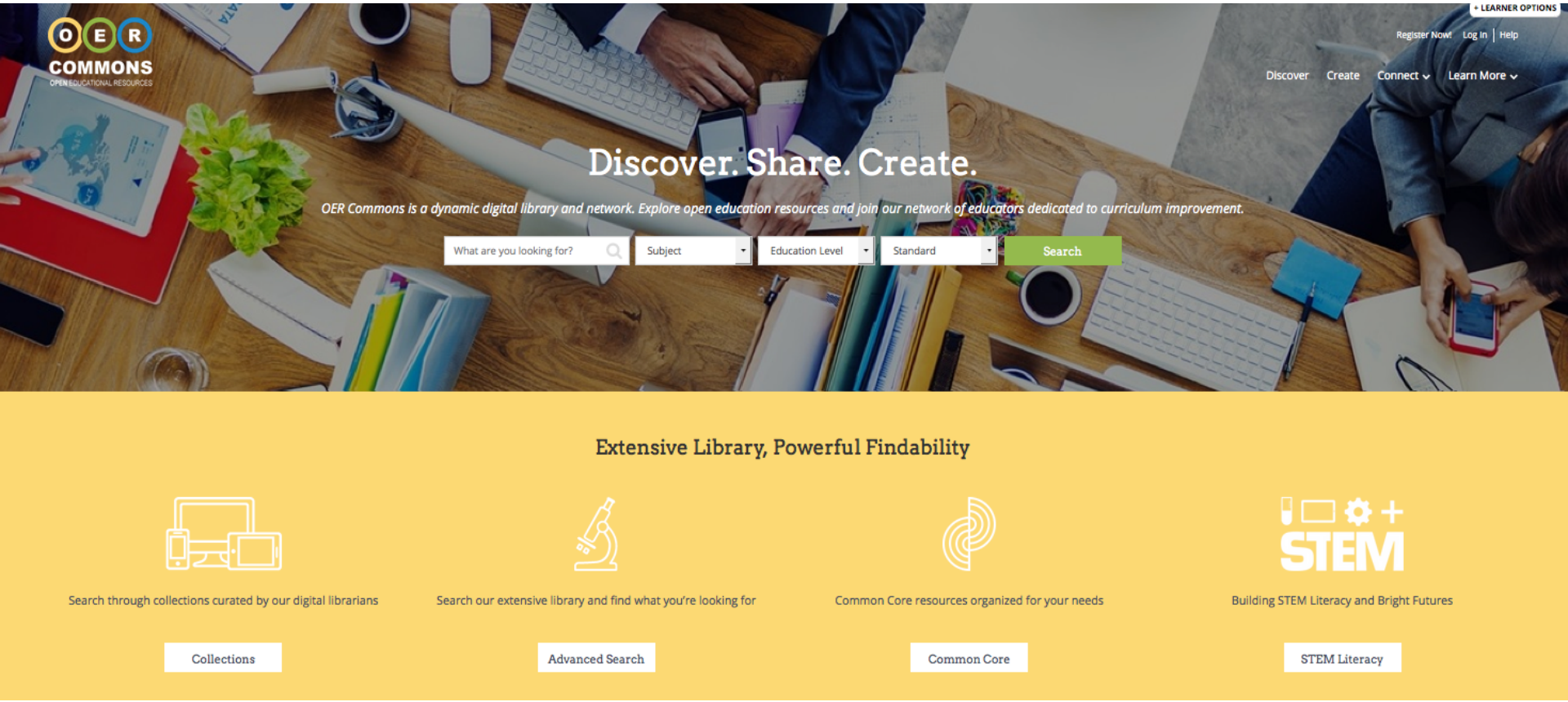
•**Collaboration:** brainstorm innovative ideas, contribute our resources and best practices, get and give feedback, reflect and share our successes and challenges with our global community

•**Curation:** identify, evaluate, organize, and share resources that meet our learning goals

•**Design:** support personalized learning and continuous improvement by utilizing authoring templates and planning tools to think deeply about how we design resources to meet the unique needs of our learners, and reflect and refine resources

•**Leadership:** present, train, and share with others to build awareness and advocacy

OER COMMONS
OPEN EDUCATIONAL RESOURCES



Extensive Library, Powerful Findability

Search through collections curated by our digital librarians

Collections

Search our extensive library and find what you're looking for

Advanced Search

Common Core resources organized for your needs

Common Core

Building STEM Literacy and Bright Futures

STEM Literacy

OER Commons Digital Public Library

- Expertly curated collections from over 400 content providers, over 65,000 resources
- Structured index for searching standards-aligned content (i.e., various state standards, CCSS, NGSS)
- Custom technical web infrastructure and supports for educators at all levels
- Integration with state and local LMS's and processes
- Steward of the National Science Digital Library (NSDL) since 2014

Mature platform leverages best practices in library science, tagging and schema protocols, metadata standards and interoperability

School Librarians Advancing STEM Learning

A project to elevate and expand the role of school librarians by **building their capacity as instructional leaders and partners to advance STEM learning**

#SLASL
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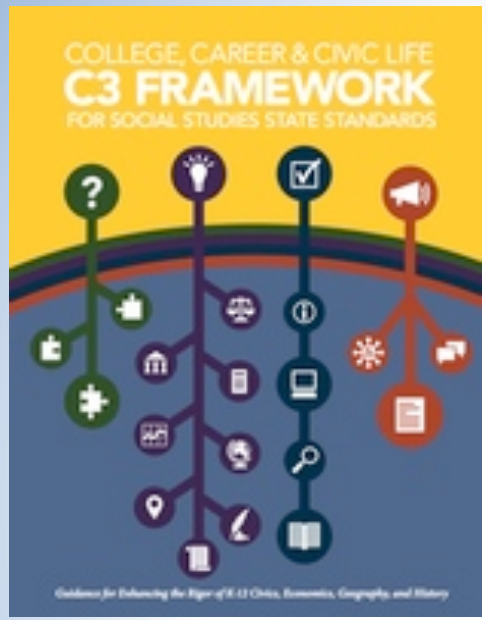
www.oercommons.org/hubs/imls/

SLASL Project Goals

Librarians as Partners in Practice

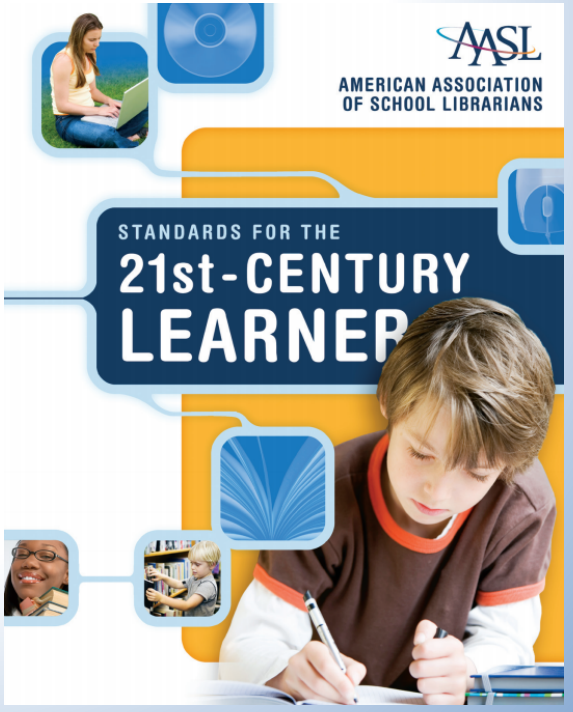
- Expand traditional roles of librarians and educators across discipline
- Understand and experience potential of open educational resources (OER) and shared digital library
- Build community of practice around inquiry, instructional shifts, and advancing school librarianship
- Focus on inquiry and literacy across subjects and across STEM
- Model collaboration and leadership

Cross-Disciplinary Inquiry, Critical Thinking



COMMON CORE
STATE STANDARDS INITIATIVE

NEXT GENERATION
SCIENCE
STANDARDS
For States, By States



You won't be able to read this right now, but you'll get the idea!!!

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School Librarians Advancing STEM Learning Project's

School Librarian Leadership Skills Rubric & Teacher Partnership

The rubric is designed to guide our practice in supporting and evaluating effective school librarian leadership development within this project. The components of the rubric are called **elements** -- the building blocks that this project deems as necessary to support school librarians to co-lead and promote high-quality STEM learning experiences that take advantage of rich information, openly accessible resources, and useful technologies, and as they collaborate with STEM teachers to integrate text-focused inquiry and literacy into the curriculum.

Leadership Element	Outcomes for School Librarians (SLs)
I. Collaboration & Thought Partnership	Model and facilitate exemplary collaboration and shared-problem solving practices with STEM teachers to build effective partnerships around a shared vision for STEM learning, literacy, and a culture of inquiry across classrooms, the campus, and into the community.
II. Curriculum & Instruction	Articulate the rigor and relevance of the Common Core Science Literacy Standards and the crosscutting concepts of the NGSS Framework to co-design curriculum, and model the instructional shifts required for the integrated instruction of literacy and inquiry in the STEM classroom.
III. Open Education Practices	Build a library environment (physical, digital, experiential) that advances a school culture of open education practice and the use of open educational resources (OER) for collection building, curriculum design and program development, in the context of continuous improvement.

I. Collaboration & Thought Partnership

Model and facilitate exemplary collaboration and shared-problem solving practices to build STEM literacy and a culture of inquiry across classrooms, the campus, and into the community.

SL Learning Objectives	SL Performance Indicators
A. Define & Implement Collaborative Processes: SLs will understand their roles as collaborative thought partners and be able to define and implement strategies for successful collaboration with STEM teacher colleagues	Identifies priorities for teacher-SL collaboration and builds time-bound objectives toward those goals. Identifies mechanisms and channels (face-to-face and online) for teacher-SL communication about student learning, STEM inquiry, and curriculum design, and initiates and maintains dialogue using those channels.
B. Initiate Co-design Practices: SLs will be able to take the lead on and engage STEM teachers around co-visioning and co-designing for inquiry in the STEM classroom.	Recruits STEM teachers to participate in the collaborative design of learning experiences for students. Introduces and guides the collaborative design and implementation of curriculum materials by defining teacher and SL roles, and how those roles can best work together to create and implement STEM lessons and learning experiences.
C. Advocate: SLs will be able to advocate to peers and within and beyond their school sites, and share	Builds and implements an outreach plan that includes face-to-face and online communication with peers and the larger professional community to share and model SL-led teaching and learning approaches that advance inquiry-based reading and science

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Defining Inquiry and STEM Literacy

Background on Lab and Text-based Inquiry

The term "inquiry" is defined by Merriam-Webster as a "request for information." In our classrooms, the goal is to create independent learners who are interested in guiding their own learning and who are capable of complex and critical analysis. In science classrooms, the term inquiry is commonly used to describe different levels of experiments or "wet labs." The same assumption is common in other types of labs (e.g. "dry labs" used in technology and math courses.)

However, as you know, scientists build knowledge both through performing their own empirical investigations, *and* through collecting, analyzing, and synthesizing existing information from scientific literature and sources. This IMLS Project views *literacy* as an important aspect of scientific inquiry, and emphasizes concept learning and questioning, searching for information, and the synthesis of text-based scientific data and information as important skills for doing and understanding science.

Science literacy standards already address inquiry in the following Common Core State Standards (and the associated Grade 11-12 Standards):

CCSS.ELA-LITERACY.RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CCSS.ELA-LITERACY.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

CCSS.ELA-LITERACY.RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

CCSS.ELA-LITERACY.RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

New Hampshire's science standards also include the following, which can involve both lab experiments and text-based inquiry:

1.Making observations and asking questions (lab-based inquiry)
Use literacy skills of reading, observing and asking questions (text-based inquiry)

2.Designing scientific investigations (lab-based inquiry)
Use literacy skills of developing of essential and supporting questions, identifying and accessing relevant sources (text-based inquiry)

3.Conducting scientific investigations (lab-based inquiry)
Use literacy skills of close reading and text-based questioning, extraction of meaningful data and information (text-based inquiry)

4.Representing and understanding results of an investigation (lab-based inquiry)
Use literacy skills of synthesizing and summarizing or arguing findings to support the findings of the investigation (text-based inquiry)

5.Evaluating scientific investigations (lab-based inquiry)
Use literacy skills of evaluating sources, findings, and inquiry processes (text-based inquiry)

School Librarians Advancing STEM Learning, Granite State University, Concord, NH, February 2016. Funding provided by IMLS.

What does it look like?

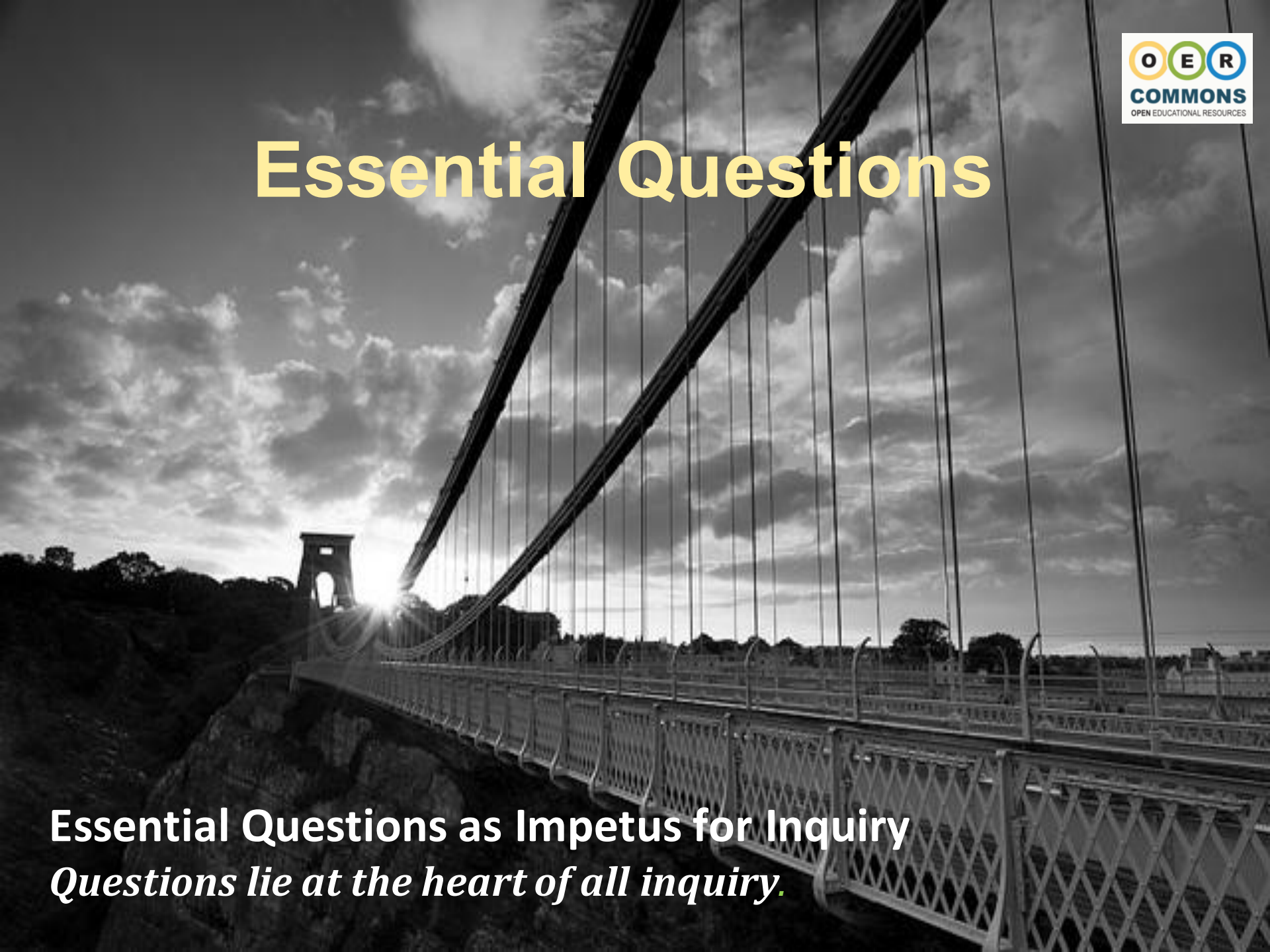
Fractals in Geometry STEM Project

Rating: ★★★★★

Author: Pam Harland, Carissa Maskwa, Rebecca Hanna
Subject: Mathematics
Provider: OER Commons
Provider Set: Open Author Resources
Level: High School

Language: English
Material Type: Instructional Material, Unit of Study
Media Format: Graphics/Photos, Text/HTML

Abstract: This lesson was created by School Library Media Specialist, Pam Harland, and Math teachers Rebecca Hanna and Carissa Maskwa to model text-based inquiry in STEM. Over the course of the unit, students will explore a variety of texts and grow in their knowledge of fractals, city design, and ability to use informational text to support their inquiry and research.The unit was created in year two of the School Librarians Advancing STEM Learning (SLASL) project, led by the Institute for the Study of Knowledge Management (ISKME) in partnership with Granite State University, New Hampshire, and funded by the Institute for Museum and Library Services (IMLS).



Essential Questions

Essential Questions as Impetus for Inquiry

Questions lie at the heart of all inquiry.

Example: Biology Unit on Plant Genetics

Essential Question Frame:

"What areas of GMO engineering would most benefit from additional research?"

SWBAT:

- Identify how scientists genetically modify organisms by reading and annotating an article about GMOs.
- Analyze the impact of GMOs on human health and the environment by applying information and data from the texts.
- Evaluate claims of the benefit or negative impact of GMOs by using evidence from the texts.
- Create a scientific research proposal by using textual evidence, data and precise details from the article to write a grant proposal for increasing research around GMOs in an area they identify as important, using evidence from their text-based inquiry.

Summative Assessment:

"Write a research proposal for increasing GMO research in an area you have identified as important from your inquiry. Discuss the science, provide evidence, and argue from a point of GMOs and human health, the environment, or economic impact."

Building Your Unit Essential Question

STEM Standards + CCSS ELA Science & Technical Literacy Standards = Unit Topic/Theme Idea		
STEM Standards	**CCSS ELA Science & Technical Literacy Standards**	**Idea for Unit Topic or Theme**

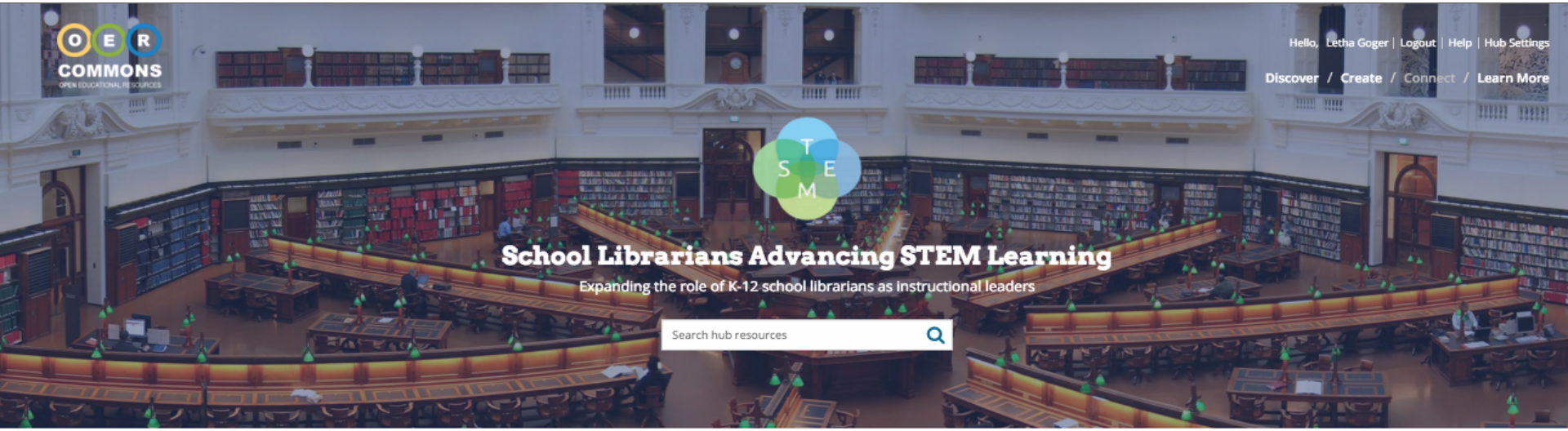
Unit Essential Question:

A question is essential if it is:

1. Open-Ended
2. Thought Provoking
3. Requires Higher Order Thinking
4. Can Be Returned to Again and Again
5. Sparks More Questions

Project Hub on OER Commons

www.oercommons.org/hubs/imls/



Learn About the Project

The goal is to support professional learning cohorts to elevate and expand the role of school librarians, and transform their capacities as instructional leaders, who support advancements in STEM learning.

Participants will collaboratively create and review curriculum using ISKME's OER Commons library of freely available resources. The resources developed will support student critical thinking, analysis, and problem solving across STEM disciplines as well as close reading of texts and math integration, in alignment with the Common Core State Standards (CCSS) and state and national science standards.

The project is led by ISKME, in partnership with the New Hampshire Department of Education, Granite State College, and New Hampshire's Institutions of Higher Education (IHE) Network. The project is supported by the Institute of Museum and Library Services. The institute of Museum and Library Services (www.imls.gov) is the primary source of support for the nation's 123,000 libraries and 35,000 museums.

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Megan Simmons
megan@iskme.org

Letha Goger
lethagoger@gmail.com