

SAMPLE Inquiry Design Plan

Teacher Name: Jesse Semeyn

Course: 5th Grade

Wednesday | September 18

Unit: Earth's Systems

Lesson: What causes sinkholes?

Content Area	MEETS standard OR BUILDS TOWARDS standard	Standards Addressed:
ELA:	Builds Towards	CC.5.R.1.10: By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.
Math	N/A	N/A
Science	Builds Towards	4-ESS2-1 - Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
Social Studies	Builds Towards	SS.IS.1.3-5: Develop essential questions and explain the importance of the questions to self and others.
Fine Arts	N/A	N/A
SEL	Builds Towards	2B.2b: Demonstrate how to work effectively with those who are different from oneself.
World Languages	N/A	N/A

How are students <i>using skills</i> to <i>develop content knowledge</i> ?	<ul style="list-style-type: none"> • Students will develop questions that will lead to explaining how the hydrosphere and geosphere interact to create sinkholes. • Students will read to obtain information on the characteristics of limestone. • Students will plan and carry out an investigation to collect evidence that shows how limestone changes over time. • Students will develop a model that describes of dissolving limestone in causing sinkholes.
Materials/Texts Needed: Technology/website used:	<ul style="list-style-type: none"> • Computer and projector to view news clip: https://www.youtube.com/watch?v=oXCAFD7dcic • Map of Reported Sinkholes in FLA • Map of Geology of FLA • Post-it notes and chart paper for Driving Question Board • Science Journal or paper for students to create models • Sidewalk Chalk

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	<ul style="list-style-type: none"> • Nails to carve into chalk • Water, Lemon Juice, Vinegar • Clear containers (Plastic Cups, Mason Jars, Beakers) • Timing device
<p>How will you engage the students in the topic?</p> <p>What hook/phenomena will you use to allow students to ask questions?</p>	<ul style="list-style-type: none"> • Students will watch part of a segment of the news that describes part of a house collapsing into a sinkhole (https://www.youtube.com/watch?v=oXCAF7dcic STOP at 1:25).
<p>What questions will students ask as a result of observing the hook/phenomena?</p>	<ul style="list-style-type: none"> • What is under the house? • Why do sinkholes happen in some places and not others? • What causes sinkholes to occur? • Could this happen to my house? • Can sinkholes be prevented?
<p>What will students do to figure out the answers to the questions they posed from the hook/phenomena?</p>	<p>Why do sinkholes happen in some places and not others?</p> <ul style="list-style-type: none"> • Look for patterns of geology and occurrences of sinkholes. <p>What is limestone?</p> <ul style="list-style-type: none"> • Read articles to obtain information about the formation and characteristics of limestone. <p>How does limestone change over time?</p> <ul style="list-style-type: none"> • Acid Attack activity
<p>How will students use new learning to answer the questions they posed from the hook and/or explain phenomena?</p>	<ul style="list-style-type: none"> • Students will discuss new information after they look at maps of Florida to look for patterns in the geology of where sinkholes occur. After this discussion, students should be ready to add limestone under the house as part of their model. • After the acid activity students will discuss results and apply their observations to the sinkhole. They should be ready to add limestone dissolving in water to their model.
<p>What are some related phenomena/situations that students could explore?</p>	<ul style="list-style-type: none"> • Limestone caves • Some sinkholes are caused by leaking pipes eroding soil. • Surface level erosion from water • Limestone statues are dissolving faster due to acid rain.
<p>How will students show you what they have learned?</p> <p>How will you use this information in your instruction?</p>	<ul style="list-style-type: none"> • Students will show what they learned through the development of their models. • Students will decide, through consensus conversations, what to add to the model. If the teacher is not confident that students are at the same level of understanding, students can develop their own individual models. • If every individual in the class is not coming to the expected conclusions, together we can formulate new questions to drive new learning.

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<p>What will you do if they do not meet the expected learning targets?</p>	
<p>How will students act on their new knowledge?</p> <p>How will students build on their new learning?</p>	<ul style="list-style-type: none"> • Students could make recommendations for new home builders about build sites. • The acid attack activity can be used as phenomenon to discuss conservation of mass, characteristics of substances, and chemical reaction. • Students should be introduced to other interactions between the geosphere, hydrosphere, and atmosphere.
<p>Reflection Questions:</p>	<ol style="list-style-type: none"> 1. How will you ensure students are driving the learning? What facilitative strategies are you using to guide learning instead of directly instruct? <ul style="list-style-type: none"> • <i>Driving question boards</i> • <i>Discourse/ class discussions</i> • <i>Consensus Modeling</i> 2. Where are students doing the thinking/reasoning in this lesson? <ul style="list-style-type: none"> • <i>Students are developing the questions for later investigation.</i> • <i>Students are having discussion of how to integrate new knowledge into their model to explain the cause of the sinkhole.</i> • <i>Students are deciding how to collect the data to answer the investigative question for the Acid Attack activity.</i> 3. How did this lesson engage students in collaborative learning and enhance their collaborative learning skills? <ul style="list-style-type: none"> • <i>Students have to engage in discourse and consensus modeling.</i> • <i>As a team, students decide how they will collect the necessary data during the Acid Attack activity.</i> 4. In what ways could diverse students express their learning in this lesson? <ul style="list-style-type: none"> • <i>Models can have a lot of drawing, a lot of writing, or a balance of both.</i> • <i>Students could express their explanation for how a sinkhole a forms verbally.</i> 5. In what ways could diverse students be engaged in this lesson? <ul style="list-style-type: none"> • <i>Students all experience the phenomenon through the new clip.</i> • <i>Consider asking students if they have personal connections to sinkholes, or if the sinkhole story reminds them of something</i>

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	<p><i>similar. These similar phenomena can be used later to apply their new learning.</i></p> <p>6. What are the different levels of teacher support that diverse students may need in this lesson?</p> <ul style="list-style-type: none">• <i>Students may need varying amounts of time and guidance when applying new knowledge to the phenomena. Make sure to give them enough support to reach the desired conclusions, but ensure the ideas are coming from the students and not given by the teacher.</i>• <i>Students may be comfortable developing models independently, or they this may need to be done as a class.</i>• <i>Students may be ready to plan their own investigation for the Acid Attack activity, or this may need to done as a whole class.</i>
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