

Climate Change Site Mitigation Plan

Identify course objectives	<p>These are statements of what a student will know and do as a result of instruction: Through watershed and stream system analysis, data collection across the region, and climate models that predict changes in climate and weather events in the area, students will identify factors that might affect an assigned area of the city that sits on the Rio de Flag stream system and develop a comprehensive plan for site modification in the short and long term.</p>
Big Idea/Concept	<p>Explain how solar energy is transferred to different forms on Earth and how this energy modifies the Earth system via stream systems.</p>
The CHALLENGE	<p>Design challenges for instruction – these are statements that pose a complex goal to the students. Interesting challenges engage students in a process of inquiry that requires them to apply the desired concepts beyond simple manipulation of mathematics. (Anticipatory set or Engage; GIS workflow: Define the problem or scenario)</p> <p style="padding-left: 40px;">The City of Flagstaff is planning to develop an area surrounding downtown, but there is a river, the Rio de Flag, that runs straight through several of the proposed areas. You have been tasked to report to the community planning committee the likely behavior of the stream system in the short and long term, and develop a plan to mitigate possible problems. The Earth’s climate is likely to change, so plan for these changes in the long term and propose a sustainable improvement and site management plan.</p>
<p>Lesson Introduction/Summary</p> <p>GENERATE IDEAS</p>	<p>Students have an opportunity to explore what they currently know about the challenge. This includes their naïve concepts or models of the domain and will provide a baseline or pre-assessment of what they know about the challenge. (Elicit Prior Knowledge)</p> <p>Some things to consider:</p> <ul style="list-style-type: none"> • Different areas respond to change in different ways • Extremes of seasonal weather may increase • Severity of individual storms may increase • Changes in precipitation amounts • How and when precipitation occurs (snow vs. rain)

	<p>Target Questions for Generate Ideas:</p> <ul style="list-style-type: none"> • What are some things that might affect how a stream system behaves or where a watershed begins and ends? (ex: Sharp bends, changes in width, type of soil or bedrock, pervious and impervious surface cover, drains and culverts, and vegetation growth, divides) • What factors might you need to consider when proposing improvement plans? (ex: Stakeholders, infrastructure, recreation)
<p>MULTIPLE PERSPECTIVES</p>	<p>These are statements by “experts” describing what they see in the challenge. Their comments provide insights into various dimensions of the challenge, but do not provide a direct solution to the challenge. Students can compare their initial thoughts with the experts. (Explore or Point out/present important information, Input, Modeling) 15 minutes at most</p> <p>City of Flagstaff ideas for floodplain management and Rio de Flag plan? Rio de Flag watershed maps?</p>
<p>RESEARCH AND REVISE</p>	<p>Students engage in a series of learning activities (such as simulations, lectures, homework, labs, and readings) designed to help them focus on the important dimensions of the challenge. These activities are designed to help the students make a link to the original “Challenge.” (Explain or Guided Practice)</p> <ul style="list-style-type: none"> • Stream Table Activities from Landforms – FOSS Kit • GIS Investigations on Rio de Flag floodplain zonation • Rio de Flag Basemap Creation and Investigation using Historical Aerial Photos • Fieldwork and data collection • Lectures/Presentations on flood hazards, flood mitigation, stream processes
<p>TEST YOUR METTLE</p>	<p>This assessment method (homework questions, online quizzes, essays, etc.) provides students the opportunity to apply what they know and evaluate what they need to study more. It also allows the students to reflect on how well they’ve learned the content and to evaluate if they are ready to Go Public with what they know. (Elaborate or Check for Understanding)</p> <p>Apply what was learned to their particular city using GIS to create a presentation</p> <p>Identify the deliverables needed to support the decision (maps)</p> <p>In applying GIS to a problem, you must have a very clear understanding of the problem or scenario.</p>

	<p>We find it helpful to answer these four questions, which test your understanding and divide the problem into smaller problems that are easier to solve.</p> <p>Q1 <i>What geographic area are you studying?</i> Q2 <i>What decisions do you need to make?</i> Q3 <i>What information would help you make the decisions?</i> Q4 <i>Who are the key stakeholders for this issue?</i></p> <p>Identify, collect, organize, examine the data needed to address the problem.</p> <ul style="list-style-type: none"> Document your work <ul style="list-style-type: none"> Create a process summary Document your map Set the environments Prepare your data Create a basemap or locational map Perform geospatial analysis <p>Produce deliverables, draw conclusions and prepare a presentation for a scientific convention.</p>
GO PUBLIC	<p>This is the final assessment of what students know at the end of the module. This assessment could be a presentation of the content, a quiz or test, an essay, homework, etc. (Evaluate)</p> <ul style="list-style-type: none"> • Presentations shared in scientific convention • present the results
LOOK AHEAD AND REFLECT BACK	<p>Elaborate, apply to a new situation</p>