

**Environmental analysis**

**Team:**

**Project:** Climate change

**Driving question:** How much carbon is stored in the forests of the Normanskill Preserve?

**Product:** Scientific report and presentation

<b>Learning outcome</b>	<b>Emerging</b> (below performance standards).	<b>Developing</b> (meets the minimum criteria).	<b>Mastering</b> (demonstrates exceptional performance).
<p><b>Algebra content (100 points)</b></p>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• Report is missing or uses inappropriate methods that lead to miscalculation of               <ul style="list-style-type: none"> <li>○ height of trees,</li> <li>○ volume of trees,</li> <li>○ area of forest,</li> <li>○ carbon stored in forest, and</li> <li>○ carbon in mass and fuel units.</li> </ul> </li> <li>• Number values are incorrectly expressed or have missing units or incorrect units.</li> <li>• Calculations include significant errors that affect the team’s conclusions or do not support the team’s conclusions.</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• An appropriate method is used to determine the height of trees. There may be errors in the use of the method or in calculations.</li> <li>• Appropriate formulas are used to determine the volume of trees. There may be errors in the use of the formula or in calculations.</li> <li>• Appropriate methods are used to determine the area of the forest. There may be errors in the use of the method or in calculations.</li> <li>• Conversions and calculations used to quantify the carbon stored in the forests are included. There may be errors in the use of the method or in calculation.</li> <li>• Includes values for amount of stored carbon in mass units and equivalents of fuel that are inappropriate for the data.</li> <li>• Number values are accurate and correctly expressed and identified, with isolated significant errors that affect the meaning of the numbers or prevalent insignificant errors.</li> <li>• All calculations are accurate and relevant with isolated significant errors that affect the team’s conclusions or do not support the conclusions or prevalent insignificant errors.</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• An appropriate method is used to accurately determine the height of trees.</li> <li>• Appropriate formulas are used to accurately determine the volume of trees. Formulas fit the shape of the trees.</li> <li>• Appropriate methods are used to accurately determine the area of the forest.</li> <li>• Conversions and calculations used to quantify the carbon stored in the forests are mathematically correct.</li> <li>• Includes accurate values for amount of stored carbon in mass units and equivalents of fuel.</li> <li>• Number values are accurate and correctly expressed and identified with isolated insignificant errors.</li> <li>• All calculations are accurate and relevant with isolated insignificant errors.</li> </ul>

	0–64%	65–84%	85–100%
<b>Environmental science content (100 points)</b>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• Does not give background information on the causes of climate change, the potential effects, and the concept of a carbon sink.</li> <li>• Does not describe a method for identifying the boundaries and area of the study site.</li> <li>• Does not describe a method for selecting the type, number, and location of sample plots.</li> <li>• Does not describe a method for finding the volume of the trees in the sample plots.</li> <li>• Does not describe a method for calculating the biomass of the trees from the volume.</li> <li>• Does not describe a method for calculating the carbon stored in the trees from the biomass.</li> <li>• Does not include the amount of carbon stored in the trees.</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• Gives insufficient background information for a lay reader to understand the causes of climate change, the potential effects, and the concept of a carbon sink.</li> <li>• Describes a method for identifying the boundaries and area of the study site.</li> <li>• Describes a method for selecting the type, number, and location of sample plots.</li> <li>• Describes a method for finding the volume of the trees in the sample plots.</li> <li>• Describes a method for calculating the biomass of the trees from the volume.</li> <li>• Describes a method for calculating the carbon stored in the trees from the biomass.</li> <li>• Reports the amount of carbon stored in the trees in mass units only.</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• Gives background information sufficient for a lay reader to understand the causes of climate change, the potential effects, and the concept of a carbon sink.</li> <li>• Describes a logical method for identifying the boundaries and area of the study site.</li> <li>• Describes a logical method for selecting the type, number, and location of sample plots.</li> <li>• Describes a logical method for finding the volume of the trees in the sample plots.</li> <li>• Describes a logical method for calculating the biomass of the trees from the volume.</li> <li>• Describes a logical method for calculating the carbon stored in the trees from the biomass.</li> <li>• Describes the implementation of the methods outlined in the bullets above.</li> <li>• Reports the amount of carbon stored in the trees in mass units and fuel equivalents.</li> </ul>
	0–64%	65–84%	85–100%
<b>Communication (100 points)</b>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• The report is sloppy.</li> <li>• The report has no graphics that enhance understanding.</li> <li>• There is no evidence of revision or proofreading.</li> <li>• The report is inaccurate.</li> <li>• There are ubiquitous errors in grammar, spelling, or</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• The report is neat and follows most of the format for scientific reports.</li> <li>• The report has one graphic that enhances understanding.</li> <li>• There is no evidence of revision of the report.</li> <li>• The report is accurate, but incohesive.</li> <li>• There are several errors in grammar,</li> </ul>	<p><i>Report</i></p> <ul style="list-style-type: none"> <li>• The report is neat and follows the format for scientific reports.</li> <li>• The report has appropriate graphics to enhance understanding.</li> <li>• There is evidence of revision of the report.</li> <li>• The report is accurate and cohesive.</li> <li>• There are virtually no errors in</li> </ul>

	<p>formatting.</p> <ul style="list-style-type: none"> <li>The report is unprofessional in its presentation.</li> <li>Concepts are unclear.</li> </ul> <p>Please see Oral Communication Rubric for the presentation.</p>	<p>spelling, or formatting.</p> <ul style="list-style-type: none"> <li>The report is sometimes unprofessional in its presentation.</li> <li>Concepts are sometimes made clear to the reader through the language used.</li> </ul> <p>Please see Oral Communication Rubric for the presentation.</p>	<p>grammar, spelling, or formatting.</p> <ul style="list-style-type: none"> <li>The report is professional in its presentation.</li> <li>Concepts are made clear to the reader through the language used.</li> </ul> <p>Please see Oral Communication Rubric for the presentation.</p>
	0–64%	65–84%	85–100%
<b>Critical thinking and innovation (100 points)</b>	<p><i>General</i></p> <ul style="list-style-type: none"> <li>Content skills and knowledge are not successfully applied to the challenge presented in the entry document.</li> </ul> <p><i>Report</i></p> <ul style="list-style-type: none"> <li>Successful scientific and mathematical reasoning does not occur.</li> </ul>	<p><i>General</i></p> <ul style="list-style-type: none"> <li>Content skills and knowledge are successfully applied to part of the challenge presented in the entry document.</li> </ul> <p><i>Report</i></p> <ul style="list-style-type: none"> <li>Successful scientific and mathematical reasoning are used but not well reflected in methods described in report.</li> </ul>	<p><i>General</i></p> <ul style="list-style-type: none"> <li>Content skills and knowledge are successfully applied to the challenge presented in the entry document.</li> </ul> <p><i>Report</i></p> <ul style="list-style-type: none"> <li>Successful scientific and mathematical reasoning are reflected in methods described in report.</li> <li>Some of the methods used to quantify the carbon stored in the forest are different from those presented by the instructors, and reasonably accurate.</li> </ul>
	0–64%	65–84%	85–100%
<b>Information literacy (100 points)</b>	<ul style="list-style-type: none"> <li>No reliable references are cited.</li> <li>Data and information sources are inaccurate or irrelevant.</li> </ul>	<ul style="list-style-type: none"> <li>Diverse texts and information sources, including guest speakers, are incorporated into the report.</li> <li>Data and information sources are mostly accurate and relevant.</li> </ul>	<ul style="list-style-type: none"> <li>Diverse texts and information sources, including guest speakers, are incorporated into the report according to Modern Language Association format, with insignificant errors.</li> <li>Data and information sources are accurate and relevant.</li> </ul>
	0–64%	65–84%	85–100%
<b>Collaboration (100 points)</b>	<ul style="list-style-type: none"> <li>The project is substantially incomplete at the deadline.</li> <li>The team folder is scarcely used.</li> <li>One or two students are carrying</li> </ul>	<ul style="list-style-type: none"> <li>Project is mostly complete at the deadline.</li> <li>Some team members are posting to the shared folder.</li> <li>All but one person on the team has a meaningful role.</li> </ul>	<ul style="list-style-type: none"> <li>Project is on time and complete.</li> <li>Team members are consistently posting work to a shared folder.</li> <li>The team has established norms in the contract and consistently enforces</li> </ul>

	<p>the team.</p> <ul style="list-style-type: none"> <li>• Several team members do not have meaningful roles.</li> <li>• The team is not distributing work equitably.</li> <li>• Team members are not sharing skills or explaining ideas.</li> <li>• Team members are not asking questions and seeking help.</li> <li>• Team is substantially off-task during class time.</li> </ul>	<ul style="list-style-type: none"> <li>• The team usually distributes work equitably but this is not well documented.</li> <li>• Team members sometimes share skills and explain ideas.</li> <li>• Team members sometimes ask questions and seek help.</li> <li>• Team members are usually on-task during class time.</li> </ul>	<p>them.</p> <ul style="list-style-type: none"> <li>• Each person on the team has a meaningful role.</li> <li>• The team distributes work equitably and documents its work plan.</li> <li>• Team members are explaining ideas and sharing skills with one another.</li> <li>• Team members are asking questions of each other and seeking help.</li> <li>• Team members are consistently on-task during class time.</li> </ul>
	0–64%	65–84%	85–100%
<b>Technology literacy (100 points)</b>	<ul style="list-style-type: none"> <li>• Lab equipment is lost or damaged.</li> <li>• Images and text are not organized using computer applications and included in the report.</li> <li>• Ruler and protractor were not used in calculating the forest area.</li> </ul>	<ul style="list-style-type: none"> <li>• Lab equipment is used effectively but not cleaned up responsibly.</li> <li>• Images and text are organized using computer applications and included in the report, but with improper formatting.</li> <li>• Ruler and protractor were used with some effectiveness in calculating the forest area.</li> </ul>	<ul style="list-style-type: none"> <li>• Lab equipment is effectively and safely used.</li> <li>• Images and text are organized using computer applications and included in the report.</li> <li>• Google Earth or ruler and protractor were used effectively in calculating the forest area.</li> </ul>
	0–64%	65–84%	85–100%