



## MEETING NEXT-GENERATION SCIENCE STANDARDS (NGSS)

The Goodyear Blimp STEM Education Project curriculum for pre-K and Kindergarten is designed to be a set of turnkey resources for teachers in any school setting. Meeting Next-Generation Science Standards is a crucial criterion to ensure its success across public and private education institutions.

Each of the six available modules deliberately addresses science and engineering practices, disciplinary core ideas and cross-cutting concepts outlined in A Framework for K-12 Science Education published by the National Resource Council on [www.nextgenscience.org](http://www.nextgenscience.org).

Lesson plans address performance expectations outlined in:

- K-ESS2,
- K-2-ETS1,
- K-LS1,
- K-ESS3,
- K-PS3, and
- K-PS2.



# PROJECT LAUNCH

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Module Preview	NGSS Alignment
<p><b>Module 1 – Introduction to the Goodyear Blimp</b></p> <ul style="list-style-type: none"> <li>• What is a blimp?</li> <li>• How does a blimp fly?</li> <li>• What does weather have to do with blimp flight?</li> <li>• Drawing and writing activity</li> </ul>	<p><b>K-ESS2/K-ESS3 Earth’s Systems</b></p> <ul style="list-style-type: none"> <li>• Begin daily weather checks with students to encourage observations of local weather conditions to describe patterns over time.</li> </ul> <p><b>K-2-ETS1 Engineering Design</b></p> <ul style="list-style-type: none"> <li>• Students observe shapes and components of the blimp and sketch the ballonets and catenary curtain inside the blimp envelope.</li> </ul>
<p><b>Module 2 – Oxygen and Air</b></p> <ul style="list-style-type: none"> <li>• Oxygen element is everywhere!</li> <li>• Atoms: tiny parts of Oxygen</li> <li>• Counting and coloring activity</li> <li>• Demonstration: Air as a force</li> </ul>	<p><b>K-LS1 From Molecules to Organisms: Structures and Processes</b></p> <ul style="list-style-type: none"> <li>• Students will learn what is an atom and to identify the Oxygen atom by counting rings, protons, neutrons and electrons.</li> <li>• Students observe and discuss where Oxygen is found in the world around them and learn that it is a necessary element for human survival.</li> </ul> <p><b>K-ESS3 Earth and Human Activity</b></p> <ul style="list-style-type: none"> <li>• Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</li> </ul>
<p><b>Module 3 – Helium and Lift</b></p> <ul style="list-style-type: none"> <li>• Helium element is lighter than air!</li> <li>• Atoms: He has less than O</li> <li>• Counting and coloring activity</li> <li>• Demonstration: Floating balloon</li> <li>• Processing helium booklet</li> </ul>	<p><b>K-PS3 Energy</b></p> <ul style="list-style-type: none"> <li>• Describe sunlight’s effect on blimp lift by discussing temperature changes resulting from sunlight and how helium can expand or contract.</li> </ul>



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<p><b>Module 4 – Applied Learning</b></p> <ul style="list-style-type: none"> <li>• Create your own Oxygen and Helium atoms</li> <li>• Teacher’s Experiment: Atom Weigh-off</li> <li>• Mixed Up Atoms: Oxygen or Helium</li> <li>• Cut and paste activity</li> </ul>	<p><b>K-PS2-1 Motion and Stability: Forces and Interactions</b></p> <ul style="list-style-type: none"> <li>• Students observe and compare two objects (atoms) with measurable attributes in common by counting atomic attributes (protons, neutrons and electrons)</li> <li>• Weigh-off experiment demonstrates push/pull cause and effect of objects that have differing weights</li> </ul>
<p><b>Module 5 – Goodyear Blimp Base Tour</b></p> <ul style="list-style-type: none"> <li>• In-class video</li> <li>• Live tour</li> </ul>	<p><b>K-ESS3 Earth and Human Activity</b></p> <ul style="list-style-type: none"> <li>• Pilots and blimp crew discuss how and why they check weather every day before blimp operations to demonstrate weather forecasting to prepare for, and respond to severe weather.</li> </ul>
<p><b>Module 6 – Build-a-Blimp Art Project</b></p> <ul style="list-style-type: none"> <li>• Papier-mache balloon</li> <li>• Gondola Cutout</li> <li>• Fin Cutout</li> </ul>	<p><b>K-ESS3 Earth and Human Activity</b></p> <ul style="list-style-type: none"> <li>• Demonstrate and engage students in recycling by using old newspapers for the papier-mache project</li> </ul> <p><b>K-2-ETS1 Engineering Design</b></p>