

# Curriculum Correlation

## National Science Education Content Standards–Nano Legends™ Correlation

Nano Legends™ is a groundbreaking educational video game that engages and delights school students while teaching many aspects of cell biology. Nano Legends™ is constructed with amazing graphics and audio, providing students with an engrossing fantasy world that reflects the cellular makeup of the human body.

While they make their way through a vivid 3-D environment, students learn about concepts such as cell function, organelle function, cell division, membrane transport, and much more. The following comprehensive chart correlates National Science Education Content Standards (NSECS) and Nano Legends™ game play. The correlation is done twice: once for grades 5 to 8, and again for grades 9 to 12.

### Nano Legends™ Correlation for Grades 5–8

<b>Nano Legends™ Content Summary</b>	<b>NSECS Correlation (relevant part of Content Standards listed)</b>
<p><b>Game Chapter 1</b></p> <ul style="list-style-type: none"> <li>• Systems overview</li> <li>• Immune system reaction</li> <li>• White blood cell function</li> <li>• Normal vs. cancerous cells</li> <li>• Cancer cells and tumors</li> </ul>	<p><b>Life Science—Content Standard C</b> <b>Structure and Function in Living Systems</b></p> <ul style="list-style-type: none"> <li>• Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, whole organisms, and ecosystems.</li> <li>• Cells carry on the many functions needed to sustain life. They grow and divide, thereby producing more cells.</li> <li>• Specialized cells perform specialized functions in multicellular organisms.</li> <li>• The human organism has systems for ... protection from disease.</li> <li>• Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system.</li> </ul> <p><b>Regulation and Behavior</b></p> <ul style="list-style-type: none"> <li>• Regulation of an organism’s internal environment involves sensing the internal environment ... to keep conditions within the range required to survive.</li> </ul>
<p><b>Game Chapter 2</b></p> <ul style="list-style-type: none"> <li>• Passive transport</li> <li>• Active transport</li> <li>• Protein transport</li> <li>• Role of ATP</li> <li>• Semipermeable cell membrane</li> <li>• Chemical composition of glucose</li> </ul>	<p><b>Physical Science—Content Standard B</b> <b>Properties and Changes of Properties in Matter</b></p> <ul style="list-style-type: none"> <li>• There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and non-living substances that we encounter.</li> </ul> <p style="text-align: right;"><i>Game Chapter 2 correlation continues...</i></p>

## Nano Legends™ Correlation for Grades 5–8 (continued)

Nano Legends™ Content Summary	NSECS Correlation (relevant part of Content Standards listed)
<p><b>Game Chapter 2 (continued)</b></p>	<p><b>Life Science—Content Standard C</b> <b><i>Structure and Function in Living Systems</i></b></p> <ul style="list-style-type: none"> <li>• Cells carry on the many functions needed to sustain life. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.</li> <li>• Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</li> </ul> <p><b><i>Regulation and Behavior</i></b></p> <ul style="list-style-type: none"> <li>• Regulation of an organism’s internal environment involves sensing the internal environment ... to keep conditions within the range required to survive.</li> </ul>
<p><b>Game Chapter 3</b></p> <ul style="list-style-type: none"> <li>• Mitochondria function</li> <li>• Cellular respiration</li> <li>• Danger of carcinogens</li> <li>• DNA damage and cancer</li> </ul>	<p><b>Physical Science—Content Standard B</b> <b><i>Properties and Changes of Properties in Matter</i></b></p> <ul style="list-style-type: none"> <li>• Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties.</li> </ul> <p><b>Life Science—Content Standard C</b> <b><i>Structure and Function in Living Systems</i></b></p> <ul style="list-style-type: none"> <li>• Cells carry on the many functions needed to sustain life. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.</li> <li>• Specialized cells perform specialized functions in multicellular organisms. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</li> <li>• Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system.</li> </ul> <p><b><i>Reproduction and Heredity</i></b></p> <ul style="list-style-type: none"> <li>• Hereditary information is contained in the genes, located in the chromosomes of each cell.</li> </ul>
<p><b>Game Chapter 4</b></p> <ul style="list-style-type: none"> <li>• mRNA function</li> <li>• Cytoskeleton</li> <li>• mRNA sequencing</li> <li>• Cytoplasm</li> <li>• Lysosome function</li> </ul>	<p><b>Life Science—Content Standard C</b> <b><i>Structure and Function in Living Systems</i></b></p> <ul style="list-style-type: none"> <li>• Living systems at all levels of organization demonstrate the complementary nature of structure and function.</li> <li>• Cells carry on the many functions needed to sustain life. This requires that [they] make the materials that a cell or an organism needs.</li> <li>• Specialized cells perform specialized functions in multicellular organisms. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</li> </ul> <p style="text-align: right;"><i>Game Chapter 4 correlation continues...</i></p>

## Nano Legends™ Correlation for Grades 5–8 (continued)

Nano Legends™ Content Summary	NSECS Correlation (relevant part of Content Standards listed)
<p><b>Game Chapter 4 (continued)</b></p>	<p><b>Regulation and Behavior</b></p> <ul style="list-style-type: none"> <li>All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.</li> </ul>
<p><b>Game Chapter 5</b></p> <ul style="list-style-type: none"> <li>Protein synthesis</li> <li>Role of mRNA</li> <li>Ribosome function</li> <li>Endoplasmic reticulum function</li> <li>Golgi apparatus function</li> <li>Amino acids and protein formation</li> </ul>	<p><b>Life Science—Content Standard C</b> <b>Structure and Function in Living Systems</b></p> <ul style="list-style-type: none"> <li>Important levels of organization for structure and function include cells, tissues, organs, organ systems, whole organisms, and ecosystems.</li> <li>Cells carry on the many functions needed to sustain life. This requires that [they] make the materials that a cell or an organism needs.</li> <li>Specialized cells perform specialized functions in multicellular organisms. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</li> </ul>
<p><b>Game Chapter 6</b></p> <ul style="list-style-type: none"> <li>Carcinogen types</li> </ul>	<p><b>Life Science—Content Standard C</b> <b>Structure and Function in Living Systems</b></p> <ul style="list-style-type: none"> <li>Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system.</li> </ul> <p><b>Science in Personal and Social Perspectives—</b> <b>Content Standard F</b> <b>Personal Health</b></p> <ul style="list-style-type: none"> <li>The use of tobacco increases the risk of illness. Students should understand the ... possible long-term detrimental effects of smoking and chewing tobacco.</li> <li>Natural environments may contain substances (for example, radon and lead) that are harmful to human beings.</li> </ul>
<p><b>Game Chapter 7</b></p> <ul style="list-style-type: none"> <li>Nucleus structure and function</li> <li>DNA damage and cancer</li> <li>Apoptosis</li> </ul>	<p><b>Life Science—Content Standard C</b> <b>Structure and Function in Living Systems</b></p> <ul style="list-style-type: none"> <li>Cells carry on the many functions needed to sustain life.</li> <li>Specialized cells perform specialized functions in multicellular organisms. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</li> <li>Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system.</li> </ul> <p><b>Reproduction and Heredity</b></p> <ul style="list-style-type: none"> <li>Hereditary information is contained in the genes, located in the chromosomes of each cell.</li> </ul> <p><b>Regulation and Behavior</b></p> <ul style="list-style-type: none"> <li>All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.</li> </ul>