# 2018 Science Standards of Learning

# Environmental Science Concept Development

Environmental and sustainable resource concepts coupled with educational experiences that utilize scientific and engineering practices (SEP) provide students with the content and skills needed to make informed decisions as adults. The ability to apply science content and skills when analyzing evidence is a critical part of K-12 education and is reflected in the *2018 Science Standards of Learning*. In Virginia, environmental and sustainable resources concept development begins in kindergarten as students learn about how to reduce, reuse, and recycle. The concept expectations expand through elementary and middle school to include the exploration of environmental concepts such as climate change and sea level rise as well as a study of current environmental policy and opportunities for stewardship. Students in high school then have the opportunity to explore these issues further through courses such as biology, Earth science, and environmental science.

## Profile of a Virginia Graduate

The *2018 Science Standards of Learning* support the Profile of a Virginia Graduate through the development and use of communication, collaboration, critical thinking, and creative thinking skills and the applications of civic responsibility in the understanding and applications of science.

Figure 1: Visual representation of the science skills and processes aligned to the Profile of a Virginia Graduate

## Elementary Environmental and Sustainability Standards

| Kindergarten: Using my senses to understand my world | First Grade: How I interact with my world | Second Grade: Change occurs all around us | Third Grade: Interactions in our world | Fourth Grade | Fifth Grade |
| --- | --- | --- | --- | --- | --- |
| Using my senses to understand my world | How I interact with my world | Change occurs all around us | Interactions in our world | Our place in the solar system | Transforming matter and energy |
| K.10 The student will investigate and understand that change occurs over time.  *Lays the foundation that change may be fast or slow* | 1.7 The student will investigate and understand that there are weather and seasonal changes.  *Introduces that changes in temperature may occur over time and these changes impact plants and animals, including humans* | 2.7 The student will investigate and understand that weather patterns and seasonal changes affect plants, animals, and their surroundings.  *Changes in weather can happen quickly or slowly and impact organisms and their surroundings.* | 3.7 The student will investigate and understand that there is a water cycle and water is important to life on Earth. | 4.4 The student will investigate and understand that weather conditions and phenomena affect ecosystems and can be predicted.  *Term Climate is introduced* |  |
| K.11 The student will investigate and understand that humans use resources. | 1.8 The student will investigate and understand that natural resources can be used responsibly. | 2.8 The student will investigate and understand that plants are important natural resources. | 3.8 The student will investigate and understand that natural events and humans influence ecosystems. | 4.8 The student will investigate and understand that Virginia has important natural resources. | 5.9 The student will investigate and understand that the conservation of energy resources is important. |

## Secondary Environmental and Sustainability Standards

| Sixth Grade | Life Science | Biology | Earth Science | Environmental Science |
| --- | --- | --- | --- | --- |
| Our world; our responsibility |  |  |  |  |
| 6.6 The student will investigate and understand that water has unique physical properties and has a role in the natural and human-made environment.  *Climate addressed* | LS.8 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time.   * large-scale changes such as eutrophication, climate changes, and catastrophic disturbances affect ecosystems.   *Climate change addressed in standard and CF* | BIO.8 The student will investigate and understand that there are dynamic equilibria within populations, communities, and ecosystems.   * natural events and human activities influence local and global ecosystems and may affect the flora and fauna of Virginia.   *Climate change addressed in CF* | ES.11 The student will investigate and understand that the atmosphere is a complex, dynamic system and is subject to long-and short-term variations.  *Climate change addressed in CF* | The student will investigate and understand Earth’s resources. |
| 6.7 The student will investigate and understand that air has properties and that Earth’s atmosphere has structure and is dynamic. | LS.9 The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. |  | ES.12 The student will investigate and understand that Earth’s weather and climate are the result of the interaction of the sun’s energy with the atmosphere, oceans, and the land.  *Climate change addressed in CF* | The student will investigate and understand conservation of Earth’s resources. |
| 6.8 The student will investigate and understand that land and water have roles in watershed systems. | LS.11 The student will investigate and understand that populations of organisms can change over time.  *Climate change addressed in CF* |  |  | The student will investigate and understand the human impact on our environment. |
| 6.9 The student will investigate and understand that humans impact the environment and individuals can influence public policy decisions related to energy and the environment. |  |  |  | The student will investigate and understand pollution and waste management |
|  |  |  |  | The student will investigate and understand global climate change. |
|  |  |  |  | The student will investigate and understand civic responsibility and environmental policies |