High-Performance Buildings

# Opening Activity: Pair Discussion

**Does it require more energy to cool a building in summer or heat a building in winter? Notes:**

|  |
| --- |

# The Big Question

How can we use different materials, designs, and processes to ensure that new buildings are part of our climate solutions?

# My Climate Goals

When you complete this lesson, you’ll be able to

1. Explain the importance of energy-efficient building design, construction, and materials and their role in fighting climate change
2. Identify examples of climate-critical professionals designing and implementing solutions for new buildings to contribute to our net-zero goals
3. Describe some characteristics of LEED-certified and Passive House buildings and how they differ from most current buildings.

**Notes:**

|  |
| --- |

Designing for the Climate

# Instructions

Read the specific details for your assigned climate below. Then, follow the prompts on the next page to design your energy-efficient building.

# Climates

## Cold Climate

**Key challenges**:

* Extremely low temperatures with large amounts of snow and ice.
* High energy demands for heating.
* Long winters with short days with fewer hours of sunlight for much of the year.

## Desert Climate

**Key challenges:**

* High daytime temperatures and cold nights.
* Little rainfall requires ways to collect and conserve water.
* Intense sunlight and low humidity.

## Tropical Climate

**Key challenges:**

* High humidity and warm temperatures year-round.
* Heavy rainfall may require sloped roofs or a drainage system.
* The risk of mold, mildew, and overheating requires good ventilation.

## Coastal Climate

**Key challenges:**

* High winds, saltwater exposure, and occasional hurricanes and storms.
* Humidity and flooding risk requires waterproofing.
* The risk of flood damage may require an elevated foundation.

# Design Prompts

Use the prompts below to design your energy-efficient, high-performance building for the assigned climate.

**What is your assigned climate?**

|  |
| --- |

**What materials will you use?**

|  |
| --- |

**What three energy-saving features will your building include?**

**How will each help make your building high performance and energy efficient?**

|  |
| --- |

**Sketch your design for the building below:**

|  |
| --- |

# Lesson Key Points

* High-performance buildings are designed to use less energy, improve comfort, and reduce environmental impact.
* Key features include energy efficiency, renewable energy integration, and smart technologies.
* Equitable design ensures benefits for all communities, including disadvantaged ones.

**Additional key points:**

|  |
| --- |

# Closing Activity

**If you had time, what additional energy-saving element would you add to your green building design?**

|  |
| --- |

**What role can you see yourself playing in creating energy-efficient buildings?**

|  |
| --- |

**What careers of interest did you learn about in this lesson?**

|  |
| --- |