



# LEED PRACTICE ANSWER KEY



**TITAN UNIVERSITY**

## LEED PRACTICE ANSWER KEY – SET 2

1) **a. Preserving open space**

Justification: A greenfield is a piece of land that is either being used for agriculture or is undeveloped and in its natural state.

2) **d. Protection of undeveloped land**

Justification: Conserving land and protecting animal habitat can be achieved by placing projects in densely populated areas with existing infrastructure.

3) **c. Historic district**

Justification: Historic sites are classified as high priority sites.

4) **d. Leasing the system would offset a large up-front cost.**

Justification: In addition to leasing, some businesses may offer free or discounted installation of equipment, and the owner can purchase the company's renewable power.

5) **a. Net-zero energy**

Justification: In net-zero energy projects, no more energy from the electrical grid is used than may be generated on-site by renewable energy sources.

6) **c. Increasing greenhouse gas emissions**

Justification: Refrigerants can have negative impacts on the environment due to their ozone depletion potential (ODP) and global warming potential (GWP). To minimize these impacts, it is recommended to use refrigerants with low values of each. This can help to reduce greenhouse gas emissions and promote a more sustainable future.

7) **d. Pre-design**

Justification: A larger ventilation system may require more energy to operate, but it could be necessary to improve ventilation. However, these choices may become obsolete by the time the structure is built.

8) **b. Ergonomic desks**

Justification: Ergonomic furniture and workstations can enhance the comfort of the occupants.

9) **a. Environmental Choice**

Justification: Environmental Choice has established numerous standards that pertain to eco-friendly cleaning products.

10) **d. The location of the air intakes**

Justification: Air intakes should be placed near sources of fresh air, and away from exhaust or smoking areas.

11) **e. ACEEE**

Justification: ACEEE, the American Council for an Energy Efficient Economy, releases an annual list of the most environmentally friendly cars.

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### 12) b. ENERGY STAR for Homes

Justification: Knowledge of LEED-supporting standards is required for the test objectives. The LEED project criteria for energy efficiency are based on ENERGY STAR for Homes.

### 13) a. Identifying opportunities for synergy

Justification: Before starting any design work, the team gathers together to discuss every problem that needs to be addressed. Each team member shares their area of expertise, as well as any relevant knowledge or data they have. The data is then analyzed, and the team compares notes to find synergy between various tactics and systems.

### 14) b. Bringing in additional fresh air for indoor air quality

Justification: A tight building envelope can cause stagnant indoor air. Increasing ventilation and fresh air can improve air quality but requires more energy.

### 15) c. Convening a goal-setting workshop

Justification: Meet with the owner prior to beginning any design work to determine their goals for the project.

### 16) d. LEED interpretations are used to add new requirements to the LEED Rating System.

Justification: The LEED Rating System cannot be substantially modified or given supplementary standards using LEED interpretations. Besides, LEED interpretations are not the preferred way to rectify errors in the LEED grading systems and reference manuals. To deal with these issues, USGBC® provides clarifications, also known as addenda.

### 17) c. 5 years

Justification: Following the completion of a project, the Project Teams are given a period of five years to gradually phase out the use of CFC-refrigerants.

### 18) c. Location and Transportation

Justification: The Location and Transportation credit category awards projects close to a diversity of uses and in moderately crowded areas.

### 19) b. Combination of credit categories

Justification: Projects must meet specific requirements and earn points within various credit categories to obtain LEED certification. The number of points a project obtains determines its level of certification.

### 20) a. Source reduction

Justification: Source reduction decreases the amount of materials brought into a building, which includes products that have reduced packaging and products developed with sustainable design principles.

### 21) b. The cost of the material

**d. The environmental impact of extracting and manufacturing the material**

**e. The impact the material has on society**

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Justification: Cost is the economic component of the Triple Bottom Line, planet is the environmental component, and people is the social component.

**22) a. LEED project type (schools, healthcare, data centers, etc.)**

Justification: Each grading system has its own RP credits since each LEED project type varies. For example, if a warehouse has few tenants, it may not be given high priority for interior water consumption.

**23) b. Low VOC rubber mat**

Justification: Using grills, grates, or mats in entryways can prevent pollutants, dust, and grime from entering LEED buildings.

**24) c. The wood flooring will reduce the demand for virgin resources.**

Justification: Salvaged materials reduce demand for virgin materials and waste. Reusing flooring from a demo project reduces the need to cut down trees for new flooring.

**25) c. Temperature, humidity, and air movement**

Justification: Temperature, humidity, and air movement influence the thermal comfort of an occupant.

**26) a. Prior to occupants moving in**

Justification: Prior to occupants moving in, mechanical systems undergo a flush-out using only outside air to eliminate impurities.

**27) b. Remanufactured regionally**

Justification: Only the option of being remanufactured regionally would aid in earning credit for regional/locally sourced materials.

**28) a. Salvaged material**

**d. Regional/local material**

Justification: Since the flooring was found and used onsite, it would be considered a salvaged material. Since it came from onsite, it would also be a regional/local material.

**29) a. The acoustics may be poor.**

Justification: Big, open office designs oftentimes have poor acoustics.

**30) a. Increasing rainwater infiltration**

**c. More habitat for vegetation and wildlife**

Justification: Increasing open space has multiple benefits, including providing habitat for wildlife and vegetation, managing rainwater, and reducing the urban heat island effect.

**31) b. Demand response**

Justification: Demand response (DR) is a technology that intends to reduce energy demand, particularly during peak hours. To achieve this, utility companies send a DR event or a curtailment event alert to commercial consumers who have agreed to modify their energy

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usage patterns during peak demand. By responding to the alert, commercial consumers decrease their energy demand. As a result, they are rewarded for their participation in the DR program, and the need to build additional power plants is avoided. In some cities, utility companies may impose an additional fee during peak hours to reduce energy demand.

### 32) a. Complete a CFC phase-out conversion before project completion.

Justification: According to the Fundamental Refrigerant Management prerequisite, LEED BD+C projects are prohibited from using CFC based refrigerants in all newly installed HVAC&R systems. In addition, they should phase-out CFC based refrigerants more than 0.5 pound (225 grams) in existing equipment before the project completion.

### 33) a. Solar reflectance index (SRI)

Justification: Solar reflectance index (SRI) is a value that indicates a material's ability to remain cool by reflecting solar radiation and emitting thermal radiation. The material's reflectance and emissivity are combined to rank the material.

### 34) c. Design and construction

Justification: There are two types of review options: combined or split. In the combined option, the documentation for all the design and construction prerequisites/credits are submitted for review at the END of the construction phase. In the split review option, the design prerequisites/credits are submitted for review during the design phase, and both the additional design prerequisites/credits (if any) and the construction prerequisites/credits are submitted at the end of the construction phase.

### 35) a. Health Product Declarations (HPD)

#### b. Environmental Product Declarations (EPD)

Justification: Project teams should look for HPDs and EPDs when choosing environmentally friendly products. Products with a HPD will provide disclosure about its material ingredients, list of potential chemicals, related concerns, and additional health information. Products that contain an EPD will give information about a product's impact on global warming, ozone depletion, water pollution, greenhouse gas emission, human toxicity, and more.

### 36) c. Green Infrastructure and Buildings

Justification: Green Infrastructure and Buildings promotes the design and construction of buildings and infrastructure that use less energy and water. It also encourages more sustainable use of materials and the reuse of existing and historic structures.

### 37) b. 100% of the postconsumer recycled content plus 50% of the preconsumer recycled content

Justification: According to LEED, recycled content is the sum of 100% of the postconsumer recycled content plus 50% of the preconsumer recycled content, which is based on cost.

### 38) b. Review (certification fee)

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Justification: Review (certification) fees vary according to the gross floor area of the project and membership status; it is not a flat fee like the other fees.

### 39) c. Xeriscaping

Justification: Xeriscaping is a method of landscaping that uses drought-resistant plants to minimize or eliminate the need for watering.

### 40) c. Hydrology and Geology

Justification: A site assessment is "an evaluation of an area's above ground and subsurface characteristics, including its structures, geology, and hydrology. Site assessments typically help determine whether contamination has occurred and the extent and concentration of any release of pollutants. Remediation decisions rely on information generated during site assessments." – USGBC®

### 41) a. Less pavement for roads and less infrastructure for utilities

Justification: If buildings are closer together and hold more occupants, less road and utility infrastructure is required, which saves on materials, reduces demand for virgin materials, and transportation of those materials.

### 42) a. Reused

Justification: The door is an example of a reused material. Reused materials are construction materials that have been retrieved from building sites and repurposed at different building sites, either in the same or different capacity. These materials can include, but are not limited to, flooring, brick, beams, and doors.

### 43) b. Energy and Atmosphere

Justification: Using a natural ventilation system, also known as passive ventilation, can effectively lower the energy requirements of a building, eliminating the need for installing and running any mechanical cooling systems.

### 44) a. Convening a goal-setting workshop

Justification: It is important to meet with the building owner prior to any design work to determine their project goals.

### 45) a. Third-party technical reviews of registered LEED projects

Justification: The LEED certification program is administered by GBCI, which conducts third-party technical evaluations and inspections of registered projects to assess whether they have fulfilled the criteria established by the LEED rating system.

### 46) a. People, planet, profit

Justification: Achieving the triple bottom line is a way to measure sustainability in the building sector. This involves implementing sustainable practices that are beneficial for the planet, people, and profit.

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**47) d. An understanding of the built environment as a series of relationships in which all parts influence many other parts.**

Justification: This question involves accurately recalling the exact (or best) definition of systems thinking, as defined by USGBC®.

**48) a. EPA WaterSense Water Budget Tool**

Justification: Calculating the percent of outdoor water use reduction in LEED can be made easier with the help of WaterSense Water Budget Tool, which is a free online tool. This tool assists in determining the allowable amount of water that can be used by the landscape based on factors such as plant type, plant water needs, irrigation system design, and applied water that the landscape receives. Once the budget is set, the landscape can be designed to meet this budget. It is important to note that water budgets should be associated with a specific time frame, such as a week, month, or year, in order to be effective.

**49) a. Use air filters with high Minimum Efficiency Reporting Value (MERV) ratings**

Justification: MERV ratings are a way to compare how efficient an air filter is. The scale ranges from 1 to 16, with 1 being the least efficient and 16 being the most efficient. It measures the filter's capability to remove particles ranging in size from 3 to 10 microns. These ratings were created by ASHRAE.

**50) b. Leadership in Energy and Environmental Design**

Justification: This acronym needs to be memorized. LEED stands for Leadership in Energy and Environmental Design.

**51) d. The ways in which community infrastructure affects occupants' behavior and environmental performance**

Justification: This option is the aim of the Location and Transportation category.

**52) b. Installed lighting power per unit area**

Justification: Lighting power density is the installed lighting power per unit area. It is also known as the amount of electrical power used to illuminate a space. Lighting power is usually expressed in Watts per unit of area. By reducing the lighting power density, energy consumption can be reduced.

**53) b. Calibrating sensors and Replacing air filters**

Justification: The facilities manager could periodically check the carbon dioxide sensors and the outdoor airflow monitors to ensure that the system is functioning as intended. It is recommended to replace air filters as part of a routine preventive maintenance schedule.

**54) d. Tearing down a building and putting up a more energy-efficient one in its place**

Justification: Research indicates that most of the time, it is possible to renovate or repurpose an existing building in a way that achieves comparable energy savings to that of a new building, without the need for demolishing and disposing of the old structure in a landfill.

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### 55) c. Sustainable Sites

Justification: Landscape components called Bioswales are purposely created to eliminate silt and pollution from surface runoff water, both during and after construction. These components are made up of a swaled drainage course that has slightly inclined sides and is filled with vegetation, compost, and/or riprap. Bioswales are used to capture and enhance the quality of runoff.

### 56) c. 30%

Justification: The minimum outdoor water reduction from a baseline required for a new office project is 30%.

### 57) d. An office project on a previously developed site in a city center

Justification: Development that takes place in already established urban areas, either in a vacant space between other buildings or on a site that was previously used for other urban purposes, is known as infill development. This example is a type of infill project.

### 58) d. 80%

Justification: The Indoor Environmental Quality (IEQ) category holds great significance due to the vast amount of time people spend indoors. The health of the indoor environment, which includes air quality, has a direct correlation with human health.

### 59) b. Reduced air pollution

Justification: A benefit of cogeneration is reduced air pollution.

### 60) b. Administering and creating the LEED rating systems and issuing LEED building certifications

Justification: USGBC® administers/creates LEED rating systems and issues certifications after third-party review by GBCI.

### 61) a. The EPA Construction General Permit or the local equivalent

Justification: The plan is required for the Construction Activity Pollution Prevention prerequisite, and it must conform to the EPA Construction General Permit or local equivalent (whichever is more stringent).

### 62) d. Operable windows

Justification: This is a type of individual occupant control.

### 63) a. Computers

Justification: The plug load or receptacle load is "the electrical current drawn by all equipment that is connected to the electrical system via a wall outlet." – USGBC®. Plug loads are included in the calculation for a building's energy use.

### 64) d. Air pollution



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Justification: By walking instead of taking car trips, we can reduce air pollution caused by the emissions generated from burning fuel. This shows that climate change is influenced by the density of our surroundings.

### 65) c. Review laws and standards

Justification: It's important to review laws and standards early in the process as they greatly affect what can be built, where it can be built, and how it can be built.

### 66) a. Rainwater harvesting

Justification: Rainwater harvesting can help manage rainwater by keeping it on site and reducing the rate of runoff. When allowed, harvested rainwater can be used for irrigation, reducing municipal water use for outdoor needs.

### 67) d. CFCs

Justification: CFCs are an important aspect of refrigerant management. Ventilation alone is not enough to remove them.

### 68) c. Materials and Resources and Sustainable Sites

Justification: The LEED credit categories include Integrative Process, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality (IEQ), Innovation, Regional Priority. Please note: The correct category name is Indoor Environmental Quality, not Air, and air quality is part of IEQ.

### 69) c. 40/60

#### d. Use the rating system that is most applicable

Justification: When choosing a LEED rating system, it is important to follow two rules. First, select the rating system that is most suitable for the project. This means opting for the system that best aligns with the project's specific requirements and goals. Second, it is essential to consider the balance between different rating systems. If two or more rating systems are equally fitting, follow the 40/60 rule and choose the system with the higher percentage of applicable credits. This will ensure that the chosen rating system has a greater emphasis on the project's particular sustainability objectives.

### 70) d. Credit Forms

Justification: A qualified member of the Project Team submits Credit Forms to verify the compliance of a credit or prerequisite. Credit Forms act as evidence or documentation to show that a specific credit or prerequisite has been met in a project.

### 71) a. Space Heating

Justification: Space heating is responsible for the highest energy consumption in buildings. This is because heating up the indoor environment requires a significant amount of energy, especially during colder seasons. The energy is used for heating the air or water that circulates throughout the building to maintain a comfortable temperature. Office equipment, water heating, and lighting use energy as well, but in smaller amounts compared to space heating.

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### 72) c. Montreal Protocol

Justification: The Montreal Protocol is an international agreement that aims to protect the ozone layer by eliminating the production and use of ozone-depleting substances. Although the other options might be relevant to environmental regulations or standards, they do not specifically address the protection of the ozone layer in the US, as the Montreal Protocol does.

### 73) b. ASHRAE 90.1

Justification: ASHRAE 90.1 is the standard for building energy performance.

### 74) b. 1.6 gallons per flush

Justification: The Energy Policy Act establishes the baseline water consumption for water closets at 1.6 gallons per flush.

### 75) b. Social, economics, and environment

Justification: The Triple Bottom Line framework evaluates an organization's activities based on their social, economic, and environmental impacts. It acknowledges that a company's success should not be judged solely on financial profits, but also on its contributions to society and the environment. By considering these three factors, organizations can strive for sustainable development and make decisions that benefit not only their bottom line but also the well-being of people and the planet.

### 76) a. Rock

#### b. Soil

Justification: Construction and demolition debris refers to the materials generated during the construction, renovation, or demolition of buildings and structures. Rocks are not typically considered debris in this context since they are often used in construction projects or landscaping. Similarly, soil is not usually categorized as debris since it can be repurposed or reused in various ways. Therefore, rocks and soil are the only two items that cannot be included in construction and demolition debris.

### 77) a. LEED BD+C: Core and Shell

Justification: LEED BD+C: Core and Shell would be best for a project that includes a major HVAC renovation, significant envelope modification, and core plumbing renovation.

### 78) b.3

Justification: There are three BPDO credits in the Materials and Resources credit category. They are Environmental Product Declarations, Sourcing of Raw Materials, and Material Ingredients.

### 79) a. Plastic

#### b. Cardboard

#### e. Metal

Justification: A building recycling program should consist of plastic, cardboard, and metal as these materials are commonly recyclable and can be easily gathered and stored. Plastic, cardboard, and metal are prevalent in packaging, construction, and other industries, making

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them essential materials to recycle to decrease waste and conserve resources. However, brick and hazardous materials are not typically part of building recycling programs since they are not easily recyclable or may pose safety risks during the recycling process.

### 80) b. Providing third-party LEED professional credentialing

#### d. Providing third-party LEED project certification

Justification: The Green Building Certification Institute (GBCI) is responsible for providing third-party certification for LEED projects as well as third-party professional credentialing for LEED. This means that the GBCI evaluates and certifies individuals who possess knowledge and expertise in green building practices, as well as certifying green building projects that satisfy the requirements of the LEED Green Building Rating Systems. These responsibilities ensure that professionals in the industry are qualified and that buildings meet the necessary standards for sustainability and environmental performance.

### 81) b. Operational energy efficiency

Justification: Retrocommissioning is the study of an existing building and how to improve its operational energy efficiency.

### 82) c. The boundary description that is submitted for certification

Justification: "The boundary description is submitted for certification" is the right answer. This implies that the LEED project boundary may not be the same as the site boundary or the attendance boundary. Instead, it refers to the area that is described and submitted for certification. This provides flexibility in defining the project boundary based on the specific needs and characteristics of the building and hardscape areas.

### 83) a. Using technology that requires less energy to perform the same function as a conventional item

Justification: Using technology which requires less energy is useful in achieving energy efficiency.

### 84) a. 1,000 square feet of gross floor area

Justification: For LEED BD+C and LEED O+M Rating Systems, the project must include a minimum of 1,000 square feet (93 square meters) of gross floor area.

### 85) a. ENERGY STAR

Justification: ENERGY STAR is a program that is widely used to compare the energy performance of multiple buildings. This program is run by the U.S. Environmental Protection Agency (EPA) and is completely voluntary. It provides a standardized rating system for energy efficiency in buildings. The goal of the program is to help building owners and managers assess and compare the energy performance of their buildings. By doing so, they can identify areas for improvement and make informed decisions about energy efficiency upgrades. ENERGY STAR also provides resources and tools to help buildings achieve energy savings and reduce greenhouse gas emissions.

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### 86) c. Exemplary Performance

Justification: By doing Exemplary Performance, Project Teams earn an extra point for achieving double the credit requirements.

### 87) c. Life Cycle Costs

Justification: Developing a sustainable project budget requires a major consideration of life-cycle costs. This means considering not just the initial construction costs but also the costs associated with the entire lifespan of the project, including maintenance, operation, and disposal. By taking life-cycle costs into account, organizations can make more informed decisions about the long-term financial sustainability of their projects and ensure that they are considering the complete cost implications of their choices.

### 88) c. Dishwashers

Justification: The EPA Act of 1992 exclude dishwashers from its water efficiency requirements.

### 89) b. The integrative process applies to any phase in the life-cycle of a building or land-use project.

Justification: LEED prefers an integrative process because it applies to any phase in the life-cycle of a building or land-use project.

### 90) b. Meet all prerequisites and get at least 40 points

Justification: LEED buildings must meet all prerequisites and earn at least 40 points.

### 91) b. Enhance human health and well-being, protect and restore water resources, and build a greener economy

Justification: Three LEED impact categories principles are to enhance human health and well-being, protect and restore water resources, and build a greener economy.

### 92) a. Is within walking distance of a public park

Justification: Project sites should be within walking distance of a public park to increase diversity of uses.

### 93) c. Add a walking trail on the property.

Justification: Adding a walking trail would provide open space on a project site.

### 94) d. Density bonus

Justification: Density bonuses would encourage developers to pursue green building.

### 95) d. Certified

Justification: The lowest level of LEED certification is “Certified.” Next is Silver, then Gold, then Platinum.

### 96) d. Has a minimum green score of 45 on the ACEEE annual vehicle guide

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Justification: Green vehicles must have a minimum green score of 45 on the ACEEE annual vehicle guide.

**97) b. A list of construction waste materials that will be commingled or separated during recycling**

Justification: A construction waste management plan should include a list of construction waste materials that will be commingled or separated during recycling.

**98) c. Blackwater**

Justification: Blackwater is not allowed to be used for irrigation purposes.

**99) b. 20%**

Justification: Project teams should work towards at least 20% of indoor water savings.

**100) b. Improved productivity**

Justification: Productivity improves when individual lighting and thermal controls are provided for building occupants.