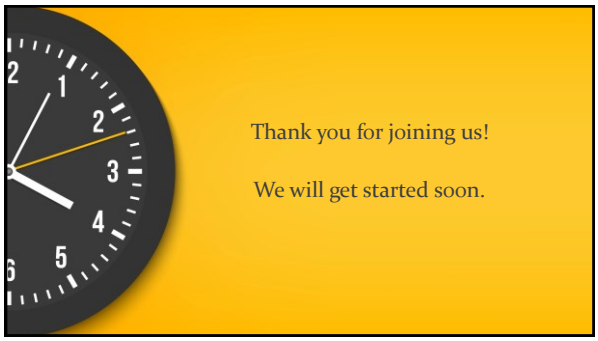


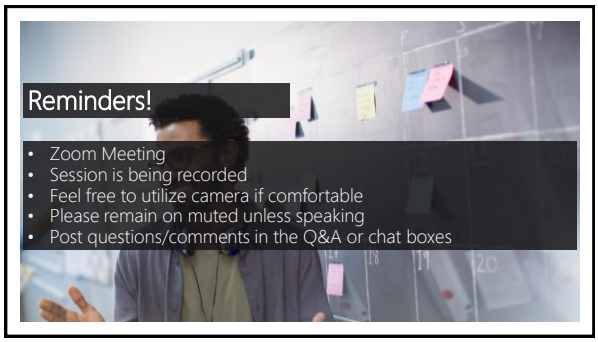

1

LEED Green Associate
Exam Prep

Meeting 1

EDUCATION PARTNER

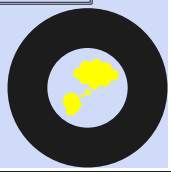
2




3

# Q:

Where are you joining us from today?



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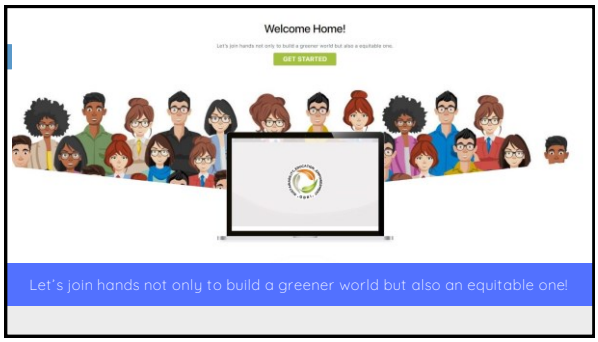


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## COURSE DESCRIPTION

THIS COURSE IS IDEAL FOR **BUILDING PROFESSIONALS** AND **STUDENTS** SEEKING TO LEARN THE FUNDAMENTALS OF **SUSTAINABILITY** AND HOW IT CAN BE APPLIED TO THE BUILT ENVIRONMENT. YOU WILL LEARN ABOUT **GREEN BUILDINGS** AND GREEN RATING SYSTEMS SUCH AS LEED. ADDITIONALLY, THIS COURSE WILL INTRODUCE YOU TO THE **LEED GREEN ASSOCIATE EXAM**.

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## COURSE OBJECTIVES

- Understand the fundamentals of sustainability
- Explore the role of green buildings in sustainability, understand the benefits and distinguish the green building process
- Analyze the LEED rating system and how it addresses environmental issues
- Identify the key components of the LEED certification process
- Get inspired from a green building case study

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## Table of Contents



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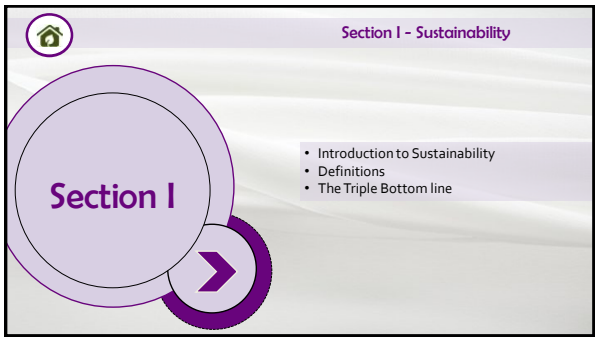
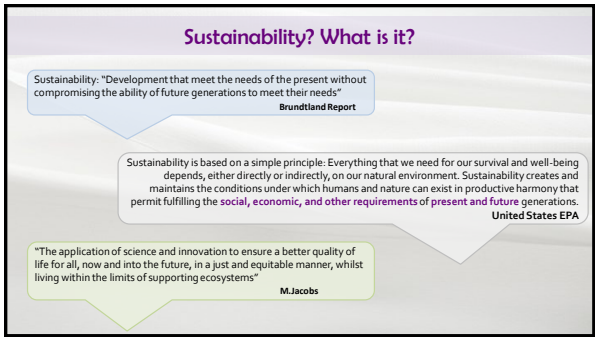
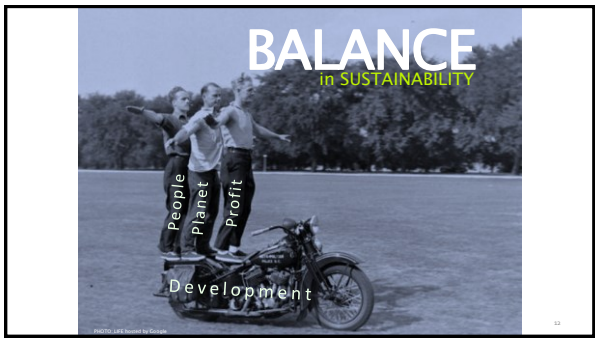

Section I - Sustainability
Section I
• Introduction to Sustainability
• Definitions
• The Triple Bottom line

10


Sustainability? What is it?
Sustainability: "Development that meet the needs of the present without compromising the ability of future generations to meet their needs"
Brundtland Report
Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony that permit fulfilling the social, economic, and other requirements of present and future generations.
United States EPA
"The application of science and innovation to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems"
M.Jacobs

11


BALANCE
in SUSTAINABILITY
People
Planet
Profit
Development

12

## The Triple Bottom Line




13

## Promoting Triple Bottom Line - Example

Awesome Outdoor Clothing's (example company- not real) success comes from offering stylish outdoor gear.

People

\+

Planet

=

Profit

**People** – By paying workers a living wage and providing clean and safe working environments, workers make a higher quality product and continue to develop skills beneficial to their job.

**Planet** – By using more environmentally friendly products such as organic cotton & non-heavy metal dyes, along with techniques that lessen water pollution, they ensure that they will continue to have a steady supply of high quality materials and clean water supply

**Profit** – They make a profit by selling their superior quality gear because it's a brand that people trust for quality and good ethics.

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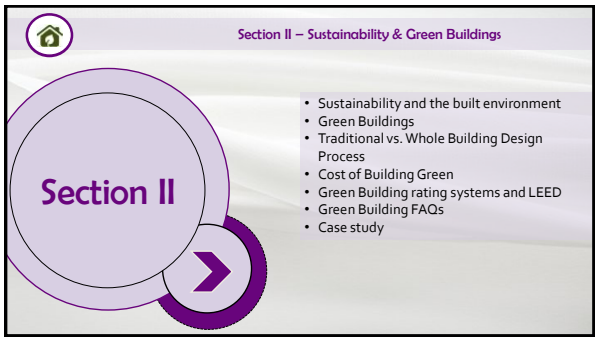


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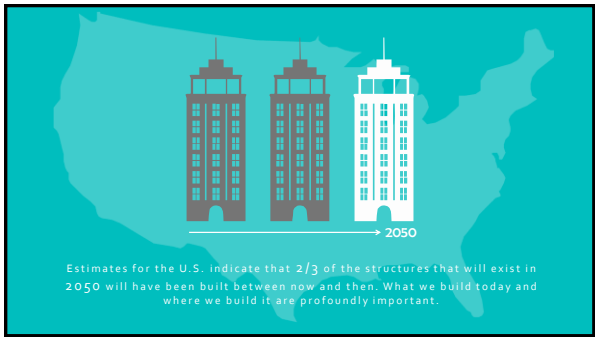


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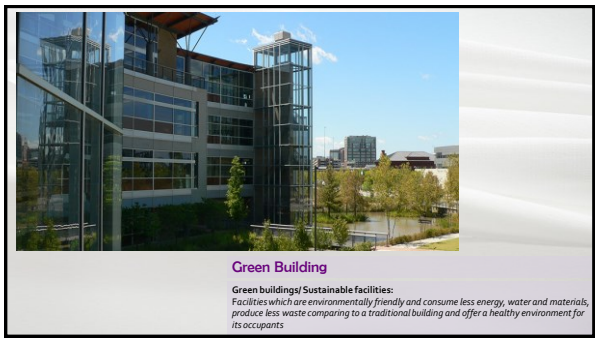


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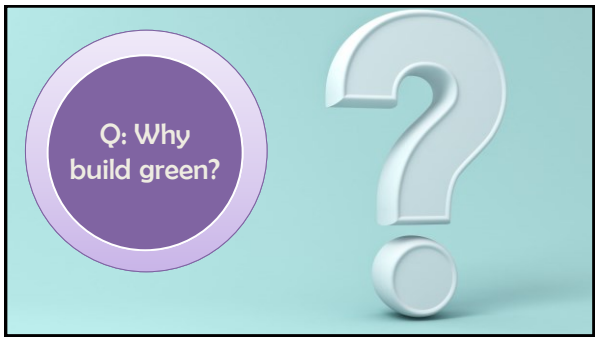


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## Impact of Buildings

IN THE UNITED STATES, BUILDINGS ACCOUNT FOR:

**SOCIAL**

We spend an average of **90%** of our time indoors

**7.36 million** jobs in the construction industry in 2014

**ECONOMIC**

**$531 billion** in annual revenue in the building industry.

**30%** of buildings suffer from sick building syndrome negatively affecting occupants' health and productivity

**ENVIRONMENTAL**

**40%** of total energy use
**72%** of electricity use
**38%** of greenhouse gas emissions
**40%** of raw materials use
**40%** of waste output/136 million tons annually
**14%** of potable water consumption

20


21

## GREEN BUILDINGS QUESTIONS

Q: How are Green Buildings Different and How do I start designing green buildings?

Q: How much does it cost to build green?

Q: How do I measure or verify if a building is green?

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## How are Green Buildings Different?

Traditional Building Process

*Team members working in isolation*

- Design Phase
- Construction Documents
- Bidding process
- Construction Phase
- Commissioning & turnover
- Occupancy

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## Green Building Process

*Integrated project delivery (IPD)*

- Pre-design
- Design
- Construction Documents
- Bidding process
- Construction Phase
- Commission the building
- Occupancy & Recommissioning

24

## Cost of Building Green

"In the most comprehensive analysis of the financial costs and benefits of green building conducted to date, this report finds that an upfront investment of less than **two percent of construction costs yields life cycle savings of over ten times the initial investment.** For example, an initial upfront investment of up to $100,000 to incorporate green building features into a $5 million project would result in a savings of at least $1 million over the life of the building, assumed conservatively to be 20 years."

-The Cost and Finical Benefits of Green Buildings, a report by Capital E

RETURN ON INVESTMENT 900%

**0.7%-6.5%** the average cost increase of green offices and schools

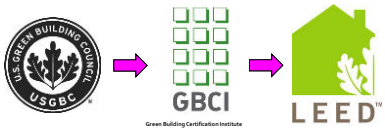
25

## How many stars does your car have?


Parent Organization | Testing and Verification Branch | Rating System

26

## USGBC & LEED Rating System


Parent Organization | Testing and Verification Branch | Rating System

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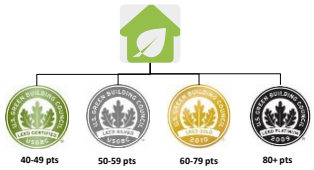
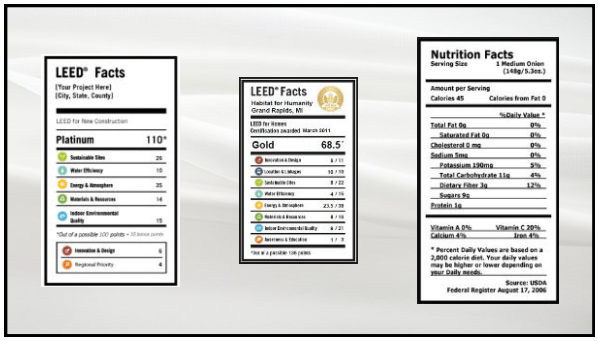
## 4 Levels of LEED Certification




MORE SUSTAINABLE

28

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## Green Buildings Categories


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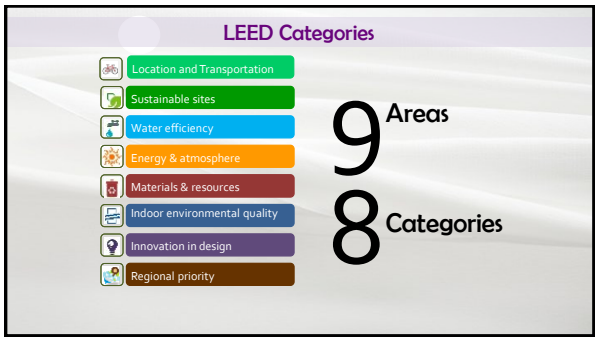


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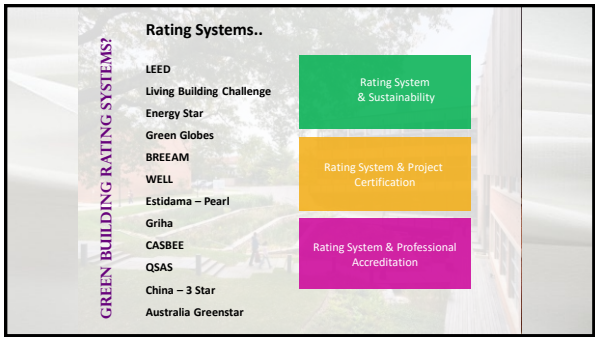


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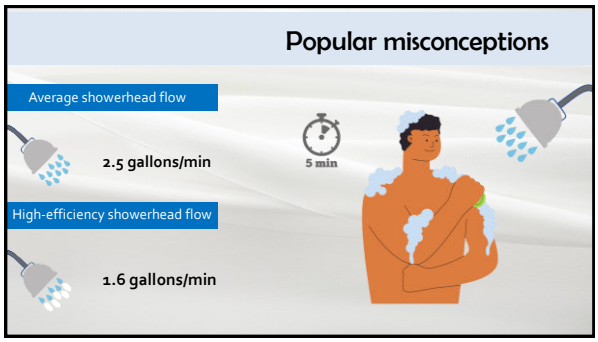


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## Popular misconceptions

### Water Savings

1 Day 4.5 gallons/person/day

1 Year 6,570 gallons/person


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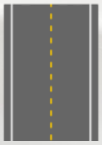
## Popular misconceptions

### Retrofitting with water efficient fixtures



1/100 American homes

*prevents*

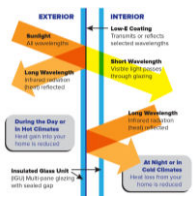
80,000 tons GHG emissions

*removes*

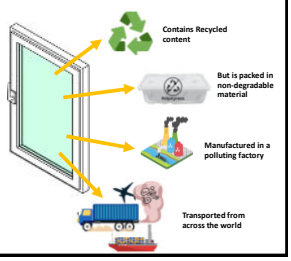
15,000 cars from road for a year

35

**A New window would be green if -**




**Recycled window may not necessarily be green if -**

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## Popular Misconceptions

- ✓ LEED only certifies buildings - True
- ✓ LEED certifies products - False
- ✓ Energy Star certifies buildings and products - True


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CASE STUDY

## Holistic and Integrative Design Approach

Dockside Green , Victoria, British Columbia
15-acre mixed-use community
https://docksidebybosa.com/

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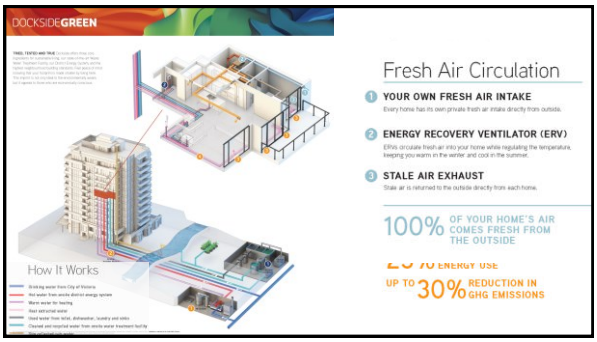


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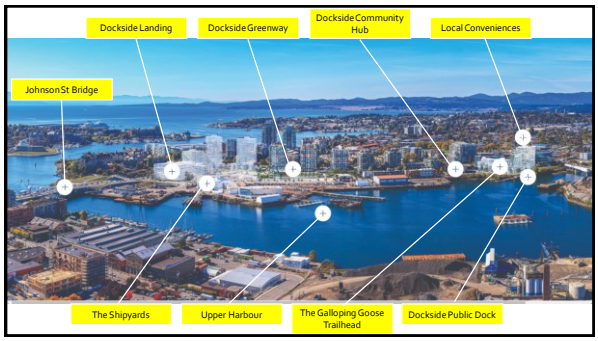


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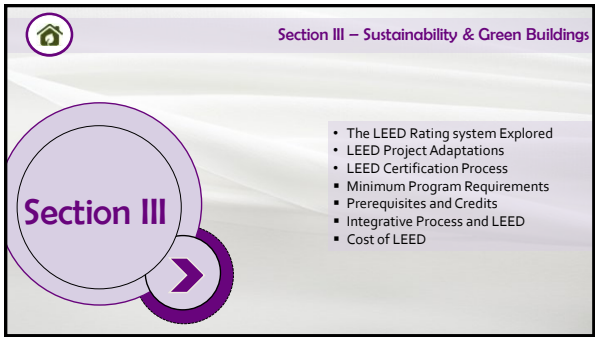


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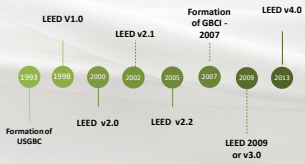
## History of LEED

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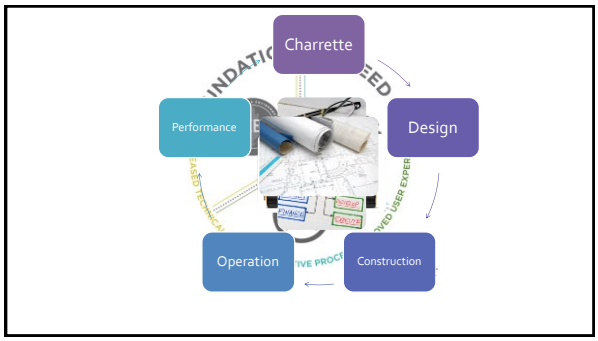
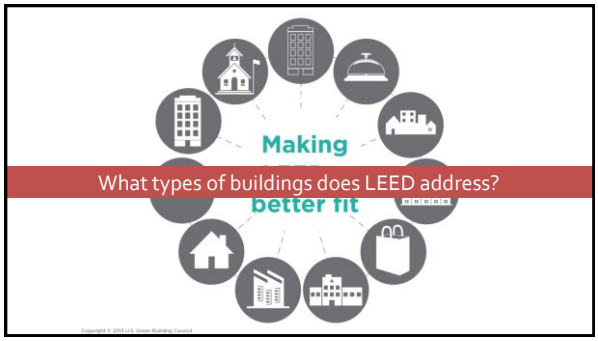
## LEED V4 SYSTEM GOALS

- Reduce contribution to **global climate change**
- Enhance individual **human health**
- Project and restore **water resources**
- Protect and enhance **biodiversity and ecosystem services**
- Promote **sustainable and regenerative** material cycles
- Build a **green economy**
- Enhance **community quality of life**

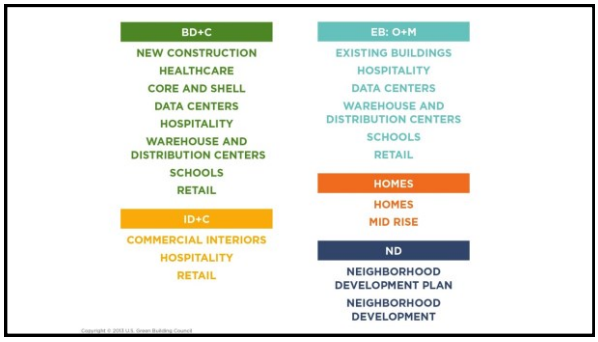
45


Charrette
Performance
Design
Operation
Construction

46


Making
What types of buildings does LEED address?
better fit

47


BD+C
NEW CONSTRUCTION
HEALTHCARE
CORE AND SHELL
DATA CENTERS
HOSPITALITY
WAREHOUSE AND DISTRIBUTION CENTERS
SCHOOLS
RETAIL
ID+C
COMMERCIAL INTERIORS
HOSPITALITY
RETAIL
EB: O+M
EXISTING BUILDINGS
HOSPITALITY
DATA CENTERS
WAREHOUSE AND DISTRIBUTION CENTERS
SCHOOLS
RETAIL
HOMES
HOMES
MID RISE
ND
NEIGHBORHOOD DEVELOPMENT PLAN
NEIGHBORHOOD DEVELOPMENT

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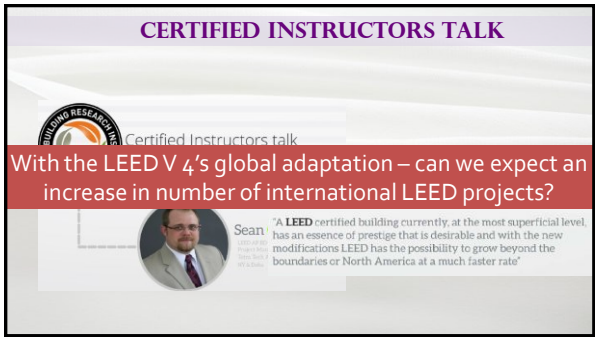
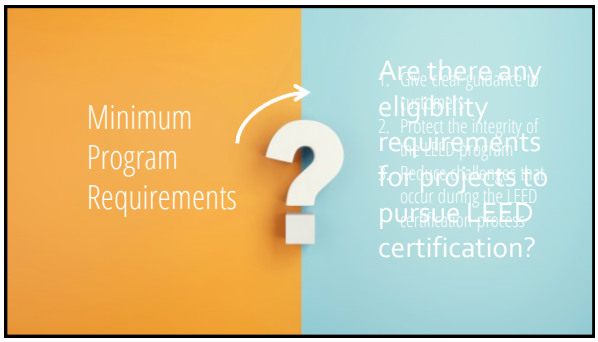
The full ranking for 2021:
Top 10 Countries and Regions for LEED in 2021
Rank
Country
Project count
Square Feet
Square Meters
1
Mainland China
1,077
152,325,125.75
14,151,480.95
2
Canada
205
34,530,920.95
3,208,030.63
3
India
148
30,337,364.12
2,818,436.08
4
Republic of Korea
42
16,768,269.12
1,557,824.68
5
Spain
100
16,107,160.54
1,496,400.05
6
United Arab Emirates
73
13,730,832.39
1,275,916.01
7
Brazil
69
13,366,770.03
1,241,813.33
8
Italy
106
12,543,738.44
1,165,352.56
9
Mexico
47
10,285,729.57
955,576.47
10
Taiwan, China
31
9,610,970.92
893,088.21

49


CERTIFIED INSTRUCTORS TALK
Certified Instructors talk
With the LEED V 4's global adaptation – can we expect an increase in number of international LEED projects?
Sean
"A LEED certified building currently, at the most superficial level, has an essence of prestige that is desirable and with the new modifications LEED has the possibility to grow beyond the boundaries or North America at a much faster rate"

50


Minimum Program Requirements
Are there any eligibility requirements for projects to pursue LEED certification?

51

## 1. Must be in a permanent location on existing land

### Intent

Since LEED credits are dependent on the project's location, it is critical to evaluate projects as permanent structures.

### Criteria

- All projects must be constructed and operated in a permanent location on existing land.
- No project that is designed to move at any point in its lifetime may pursue LEED certification.
- Applies to all land within the LEED project.

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## 2. Must use reasonable LEED boundaries

### Intent

Defining a reasonable LEED boundary ensures that project is accurately evaluated.

### Criteria

- The LEED boundary must include all contiguous land that is associated with the project and supports its operations.
- The boundary may not unreasonably exclude portions of the building, space, or site to give the project an advantage.
- Project team must clearly communicate the project boundary and distinguish it from non-certifying spaces.

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## 3. Must comply with project size requirements

### Intent

LEED requirements do not accurately assess the performance of projects outside of these size requirements.

### Criteria

LEED BD+C: minimum 1,000 square feet of gross floor area

LEED O+M: minimum 1,000 square feet of gross floor area

LEED ID+C: minimum 250 square feet of gross floor area

LEED for Homes: defined as a "dwelling unit" by all applicable codes

LEED for ND: at least 2 habitable buildings, no larger than 1500 acres

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## LEED Certification Process

- Registration
- Application
- Preliminary review
- Prelim review response
- Final review
- Accept or appeal
- Appeal review
- Certification/ denial

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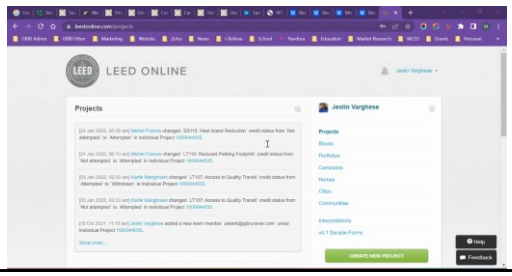
## LEED Online

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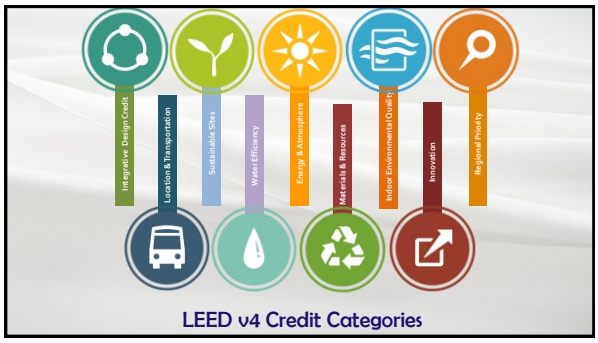


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## LEED Certification for buildings

### Credits

- The phrase 'credit' means a non-mandatory project characteristic, measurement, quality, value or function as identified within a LEED rating system. Credits represent particular facets of sustainable design that contributes to overall green building performance.
- No single credit is mandatory, credits are selected and pursued at the options of a LEED project team.
- Each credit for the rating system include information on:

| | |
|---|---|
| INTENTS | REFERENCE STANDARDS |
| STRATEGIES | IMPLEMENTATION IDEAS & STRATEGIES |
| REQUIREMENTS | TIMELINE AND TEAM INFORMATION |
| ENVIRONMENTAL & ECONOMIC ISSUES | CALCULATION |
| RELATED CREDITS | DOCUMENTATION |
| EXEMPLARY PERFORMANCE | |

*Local, state, and federal rules **ALWAYS** take precedent over LEED requirements and referenced LEED standards. If a LEED Credit says 'do X' first review any relevant laws, codes, local ordinances, and statutes to make sure there isn't a conflict.*

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## LEED Certification for buildings

### Pre-requisites

- The term 'prerequisite' refers to a mandatory project characteristic. Measurement, quality, value or function as identified within the LEED rating system.
- Prerequisites represent that key criteria that define green building performance.
- Failure to meet any prerequisite will render a project ineligible for certification.

Examples

- SUSTAINABLE SITE PREREQUISITE 1 – CREATE A CONSTRUCTION ACTIVITY POLLUTION PREVENTION PLAN
- WATER EFFICIENCY PREREQUISITE 1 – REDUCE OVERALL WATER CONSUMPTION BY 20% (COMPARED TO BASELINE)
- ENERGY & ATMOSPHERE PREREQUISITE 3- ZERO USE OF CFC-BASED REFRIGERANTS
- MATERIALS AND RESOURCES PREREQUISITE- COLLECT AND STORE RECYCLABLES
- INDOOR ENVIRONMENTAL QUALITY 1- PROHIBIT SMOKING

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## Design Vs. Construction Credits

Also called Designer Responsible Credits

Also called Contractor Responsible Credits

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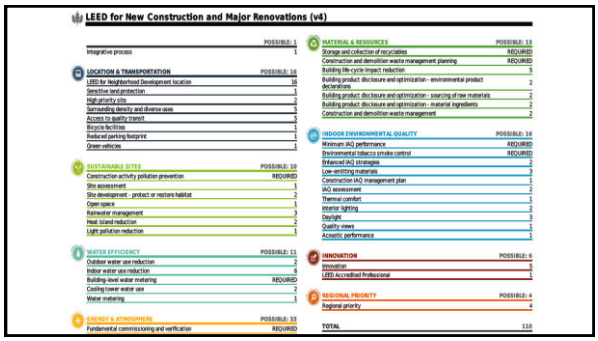

**LEED for New Construction and Major Renovations (v4)**

| | POSSIBLE: 1 |
|---|---|
| Integrative process | 1 |

| LOCATION & TRANSPORTATION | POSSIBLE: 16 |
|---|---|
| LEED for Neighborhood Development location | 16 |
| Sensitive land protection | 1 |
| High-priority site | 2 |
| Surrounding density and diverse uses | 5 |
| Access to quality transit | 5 |
| Bicycle facilities | 1 |
| Reduced parking footprint | 1 |
| Green vehicles | 1 |

| SUSTAINABLE SITES | POSSIBLE: 10 |
|---|---|
| Construction activity pollution prevention | REQUIRED |
| Site assessment | 1 |
| Site development - protect or restore habitat | 2 |
| Open space | 1 |
| Rainwater management | 3 |
| Heat island reduction | 2 |
| Light pollution reduction | 1 |

| WATER EFFICIENCY | POSSIBLE: 11 |
|---|---|
| Outdoor water use reduction | 2 |
| Indoor water use reduction | 6 |
| Building-level water metering | REQUIRED |
| Cooling tower water use | 2 |
| Water metering | 1 |

| ENERGY & ATMOSPHERE | POSSIBLE: 33 |
|---|---|
| Fundamental commissioning and verification | REQUIRED |

| MATERIAL & RESOURCES | POSSIBLE: 13 |
|---|---|
| Storage and collection of recyclables | REQUIRED |
| Construction and demolition waste management planning | REQUIRED |
| Building life-cycle impact reduction | 5 |
| Building product disclosure and optimization - environmental product declarations | 2 |
| Building product disclosure and optimization - sourcing of raw materials | 2 |
| Building product disclosure and optimization - material ingredients | 2 |
| Construction and demolition waste management | 2 |

| INDOOR ENVIRONMENTAL QUALITY | POSSIBLE: 16 |
|---|---|
| Minimum IAQ performance | REQUIRED |
| Environmental tobacco smoke control | REQUIRED |
| Enhanced IAQ strategies | 2 |
| Low-emitting materials | 3 |
| Construction IAQ management plan | 1 |
| IAQ assessment | 2 |
| Thermal comfort | 1 |
| Interior lighting | 2 |
| Daylight | 3 |
| Quality views | 1 |
| Acoustic performance | 1 |

| INNOVATION | POSSIBLE: 6 |
|---|---|
| Innovation | 5 |
| LEED Accredited Professional | 1 |

| REGIONAL PRIORITY | POSSIBLE: 4 |
|---|---|
| Regional priority | 4 |

| TOTAL | 110 |
|---|---|

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## Credit Interpretation Requests

CIRs are used to clarify a single question the project team may have and can be submitted any time after project registration.

Often the reference guide will not specifically address the issues at hand and more information is needed. To address these issues, GBCI has created the CIR process.

USGBC company members, LEED registered project team members, and workshop attendees have access to view CIRs.

CIR rulings do not affect the existing requirements of credits within the rating system.

No credit or points are awarded by the CIR process

The project team must still demonstrate credit compliance in order to achieve the credit

$220 = cost of submitting a CIR

600 words = limit of CIR

Rulings = 2-5 weeks

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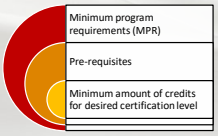
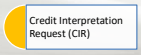
## Credits, Prerequisites & CIRs

Projects must satisfy three requirements for certification:




In the event clarification is needed on a credit:

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| | | |
|---|---|---|
| $1200 ($900) | $0.055/sf ($0.045/sf) | $10,000 |
| Project Registration | Projects bigger than 50,000 square feet | Expedited Review |
| $4,250 ($3250) | $5,000 (10-12 days) | Complex credit $800 (All other credits - $500) |
| Pre-certification | Expedited Fees for Pre-certification | Appeals |
| $2750 ($2250) | $1,000 (10-12 days) | $220 (per credit) |
| Project Certification | Expedited Fees for Certification | Project CIRs |

Review takes 20-25 business days. Expedited reviews available – 10-12 days

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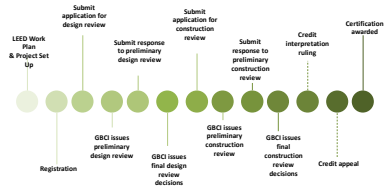


LEED Certification Process

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PROJECT UNDER CONSTRUCTION
Can a project currently under construction pursue LEED certification?

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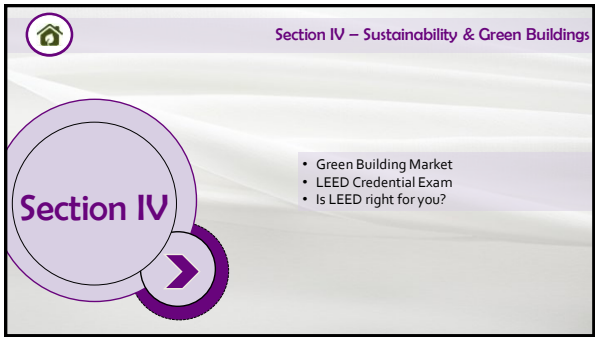
Section IV – Sustainability & Green Buildings
Section IV
• Green Building Market
• LEED Credential Exam
• Is LEED right for you?

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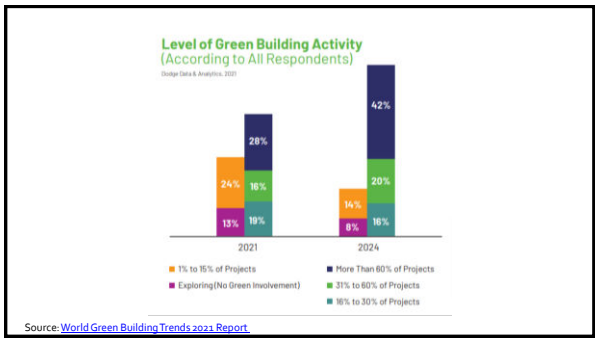
Level of Green Building Activity
(According to All Respondents)
28%
24%
16%
13%
19%
42%
14%
20%
8%
16%
2021
2024
1% to 15% of Projects
Exploring(No Green Involvement)
More Than 60% of Projects
31% to 60% of Projects
16% to 30% of Projects
Source: World Green Building Trends 2021 Report

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## So What's Driving Green Building?

**Financial Benefits of Building Green, Compared With Traditional Buildings**

| | New Green Buildings | Green Renovation/Retrofit |
|---|---|---|
| Average Reduction in Operating Costs in Next 12 Months | 10.5% | 11.5% |
| Average Reduction in Operating Costs in Next 5 Years | 16.9% | 17% |
| Average Increase in Asset Value (According to Owners/Investors) | 9.2% | 9.1% |

**Top Triggers for Increasing Green Building Selected by One Quarter or More Respondents**

| Owners/Investors | Architects/Engineers/Contractors |
|---|---|
| 1. Lower Operating Costs | 1. Client Demands |
| 2. Right Thing to Do | 2. Environmental Regulations |
| 3. Healthier Buildings | 3. Right Thing to Do |
| 4. Internal Corporate Commitment | 4. Healthier Buildings |
| 5. Environmental Regulations | 5. Lower Operating Costs |

**Most Important Business Benefits of Green Building**


Source: World Green Building Trends 2021 Report

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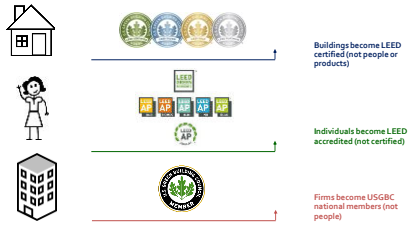
## About the LEED Rating System

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## WHO IS LEED® ACCREDITATION FOR?

The LEED AP® credential designates an advanced knowledge of a specific LEED® rating system. The LEED AP® exams *require specific knowledge of each prerequisite and credit in a particular rating system*


*Anyone interested in a career in sustainability and Green buildings will benefit from a LEED credential*

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## LEED GREEN ASSOCIATE ELIGIBILITY

There are *no eligibility requirements* to take the LEED GA exam; however, exposure to LEED and green building concepts through education, volunteering or work experience is recommended.

- Must be 18 years of age or older
- Must agree to GBCI's exam policy

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## Registering for the Exam

**Login**
- to your Credentials account via the USGBC® site

**Verify**
- that the name you enter in matches the name on the ID you will present at the testing center.

**Select**
- the Green Associate credential exam and follow the instructions for the application

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你好

hola

olá

مرحبا

bonjour


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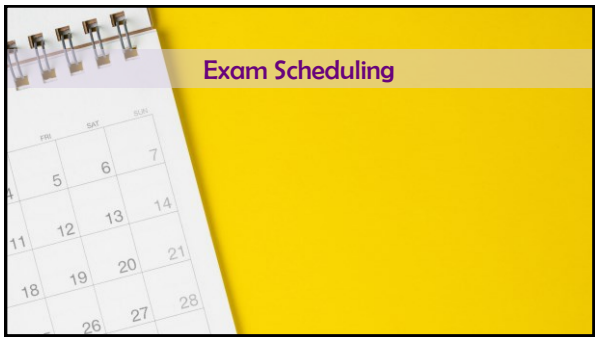
Exam Scheduling

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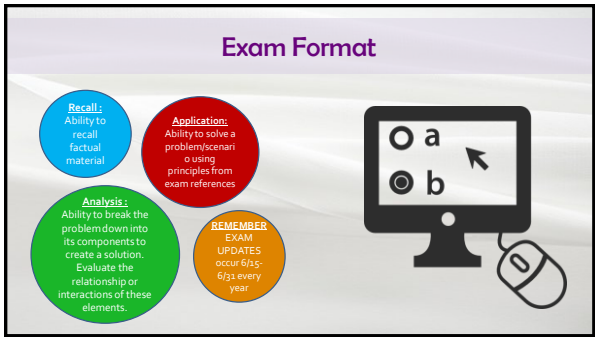
Exam Format
Recall :
Ability to recall factual material
Application:
Ability to solve a problem/scenari o using principles from exam references
Analysis :
Ability to break the problem down into its components to create a solution. Evaluate the relationship or interactions of these elements.
REMEMBER
EXAM UPDATES occur 6/15-6/31 every year
a
b

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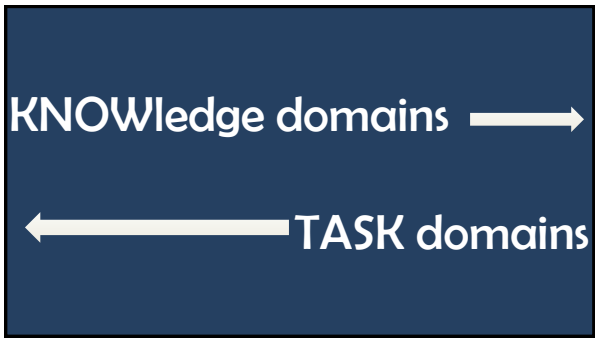
KNOWledge domains
TASK domains

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## LEED Green Associate Knowledge Domains

- LEED Process (16 Questions)
- Integrative Strategies (8 Questions)
- Location & Transportation (7 Questions)
- Sustainable Sites (7 Questions)
- Water Efficiency (9 Questions)
- Energy & Atmosphere (10 Questions)
- Materials & Resources (9 Questions)
- Indoor Environmental Quality (8 Questions)
- Project Surroundings & Public Outreach (11 Questions)

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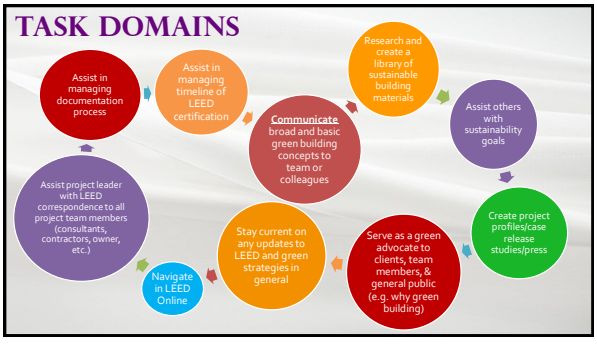
## TASK DOMAINS

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## At the Exam

**IDENTIFICATION REQUIREMENTS**
Candidates must provide valid, unexpired ID with a signature, a photograph that looks like the candidate, and an expiration date.

**EXAMPLES**
1 Non-Expired Government-issued photo ID with signature
1 Non-Expired Credit card photo ID with signature
1 Non-Expired photo ID without signature plus 1 credit card with signature—first and last names must match on both

Examples of acceptable forms of Non-Expired photo ID:
Driver's license , Passport, Military ID
Alien ID/Resident Alien Card*

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## After the Exam


**EXAM SCORE**

Exams are scored between 125 and 200. You need a score of 170+ to pass.

Your score will appear on the screen after your exam is finished.

**CERTIFICATES**

Once your exam results have been processed, you can request your certificate. Certificates are available in two forms: PDF softcopy (available for download at any time for free) and a hardcopy (see website for pricing).

**DESIGNATING YOUR CREDENTIAL**

As soon as you have passed the exam, you can use the title "LEED Green Associate" or the logo.

**CREDENTIAL MAINTENANCE PROGRAM**

LEED Green Associates must complete 15 continuing education (CE) hours.

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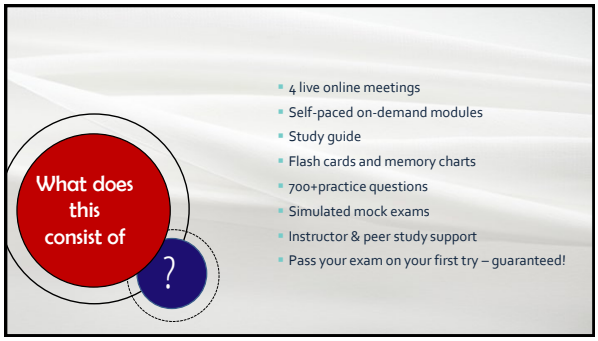


- 4 live online meetings
- Self-paced on-demand modules
- Study guide
- Flash cards and memory charts
- 700+practice questions
- Simulated mock exams
- Instructor & peer study support
- Pass your exam on your first try – guaranteed!

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## INSIDER KNOWLEDGE

- You DO NOT need to know how many exact points a credit can earn.
- You DO need to know how many points your project has to earn to become certified, LEED silver, LEED gold & LEED platinum.
- You DO need to be familiar with the key terms listed in your flash cards.
- You DO need to be familiar with credits across all rating systems.

EDUCATION PARTNER

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## MEMORIZATION METHODS

USE ACRONYMS

TAKE ADVANTAGE OF GBRI FLASH CARDS AND MEMORIZATION CHARTS

READ, WATCH & LISTEN. THEN REPEAT.

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## TIPS AND TRICKS

LEARN YOUR TERMS AND DEFINITIONS FIRST

BUILD YOUR FOUNDATION IN GREEN BUILDING BASICS

TAKE MORE THAN ONE PRACTICE EXAM. ONCE YOU CONSISTENTLY MAKE AN 80-90% YOU ARE READY TO TAKE YOUR LEED GA TEST.

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## LEED Green Associate Roadmap

| Week 1 | Week 2 | Week 3 | Week 4 |
|---|---|---|---|
| ✓ Watch Intro to Sustainability, LEED Green Associate Overview - Online Modules | ❑ Watch LEED Process, Integrative Strategies - Online Modules | ❑ Watch LT, SS & WE Online Modules | ❑ Watch EA, MR IEQ, Innovation & RP Online Modules |
| ❑ Study Key Term Flash Cards and review Study Guide | ❑ Study Key Term Flash Cards and review Study Guide | ❑ Study Key Term Flash Cards and review Study Guide | ❑ Study Key Term Flash Cards and review Study Guide |
| ❑ Read Appendices A&B in your study guide | ❑ Read Appendices A, & B in your study guide | ❑ Read Appendices C, D & E in your study guide | ❑ Read Appendices F, G, H & I in your study guide |
| ❑ Register online at USGBC.org | ❑ Study LT, SS & WE credits using flash cards | ❑ Study EA & MR credits using flash cards | ❑ Study EA & MR credits using flash cards |
| ❑ Schedule your LEED GA Exam | ❑ Complete LT, SS & WE Practice Questions | ❑ Complete EA & MR Practice Questions | ❑ Complete EA & MR Practice Questions & Mock Exams |

*Successfully complete section practice questions before moving on to the next weeks tasks.

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