



Welcome to the Highway Materials Engineering Course (HMEC) Module A, Lesson 1: Introduction. This brief introductory lesson will provide you with an overview of how the HMEC's Web-based training works, including how to access different tools provided exclusively in the Web-based lessons and how to get the most out of your learning experience. We will also review a couple of interactivity examples and explain some of the different icons that you will encounter throughout the course.

Let's get started! Advance to the next screen by selecting the forward arrow in the lower right-hand corner of the screen.

Welcome to the Highway Materials Engineering Course!



- We appreciate the high caliber of participants and are honored by your dedication to furthering your knowledge of highway materials



 U.S. Department of Transportation
Federal Highway Administration

MODULE A
LESSON 1

INTRODUCTION TO WEB-BASED
TRAINING (WBT)

Resources
Glossary
Help



We at the Federal Highway Administration (FHWA) are excited that we have such a high caliber of participants involved in the Highway Materials Engineering Course this year. We understand that this is an immense commitment of your time and talent, and are honored by your dedication to furthering your knowledge of highway materials.

As we explained during the orientation, this experience will help to broaden your knowledge of highway materials, expand your professional network, and provide new and exciting professional experiences.

Again, congratulations on your participation in the Highway Materials Engineering Course. We are very excited to have you.

Next, we will take a look at what we will cover in this lesson. Select the forward arrow to advance to the next screen.

Image description: Collage of transportation engineers and technicians in different settings.

The screenshot shows a slide titled "Learning Outcomes" with a blue header bar. In the top right corner, there is a circular logo with the letters "HME" and a stylized road icon. Below the title, the text reads "In this lesson, we will cover:" followed by a bulleted list of four items. At the bottom of the slide, there is a light blue box with a clock icon and the text "This lesson will take approximately 15 minutes to complete." The footer of the slide is a dark blue bar containing the U.S. Department of Transportation Federal Highway Administration logo, the text "MODULE A LESSON 1", "INTRODUCTION TO WEB-BASED TRAINING (WBT)", "Resources Glossary Help", and two navigation arrows (left and right).

Learning Outcomes

In this lesson, we will cover:

- Basic Web-based training (WBT) navigation
- Resources and tools available specifically in the Web-based lessons
- Different types of interactions and how to use them
- Various icons that you will encounter and what they mean

This lesson will take approximately 15 minutes to complete.

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← →

Each Web-based lesson contains a lesson introduction slide. This slide will state the lesson learning outcomes as well as the estimated lesson duration.

In this lesson, we will cover:

- Basic Web-based training (WBT) navigation;
- Resources and tools available specifically in the Web-based lessons;
- Different types of interactions and how to use them; and
- Various icons that you will encounter and what they mean.

This lesson will take approximately 15 minutes to complete.

Advance to the next screen to learn the different ways to navigate this Web-based training.

The screenshot shows a web-based training interface. At the top, it says "Web-based Training Navigation" and "HME". The main content area is titled "Definition of Quality" and lists three bullet points: "Quality:", "Customer satisfaction", "Meets requirements", and "Level of 'goodness'". To the right of the text is a stack of books. Below the text, it says "Select each term to learn more." On the right side, there is a sidebar with tabs for "Outline", "Narration", and "Search". The "Outline" tab is active, showing a list of text describing the concept of quality. At the bottom, there is a navigation bar with "U.S. Department of Transportation Federal Highway Administration", "MODULE A LESSON 2", "INTRODUCTION TO QUALITY ASSURANCE PROGRAMS", "Resources Glossary Help", and navigation arrows. A second navigation bar at the very bottom shows "MODULE A LESSON 1", "INTRODUCTION TO WEB-BASED TRAINING (WBT)", and "Resources Glossary Help".

First, let us review basic navigation. To get to this screen, you have been using the forward arrow in the lower right-hand corner of the screen. Each screen also contains a back arrow in case you want to review a screen you completed previously. These arrows allow you to move forward and backward by only one screen at a time.

If you want to jump to a specific screen, you can use the Outline tab to display a list of all of the screens in the lesson. Then, you can select any screen in the list to go directly to that screen. You can also search the lesson using a keyword by selecting the Search tab and entering a keyword into the search box. Select the magnifying glass button after you have entered your search term and you will see a list of all screens containing the word you searched for. Select the Narration tab to display the narration text. The Narration tab is open by default in each Web-based lesson.

If you do not see the Outline, Narration, and Search tabs, and your screen looks like this, you may have them minimized. Select the movie camera icon to expand the window and open the tabs.

Image description: Example lesson screen.

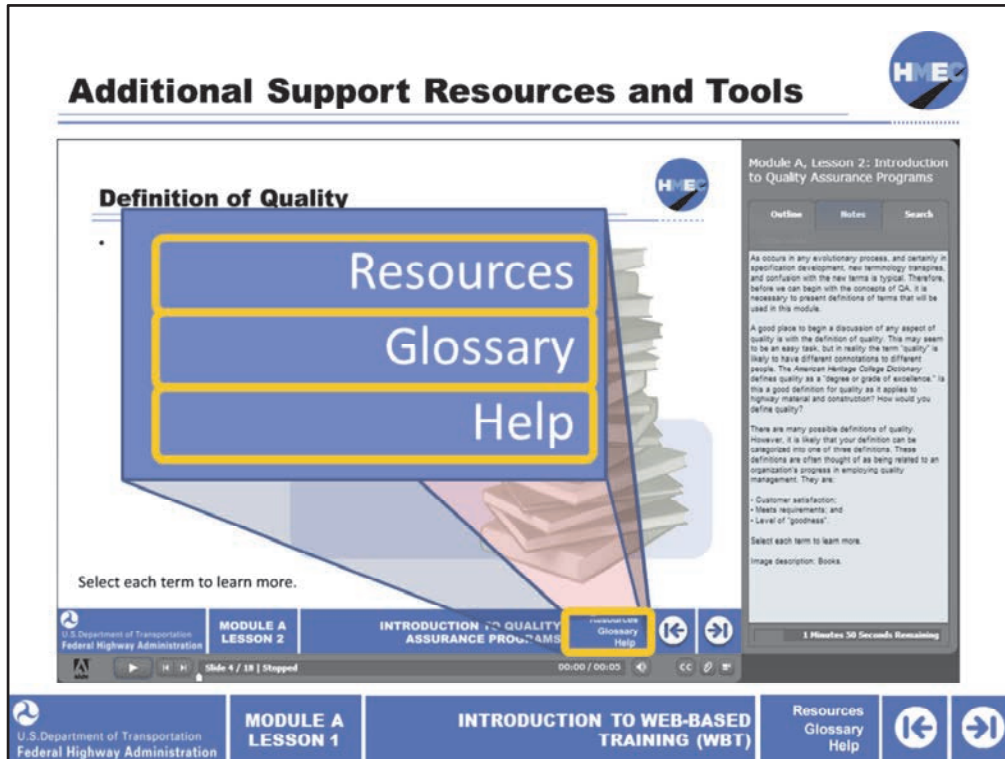


A printable lesson is available for each Web-based lesson. You can download the PDF for the lesson you have open.

To download the lesson PDF, first select the paperclip icon below the forward and back arrows. A pop-up window will open that contains the lesson PDF. Select the lesson PDF in the pop-up window. A new window will open with a link to download the PDF file. Select the Click to Download hyperlink to download the PDF to your computer. From there, you can save, open, and print the PDF from your computer.

Next, we will review the resources and tools available in each Web-based lesson.

Image description: Screenshot of Click to Download PDF pop-up window.

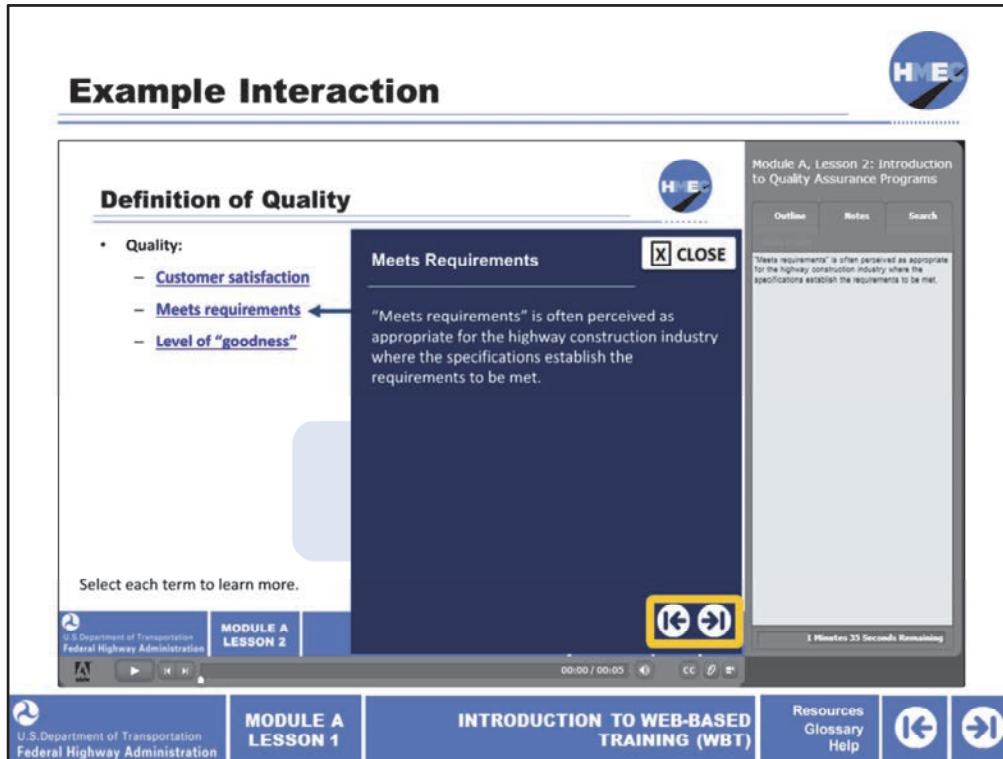


Each Web-based lesson contains links to resources, a glossary of terms, and online help or technical assistance. These additional materials may be helpful to you as you complete the lesson.

Another tool you will likely use is automatic bookmarking. If at any time you need to close the lesson, the system will automatically bookmark where you are. When you return to the curriculum to launch the lesson again, the lesson will open where you left off.

Next, let us talk about interactions. Some slides contain what we call interactions, which are words, pictures, or other objects on the screen that you can select—or interact with—to reveal additional content. We will look at some examples of interactions now so that you get an idea of how they work and how you can navigate them.

Image description: Screenshot of the location of the Resources, Glossary, and Help links.



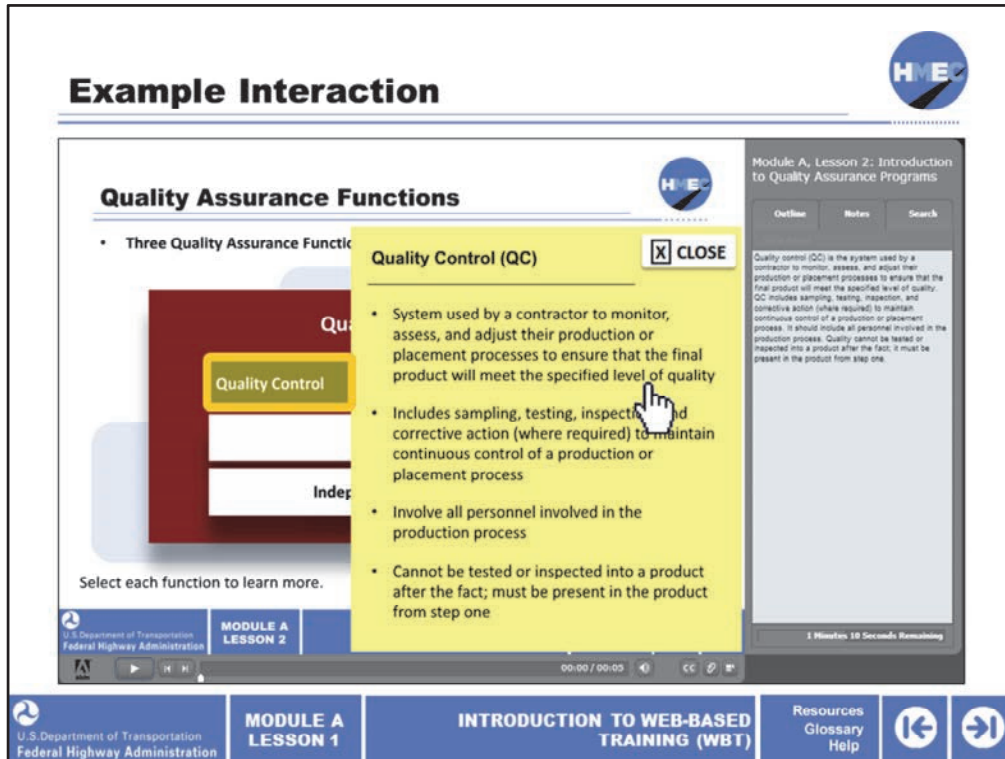
This screen contains an interaction. You can select one of the three quality terms to reveal its definition. Notice that there are directions on the bottom of the screen that explain what to do in this interaction.

When you select a term, a pop-up box opens that reveals that term's definition. Once you have reviewed the content in the pop up, you can close the pop-up window and either select another term, or, once you have reviewed all of the content on the screen, advance to the next screen.

In some cases, there may be additional content that can be accessed by selecting the back and continue buttons on the bottom of the pop-up window.

Let us review another interaction.

Image description: Example interaction screen.

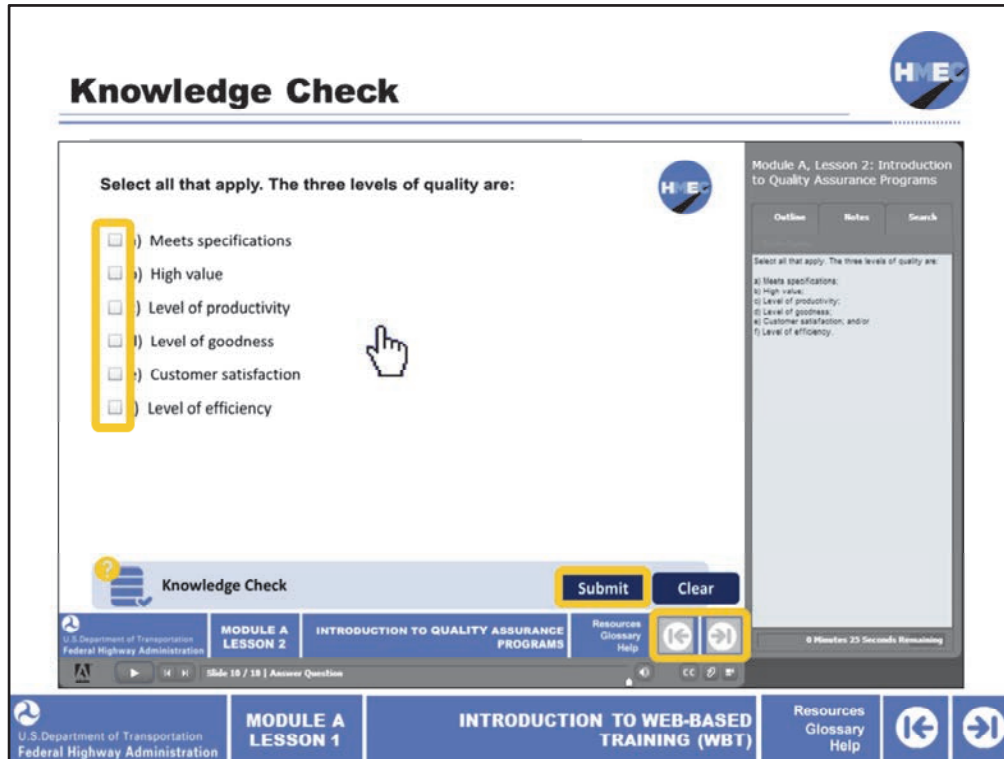


This interaction contains three boxes that you can select. Each box contains one of the quality assurance functions. Again, notice that the directions at the bottom of the screen explain what you need to do. When you select a box, a pop-up window appears that contains additional content.

Similar to the last interaction we looked at, once you have reviewed the content in the pop up, you can close the pop-up window and either select another term, or, once you have reviewed all of the content on the screen, advance to the next screen.

Now that you have a feel for some of the interactions you will see in the training, let us take a look at another type of screen: knowledge checks.

Image description: Example interaction screen.



This is an example of a knowledge check. Knowledge checks are provided in each lesson and help you check your understanding of the material. Knowledge checks are graded, which means that there is a correct answer, but not scored, which means that you do not need to answer the knowledge checks correctly to pass or complete the lesson. As we explained during the orientation, you complete a lesson by reviewing all of the content in the lesson.

There are several different kinds of knowledge checks: multiple-choice questions with multiple correct answers, multiple-choice questions with only one correct answer, matching questions, sequencing questions, and true/false questions.

This example shows a knowledge check with multiple correct answers. To complete the knowledge check, you would select all correct answers and then select the Submit button. Notice that the forward and back arrows are grayed out. After you select the Submit button, you will receive feedback on your answer.

Each knowledge check is followed by a knowledge check debrief slide. Let us review that screen next.

Image description: Example of a knowledge check screen.

The image shows a screenshot of a training slide titled "Knowledge Check Debrief". At the top right is the HME logo. The main content area contains the question: "Select all that apply. The three levels of quality are:". Below the question is a list of six options: a) Meets specifications, b) High value, c) Level of productivity, d) Level of goodness, e) Customer satisfaction, and f) Level of efficiency. A yellow rectangular box highlights options a, d, and e. To the right of the question is a sidebar with the HME logo and the text "Module A, Lesson 2: Introduction to Quality Assurance Programs". Below this text are tabs for "Outline", "Notes", and "Search". The "Notes" tab is active, showing the text: "The three components of quality are: a) Meets specifications, d) Level of goodness, and e) Customer satisfaction." At the bottom of the slide is a navigation bar with the following elements from left to right: U.S. Department of Transportation Federal Highway Administration logo, "MODULE A LESSON 2", "INTRODUCTION TO QUALITY ASSURANCE PROGRAMS", "Resources Glossary Help", and navigation icons. Below this bar is a status bar showing "Slide 11 / 18 | Stopped", "00:00 / 00:05", and "0 Minutes 25 Seconds Remaining". At the very bottom of the slide is another navigation bar with the following elements from left to right: U.S. Department of Transportation Federal Highway Administration logo, "MODULE A LESSON 1", "INTRODUCTION TO WEB-BASED TRAINING (WBT)", "Resources Glossary Help", and navigation icons.

This is a knowledge check debrief. Knowledge check debriefs show the correct answer, or answers, and provide an explanation or additional information about the question as needed.

Now that you have got an idea of how to navigate interactions and knowledge checks, let us review the different icons you will find in the training and the types of information these icons represent.

Image description: Example of a knowledge check debrief slide.

The screenshot displays a web-based training interface. At the top right, there is a logo for 'HME'. The main content area is titled 'Lesson 2 Introduction' and includes a list of learning outcomes:

- Define quality management and key terms related to quality assurance (QA)
- Define the functions of a QA program
- Explain the differences between quality assurance, quality control, and process control

Below the list, a text box states: 'During this lesson, knowledge checks are provided to test your understanding of the material presented.' A yellow-bordered box at the bottom of the main content area contains a clock icon and the text: 'This lesson will take approximately 15 minutes to complete.'

The interface includes a navigation bar at the bottom with the following elements from left to right:

- U.S. Department of Transportation Federal Highway Administration logo
- MODULE A LESSON 1
- INTRODUCTION TO QUALITY ASSURANCE PROGRAMS
- Resources Glossary Help
- Navigation arrows (back and forward)
- 2 Minutes 8 Seconds Remaining

The first icon we will review is the clock or time icon. This icon is always found on the lesson introduction slide and indicates the estimated lesson duration. As explained earlier, each lesson contains a lesson introduction slide that lists the lesson learning outcomes as well as the estimated lesson duration.

Image description: Screenshot with clock icon.

Hyperlink Icon

Quality Control vs Process Control

CIRCULAR 173
Glossary of Transportation Construction Quality Assurance Terms

For these definitions and more select the link to the TRB Glossary (2013):
<http://onlinepubs.trb.org/onlinepubs/circulars/ec173.pdf>

Module A, Lesson 2: Introduction to Quality Assurance Programs

Outline Notes Search

The document contains terms of common usage and accepted practice. The Circular was generated by a subcommittee of the Transportation Research Board's (TRB) Management of Quality Assurance Committee (AFQC).

The purpose of this publication is to provide a reference document for usage of transportation construction QA terminology. It is hoped that this publication will foster improved communications among those who are involved in transportation construction QA.

This publication is divided into four parts: an index, a glossary of transportation construction QA terms, a list of abbreviations and symbols, and a list of references. The major part is the glossary. The terms selected for definition include many terms that frequently are misinterpreted, misunderstood, or are generally confusing. The definitions provided are often more than basic definitions; they attempt to clarify the sources of confusion.

For these definitions and more select the link to the TRB Glossary (2013):
<http://onlinepubs.trb.org/onlinepubs/circulars/ec173.pdf>

0 Minutes 30 Seconds Remaining

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MODULE A
LESSON 2

INTRODUCTION TO QUALITY
ASSURANCE PROGRAMS

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Slide 9 / 18 | Stopped

00:00 / 00:05

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The hyperlink icon indicates that the screen contains a live hyperlink. Selecting this hyperlink will open the hyperlinked Web page or content in a new window.

Image description: Screenshot with hyperlink icon.

Information Icon

Measure the Spread: Range

- Range is the difference between the largest and smallest values

Example 1 3 4 8 5 4 9 **10** 7 8 **2** 6 5 8 4 9

Range (largest minus smallest)
 $R = X_{max} - X_{min}$

Max Min
 Range = 10 - 2 or 8

Example 2 6 6 6 6 6 6 **10** 6 6 **2** 6 6 6 6 6

Range can have useful applications

Max Min
 Range = 10 - 2 or 8

i Since it uses only two values, it does not take into account the other values that may be available for estimating the variability.

Module A Lesson 6

The second parameter necessary to define the population is a measure of spread or variability. One common and simple measure is the range, R . The range is the difference between the largest and smallest values. We used the parameter in Lesson 5 with the frequency table and histogram.

In this slide, we see two data sets that both have 15 values or data points. The first has a series of values with the highest 10 and the lowest 2, but with many different values in between. The range, R , is $10 - 2 = 8$. The second data set has 13 values of 6, and a high value of 10 and a low value of 2, so the range is the same as the first set, 8. But it is obvious that the two data sets are from much different populations. So due to its simplistic nature, the range does not provide the least estimate of the variability. Since it uses only two values, it does not take into account the other values that may be available for estimating the variability. It is therefore not as an efficient use of the data as another measure of variability. As we will see in Lesson 9, Quality Control, the range can have useful applications.

1 Minutes 45 Seconds Remaining

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MODULE A
LESSON 6

ANALYZING DATA

Resources
Glossary
Help

00:08 / 00:08

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Federal Highway Administration

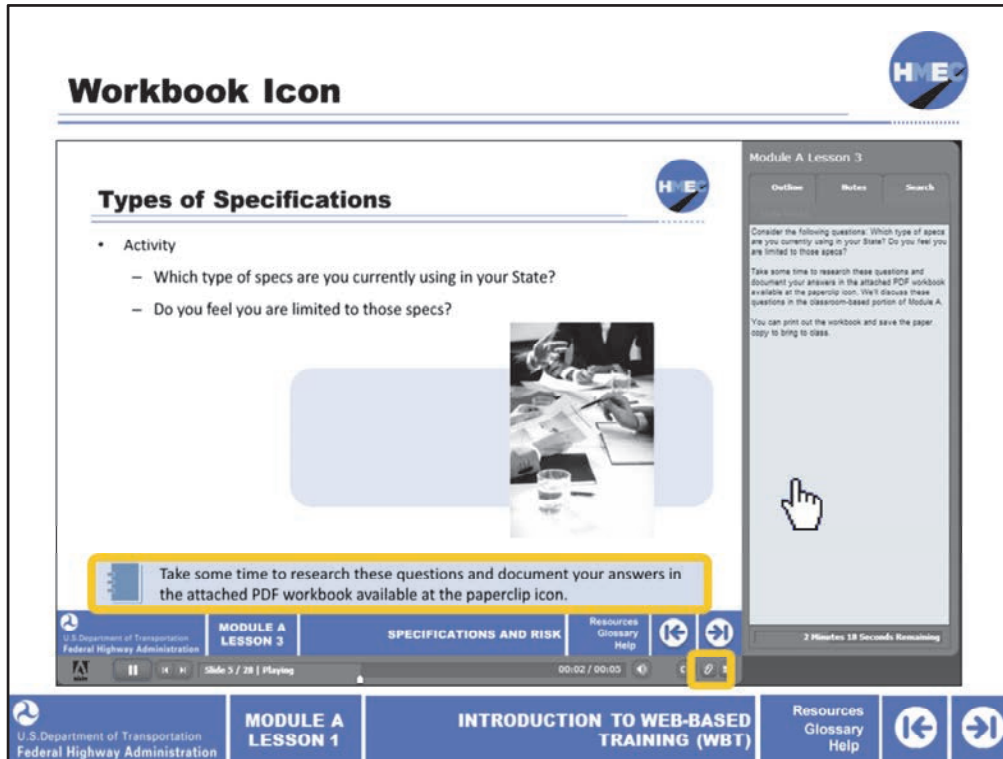
MODULE A
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Help

The information icon is used to emphasize specific content on a screen. You will see this icon when a particularly important or significant piece of information is explained and needs to be called out.

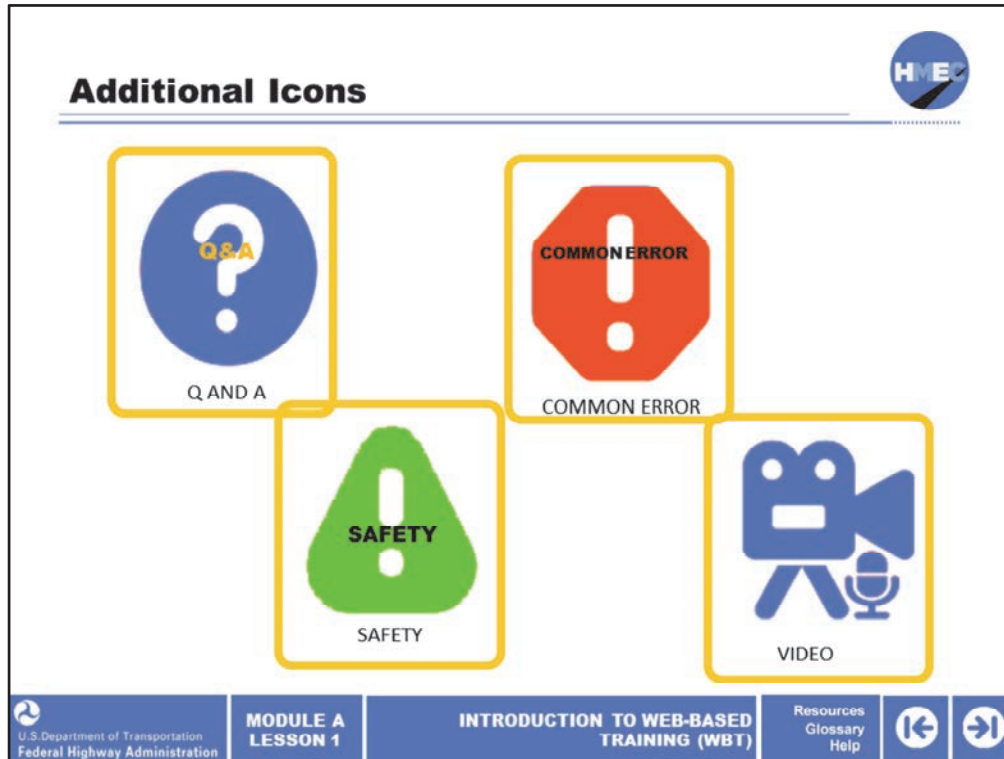
Image description: Screenshot with information icon.



In each Web-based lesson, you will need to print out a companion workbook, which is available from the paperclip icon, just like the lesson PDF we discussed earlier. This workbook contains space and directions for you to complete any offline activities or exercises as directed in the lesson. You will need to bring the companion workbook with you to the classroom part of the module as you will review your findings as a class with the instructor.

The workbook icon is used to signify that there is an activity or exercise on the screen that you should complete in your workbook.

Image description: Screenshot with workbook icon.



This screen presents several additional icons that you will see used throughout the course.

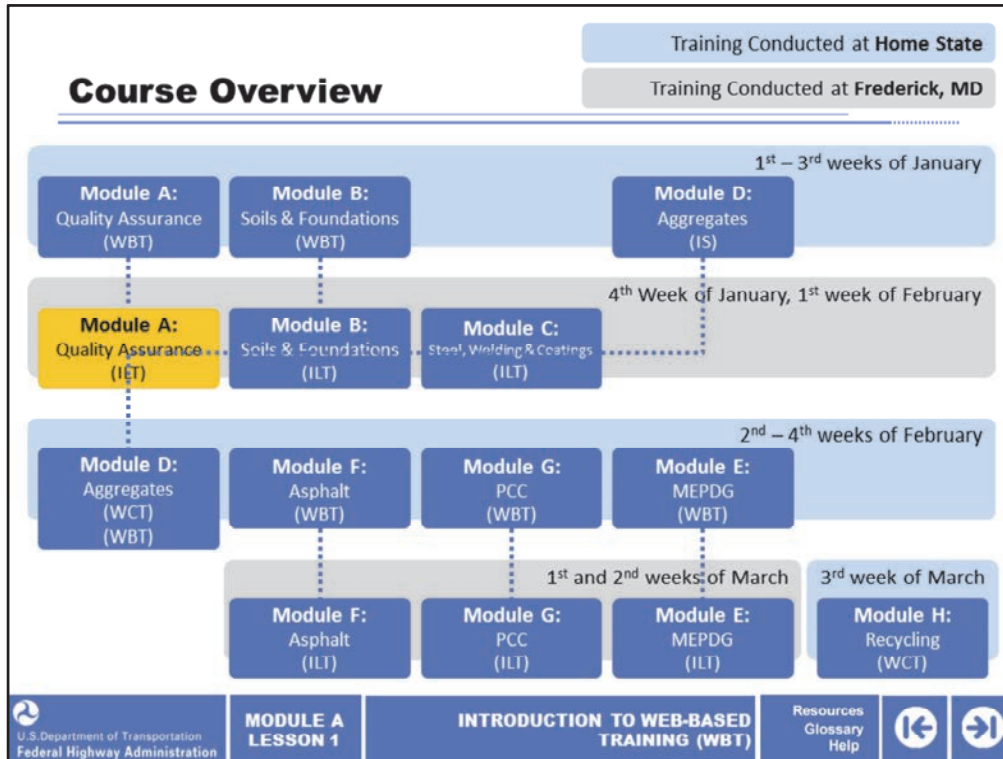
The Q&A icon indicates a thought-provoking question and potential answers for your consideration.

The common error icon is used to call out a frequently encountered error in a process or a procedure. This information can help you avoid this commonly seen error in the future. This may be especially helpful to you in the laboratory portions of the course.

The video icon will bring your attention to an embedded video in the lesson.

The safety icon signifies a safety concern in the content presented. Like the common error icon, safety concerns may be especially helpful in keeping you safe in the laboratory.

Image description: Q & A icon, safety icon, common error icon, and video icon.



Before we conclude the introduction lesson, let us take a moment to review the course schedule.




The course material was previously presented in a traditional instructor-led course over a 6-week period. The course is now being presented in a blended format over an 11-week period.

In the orientation session, you learned about the blended format of this course. There are several delivery types that make up this blended format. WBT stands for Web-based training, IS stands for independent study, ILT stands for instructor-led training, and WCT stands for Web-conference training.

You are currently in Module A: Quality Assurance, which is the first module in this course.

On the next screen, we'll review the lesson structure for Module A.


Image description: Highway Materials Engineering Course schedule.

Training Conducted at Home State				
Training Conducted at Frederick, MD				
Module A Overview				
Web-based Training (WBT) 1st - 3rd Weeks of January				
1	2	3	4	5
Intro to Web-based Training	Intro to Quality Assurance Programs	Specifications and Risk	Collecting Data: Sampling Theory	Organizing Data
6	7	8	9	
Analyzing Data	Interpreting Data	Variability and Data Analysis	Quality Control	
Instructor-led Training (ILT) 4th Week of January, 1st Week of February				
10	11	12	13	14
Intro to Instructor-led Training	Acceptance Plans and Risk	Pay Factors	Verification and Materials Testing Dispute Resolution	Other Essential QA Aspects
15	Review and Final Assessment			
Implementation and Hot Topics				
 U.S. Department of Transportation Federal Highway Administration	MODULE A LESSON 1	INTRODUCTION TO WEB-BASED TRAINING (WBT)		Resources Glossary Help
				

Module A consists of 15 lessons. Lessons 1–9 are Web-based lessons that you are completing now. The total estimated time to complete Lessons 1–9 is 9.5 hours. Lessons 10–15 and the final assessment are instructor-led lessons, which you will complete in Frederick, Maryland.

Image description: Highway Materials Engineering Course Module A lesson schedule.

Help



- **To Get Help**
 - Refer to the Help document for more information
- **To Get Started**
 - Close this introduction and return to the training curriculum
 - Select Lesson 2 to begin
 - To close this window, select the "X" in the upper right-hand corner of your screen


Return to the module curriculum to select the next lesson. To close this window, select the "X" in the upper right-hand corner of your screen.

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MODULE A
LESSON 1

INTRODUCTION TO WEB-BASED
TRAINING (WBT)

Resources
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Help



If you need assistance during the training, you may refer to the Help document as needed. Select the Help link to access this document.

Now let's get started. Close this introduction and return to the training curriculum. Select Lesson 2. To close this window, select the X in the upper right-hand corner of your screen.