



# SATERN

System for Administration, Training, and Educational Resources for NASA

## Overview of Online Exams

## Classroom Guide

(Version 5.8 SP5)  
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**From the NASA SATERN Program Office:**

All SATERN administrator training materials must be used alongside the SATERN Rules and Process Guide for administrators. The Guide identifies areas where SATERN functionality cannot enforce the Agency-defined usage of the system at NASA and provide guidance to enable administrator compliance with Agency-defined methods and procedures.

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# Course Introduction

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Through lecture, activities, and hands-on computer lab work, this course teaches you the concepts and terminology associated with SATERN online exams. You will create exams using questions created in PQE, and include the exam in an online item.

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## COURSE OBJECTIVES

The goal of this course is to teach and assist SATERN administrators in creating online exams. You will:

- Create an exam object and associate questions with the exam
- Associate an exam with an online item
- Learn how SATERN online exams and content objects support adaptive learning

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## TARGET AUDIENCE





This course is intended for administrators and course developers responsible for creating and maintaining the exam objects in the SATERN system.

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## USING THIS GUIDE

This classroom guide is designed to be used in conjunction with an instructor. The guide provides general information that will be elaborated upon by the instructor. For additional information, refer to the online help.

Throughout the guide, you encounter icons that call out various types of information. The following table illustrates how this guide uses icons to indicate different types of comments, activities, labs, etc. that support the text.

Icon	Definition
	<b>Activity:</b> Indicates an activity for you to complete that helps reinforce the information you just learned.
	<b>Note or Tip:</b> Indicates additional information that is related to the information presented. It also provides helpful hints and tips or other guidance that further explains the information it accompanies.
	<b>Lab:</b> Indicates a hands-on computer lab. Follow the step-by-step process outlined to perform specific tasks in the system.
	<b>Warning:</b> Warns against particular actions, or that a particular condition might indicate a problem.

## ADDITIONAL RESOURCES

There are a number of additional resources that can provide you more information about the SATERN system. These resources include:

- ◆ Online SATERN system help
- ◆ Task-specific job aids

# Lesson 1: How Exams Work in SATERN

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The goal for Lesson 1 is to be able to explain the concepts of exams and how they can be configured in SATERN. Taking an exam as a learner helps you understand the variety of options that SATERN supports.

You will attach an existing exam to an item, then log in as a learner and verify that the exam behaves as desired.

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## OBJECTIVES

Upon completion of this lesson, you will be able to:

- List the steps involved in implementing an online exam
- Describe the main concepts of exam objects
- Generate and configure online exams
- Create an exam object
- Associate an exam to an item

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## STEPS TO IMPLEMENT AN ONLINE EXAM

You may not be the SATERN admin responsible for performing all steps in the process for implementing an online exam. But it is helpful to have an overview of the process and to know that someone at NASA needs to:

1. Create questions in PQE related to an item.

2. *Optional:* Identify and create learning objectives for items and online content.
3. Add a new exam from the Content > Exam Object menu.
4. Associate questions (and objectives if desired) with the exam.
5. Create a new item or edit an existing item.
6. Add the exam object to the item in the Online Settings tab.
7. Define online settings for the item and this exam.
8. Test the item and exam in the SATERN learner interface.

This lesson provides the overview necessary to understand what happens at each step. Then you will be better able to determine which steps you perform, where you go to perform this step, and what happens next.

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## MAIN CONCEPTS OF EXAM OBJECTS

A SATERN exam object consists of questions that display to learners when they launch the item from their Learning Plan. All SATERN exam objects are graded and the score is captured in the learners' Learning History files.

To understand the variety of exam behavior, it is best to log in to SATERN as a learner and take an existing exam. This illustrates the discussion that follows.



## Lab 1. Log In to SATERN and Take an Exam

### Step

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1. Log in as a SATERN learner.
2. Navigate to the item your instructor provides \_\_\_\_\_
3. Locate and launch the exam.
4. Make notes about exam behavior as you go through the lab.

---

## CONFIGURATION OPTIONS FOR ONLINE EXAMS

You can include messages that display to learners before, during, and after they complete the exam.

You can also define many other software behaviors and management criteria with regard to the exam. Some of these include:

- ◆ Minimum required score for passing
- ◆ Number of times that learners are allowed to attempt the exam
- ◆ Ability to specify whether learners must answer the questions in sequence
- ◆ Actions and updates that are performed when learners pass or fail the exam
- ◆ Whether a proctor code must be used to start the exam (requires use of the SATERN instructor entity).



For learners to take exams, you must associate them with an item in the **Online Settings tab** of the item record.

Key points related to working with exams include:

- ◆ Set up exam object with:
  - Exam messages to guide learners
  - Time limit, if desired
  - Feedback during exam completion
- ◆ Organize exam to be sequential (learners must proceed in order) or freeform (learners can skip questions and come back)
- ◆ Define treatment for exam results

---

## HOW EXAMS ARE GENERATED

There are two methods for including questions on an exam:

- ◆ Guarantee the inclusion of specific questions on the exam
- ◆ Randomly select those questions that are related to specific objectives

### Assigning Point Values

The *Point Value* field of a question record allows you to determine the relative value of each question from a scoring standpoint.

### Questions in an Exam

Each question tracks numerous statistics, such as:

- ◆ Where the question is being used
- ◆ How learners have performed in answering the question
- ◆ Which learners took which exams

- ◆ How many times the learners attempted each exam
- ◆ Whether or not the learners answered the question
- ◆ How the learners answered the question
- ◆ The learners' duration in the exam
- ◆ The points earned out of total points assigned to the question
- ◆ The amount of time it took the learners to answer the question
- ◆ An answer summary indicating the distractor answer selected

---

## DECISIONS WHEN CONFIGURING AN EXAM

When creating an exam in SATERN, the admin makes decisions such as:

- ◆ Define the exam type as sequential or free-form
- ◆ Determine total number of questions to be included
- ◆ Define the pass percentage, maximum number of tries, and duration of the exam (if the exam is timed)
- ◆ Decide whether or not the learner taking the exam sees feedback
- ◆ Decide whether the learner taking the exam sees exam scoring

◆ Determine if the exam results should be analyzed

Exam Type:	<input checked="" type="radio"/> Sequential presentation exam <input type="radio"/> Free-form movement exam
Is survey:	<input type="checkbox"/>
Question Count:	0
Pass Percentage: (0 to 100)	<input type="text" value="75"/>
Maximum Tries: (0 = unlimited) (1,000)	<input type="text" value="0"/>
Exam Duration (HH:MM:SS)	<input type="text"/>
Actions:	<input type="checkbox"/> Proctor code is required to begin the exam <input type="checkbox"/> Display a welcome message at the start of the exam <input type="checkbox"/> User can stop and resume exam before it is scored (non-timed exams only) <input type="checkbox"/> Display Point Values for each question
Feedback:	<input checked="" type="radio"/> Show only correct Feedback <input type="radio"/> Show only incorrect Feedback <input type="radio"/> Show both correct and incorrect Feedback <input type="radio"/> Don't show any Feedback
Scoring Options:	<input type="checkbox"/> Show percentage correct once exam is scored <input type="checkbox"/> Show Pass or Fail once exam is scored
<b>Add New Exam or Survey</b>	
Once an exam is graded, the results can be analyzed to determine the consequences that should occur for the User's records. If you opt not to analyze the results, the exam will still be graded, but none of the consequences listed below will occur.	
Analyze the exam results	<input type="checkbox"/>
<input type="button" value="Add"/> <input type="button" value="Reset"/>	

Figure 1. Exam Object Set Up Options



## Lab 2. View and Preview an Existing Exam

### Step

1. Navigate to **Content > Exam Objects**.
2. Search for the exam object you would like to research.
3. Click **View** to look at additional details about the exam (Figure 2).

Exam and Survey Objects Search | Add New | Help |

---

> Search > [Search Results](#) > View Summary

Exam Name: ARC-001-05\_Exam01  
 Description: Lead Awareness

Custom Fields

Summary Messages Questions Item Usage Learner Usage Printed Exams

View the Exam and Survey Objects Edit Copy Delete

Domain: NASA (NASA)  
 Is Active: Yes  
 Is Online: Yes  
 Exam Type: Free-form movement exam  
 Is survey: No  
 Question Count: 15  
 Pass Percentage: 80  
 Maximum Tries: 0  
 (0 = unlimited)  
 Exam Duration (HH:MM:SS)  
 Learner Actions: Proctor code is required to begin the exam: No  
 Display a welcome message at the start of the exam: No  
 Learner can stop and resume exam before it is scored: No  
 Display Point Values for each question: No  
 Feedback: CORRECT  
 Scoring Options: Show Pass or Fail once exam is scored: No  
 Learner can review the exam questions after it is scored: Yes

Figure 2. Preview an Exam Object

4. Select the **Questions** tab (Figure 3).

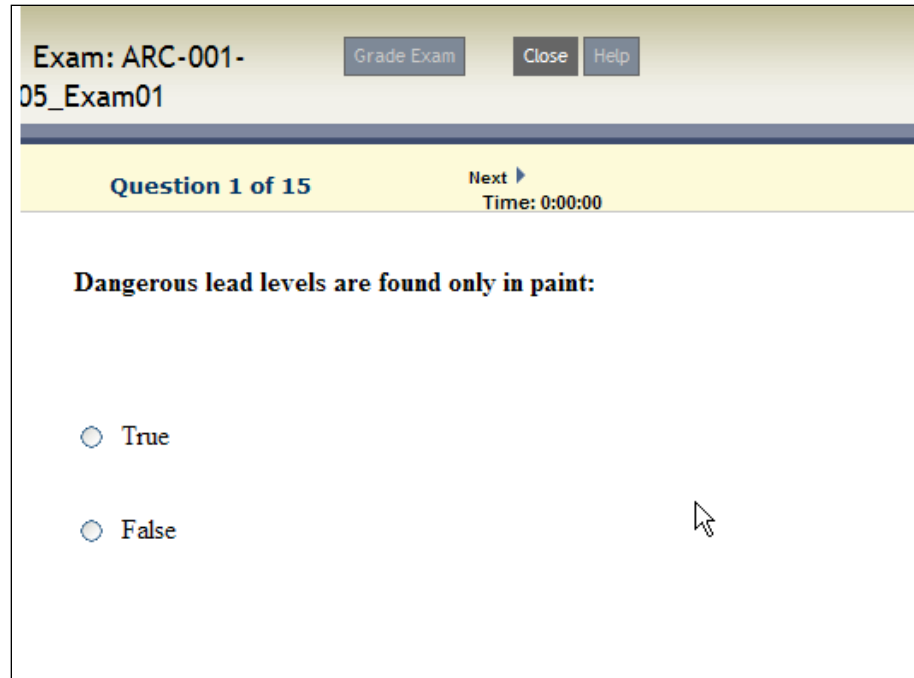
To view Question details, click the triangle. To edit data, click the Edit button.

[Preview Exam](#) Save Reset

Obj ID ▾	Objective Name	Available	Minimum	Maximum	Pass	Points	
6	▶ 6-ARC-001-05_Objective01	20	10	20	80	100.0	

Figure 3. Questions Tab of Exam

5. Click the **Preview Exam** link to view the exam as it appears at run time (Figure 4).



Exam: ARC-001-05\_Exam01

Grade Exam Close Help

Question 1 of 15 Next ▶  
Time: 0:00:00

**Dangerous lead levels are found only in paint:**

True

False

Figure 4. Exam Preview

6. Click **Close** to return to your exam object record.

## CREATING AN EXAM

Creating an exam in SATERN creates an exam object which can be added to online or blended items. When a learner launches a SATERN exam, the SATERN system tracks learners' responses to each question and grades the exam when the learners submit their answers.



### Lab 3. Create a New Exam

#### Step

1. Navigate to **Content > Exam and Survey Objects**.
2. Click **Add New**. Complete the required fields (Figure 5).

Content Objects  
Content Packages  
Questions  
**Exam and Survey Objects**  
Objectives  
Documents  
+ Tools

Exam and Survey Objects [Search](#) [Add New](#) [help](#)

> Search > [Search Results](#) > [Add New](#)

Add New Exam or Survey

\* Required Fields

Exam Name:

Domain:  [Q](#)

Is Active:

Description:

Exam Type

Sequential presentation exam  
 Free-form movement exam

Is survey:

Question Count:

Pass Percentage:   
(0 to 100)

Maximum Time:   
(0 to unlimited)

Exam Duration:   
(HH MM SS)

Figure 5. Add New Exam Object

3. Enter the exam name.

***NASA Business Rule***

Exam name must start with the Center/Discipline acronym.

4. Enter the domain for the exam.
5. Check the **Is Active** checkbox.



**Note:** *If you are not ready to make the exam active, leave this checkbox blank. You can return to the exam object record later to make the exam object active.*

6. Enter a description for the exam.
7. Select the exam type.
8. Determine the pass percentage necessary for learners to pass the exam for grading purposes. Also decide the number of attempts learners can make before the system locks them out of the exam (an administrator must reset their access).
9. Enter the exam duration in the **Exam Duration** textbox, if the exam needs to be timed.
10. Determine the settings (Figure 6) for:
  - Learner actions
  - Feedback
  - Scoring options
  - Analyze the exam results

**Learner Actions:**

- Proctor code is required to begin the exam
- Display a welcome message at the start of the exam
- Learner can stop and resume exam before it is scored
- Display Point Values for each question

**Feedback:**

- Show only correct Feedback
- Show only incorrect Feedback
- Show both correct and incorrect Feedback
- Don't show any Feedback

**Scoring Options:**

- Show percentage correct once exam is scored
- Show Pass or Fail once exam is scored

**Add New Exam or Survey**

---

Once an exam is graded, the results can be analyzed to determine the consequences that should occur for the learner's records. If you opt not to analyze the results, the exam will still be graded, but none of the consequences listed below will occur.

Analyze the exam results

**Figure 6. Exam Object Settings**

11. Click **Add** when you are done to add the exam record (Figure 7).

Custom Fields
Summary
Messages
Questions
Item Usage
Learner Usage
Printed Exams

**Edit the Exam and Survey**

\* = Required Fields

\* Domain:

Is Active:

Is Online:

Description:

Exam Type:

- Sequential presentation exam
- Free-form movement exam

Is survey:

Question Count:  (0 to 25)

**Figure 7. Summary Tab of Exam Object Record**

12. Select the **Questions** tab (Figure 8).



**Figure 8. Questions Tab of Exam Object Record**

13. Enter keywords to search for questions and/or objectives to add to the exam object.
14. Click **Search**.
15. The search results are displayed in a separate window (Figure 9).

Obj ID	Objective Name	Question Name	Number of Variants
<input type="checkbox"/> 1496	1496-SHA-SS-WBT-100_01	▶ 1496-6-Legacy Question	1
		▶ 1496-5-Legacy Question	1
		▶ 1496-3-Legacy Question	1
		▶ 1496-26-Legacy Question	1
		▶ 1496-18-Legacy Question	1
		▶ 1496-9-Legacy Question	1
		▶ 1496-7-Legacy Question	1
		▶ 1496-19-Legacy Question	1
		▶ 1496-17-Legacy Question	1
		▶ 1496-4-Legacy Question	1

**Figure 9. Search Results**

16. To select individual questions that must display on every exam (this is also how to add a specific variant of a question to the exam):
  - a. Click the arrows to the left of the question name to expand each question (Figure 10).

The screenshot shows a 'Field Chooser' window with a table of questions. The table has columns for 'Obj\_ID', 'Objective Name', 'Question Name', and 'Number of Variants'. The first row shows Obj\_ID 1496, Objective Name '1496-SMA-SS-WBT-100\_01', and Question Name '1496-6-Legacy Question' with 1 variant. Below this, three variant rows are shown, each with a radio button, a variant number (1), a revision number (1\*, 2\*), a question type ('Multi-Choice Single Answer'), and a status ('Active').

Obj_ID	Objective Name	Question Name	Number of Variants	
<input type="checkbox"/> 1496	1496-SMA-SS-WBT-100_01	▼ 1496-6-Legacy Question	1	
<input type="radio"/>	1	1*	Multi-Choice Single Answer	Active
		▼ 1496-5-Legacy Question	1	
<input type="radio"/>	1	2*	Multi-Choice Single Answer	Active
		▼ 1496-3-Legacy Question	1	
<input type="radio"/>	1	1*	Multi-Choice Single Answer	Active

**Figure 10. Selected Questions Expanded**

- b. Click the radio button for the questions you want to add. Note that you can only add one variant of a question to the exam.
- c. Click **Select**.

Your selected questions are listed at the bottom of the Questions tab screen (Figure 11).

The screenshot shows a 'Selected Questions' window with a table of selected questions. The table has columns for 'Obj\_ID', 'Objective Name', 'Available', 'Minimum', 'Maximum', 'Pass', and 'Points'. There are two rows, both with Obj\_ID 961 and Objective Name '961-WSTF-OHS-HAZCOMC... [ Required-Stem ]'. The 'Available' column is '1', and the 'Points' column is '1.0'. There are 'Save' and 'Reset' buttons at the top and bottom right.

Obj_ID	Objective Name	Available	Minimum	Maximum	Pass	Points
961	▶ 961-WSTF-OHS-HAZCOMC... [ Required-Stem ]	1	--	--	--	1.0
961	▶ 961-WSTF-OHS-HAZCOMC... [ Required-Stem ]	1	--	--	--	1.0

**Figure 11. Selected Questions**

17. To create a pool of questions for the exam that the system can choose from:
  - a. Go to the Select Questions to Add screen (Figure 8).
  - b. Check the checkboxes to the left of the objective ID you want to associate with this exam.
  - c. Click **Select**.
  - d. The Selected objectives are listed on the Questions tab of the exam object record.
  - e. Click any number under the Available, Minimum, Maximum, Pass, or Points columns (Figure 12).

To view Question details, click the triangle. To edit data, click the Edit button.

[Preview Exam](#) Save Reset

Obj ID	Objective Name	Available	Minimum	Maximum	Pass	Points	
961	▶ 961-WSTF-OHS-HAZCOMC... [ Required-Stem ]	1	--	--	--	1.0	🗑️
961	▶ 961-WSTF-OHS-HAZCOMC... [ Required-Stem ]	1	--	--	--	1.0	🗑️
961	▶ 961-WSTF-OHS-HAZCOMCBT_Objective01	23	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="75"/>	<input type="text" value="5.0"/>	🗑️

Save Reset

**Figure 12. Edit Minimum, Maximum, Pass, and Points**

- f. Enter the numbers appropriate for these fields for your exam.
- g. Click **Save**.

- Click the **Preview Exam** link to view the exam as it appears at run time (Figure 13).

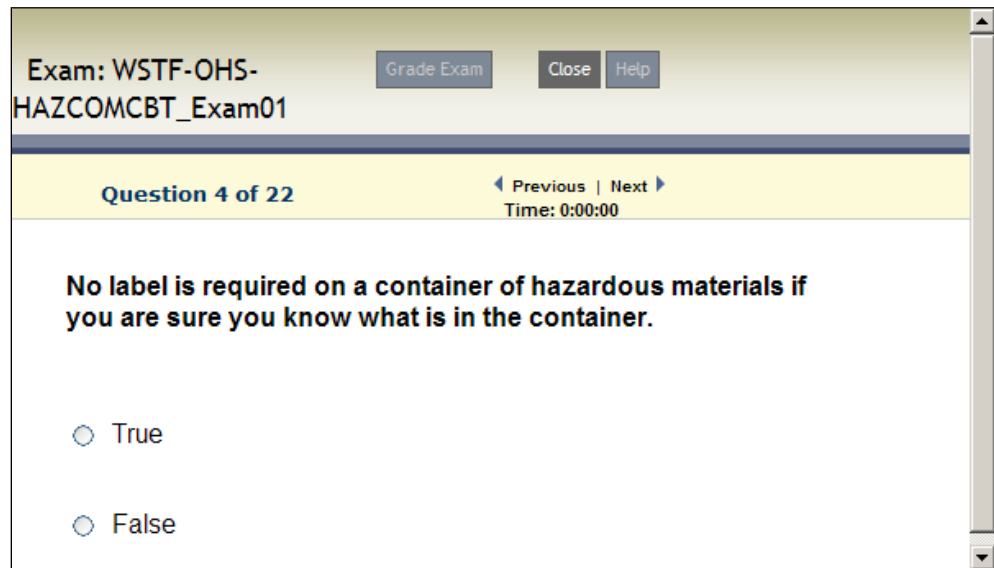


Figure 13. Exam Preview

- Click **Close** to return to your exam object record.
- Click **Apply Changes** as you make changes to the exam.



**Note:** Once questions are added to the exam, the administrator must still activate the exam and make it available for learners to launch. Follow the steps below to perform these actions.

- Select the **Summary** tab.
- Click (check) the **Is Online** and **Is Active** checkboxes.
- Click **Apply Changes**.

## ADDING AN EXAM OBJECT TO AN ITEM

After an exam has been defined, the next steps to implement an exam are to:

1. Create an online item or add the exam object to an existing item.
2. Define the online settings to include the exam.

To add an exam object to an item, select the **Online Settings** tab of the item record. Once the online settings are entered and changes applied, the content structure is automatically created when you create the item with online content (see the *Online Content Management* training guide for more information). Scroll to the bottom of the screen to view the content structure (Figure 14).

Objects	Type		Remove
 WSTF HAZARD COMMUNICATION AND EMERGENCY RESPONSE		<a href="#">Edit</a>	<input type="checkbox"/>

Figure 14. Content Structure

To add the exam object to the item:

1. Click the **Edit** link for the top-level object to add an exam object or content object.
2. Enter an object label.
3. Click the **Exams/Survey** radio button.
4. Enter (or search) an exam name.
5. Select the exam.

6. Select/enter other settings (Figure 15):

Option	Description
<b>Restrict access to other online item objects when this exam is in progress</b>	Prevents learners from launching content objects associated with the item while taking the exam
<b>Mark item completed when exam passed</b>	This writes a "For Credit" entry to the learner's Learning History upon completion of the exam, regardless whether they have completed other content objects associated to the item.
<b>Mark item failed when exam failed</b>	This writes a "Not For Credit" entry to learner's Learning History upon failure of exam.
<b>Timed Exam</b>	This designates the amount of time a learner has to complete the exam.
<b>After scoring exam</b>	These options deal with whether learner can/must review questions after they complete the exam.

Figure 15. Object Settings

7. Click **Add** to see the objects (Figure 16).

Objects	Type		Remove
<a href="#">WSTF HAZARD COMMUNICATION AND EMERGENCY RESPONSE</a>		<a href="#">Edit</a>	<input type="checkbox"/>
<a href="#">Hazard Communication and Emergency Response Training</a>	Content	<a href="#">Edit</a>	<input type="checkbox"/>
<a href="#">Course Test</a>	Exam	<a href="#">Edit</a>	<input type="checkbox"/>
<a href="#">Course Evaluation</a>	Content	<a href="#">Edit</a>	<input type="checkbox"/>

Figure 16. Object Screen



## Lab 4. Add an Exam to an Existing Item

### Step

---

1. Navigate to **Learning > Items**.
2. Enter search criteria to search for the item.
3. Click **Search**.
4. Locate the item and click the **edit icon** to access the item in edit mode.
5. Select the **Online Settings** tab.
6. Check the **Item is Online** checkbox.
7. Select an **online completion/failure status** from the drop-down menu.
8. Make other changes as necessary.
9. Click **Apply Changes**.
10. Scroll down to the Objects list and click the **edit** link for the filing cabinet.
11. Scroll down to the *Add an Object to the Structure* section and enter the object label.
12. Click the **Exam/Survey** radio button.
13. Search for the exam to add to the item.
14. Set the **Mark item...** and **After** scoring exam options.
15. Click **Add**.
16. Assign the item to a learner.
17. Log in to the learner interface, launch the item, and test the exam.



## Lab 5. Create an Online Item with an Exam Object

### Step

---

1. Navigate to **Learning > Items**.
2. Click **Add New**.
3. Enter all the required information and any optional information for the item.
4. Click **Next**.
5. Leave **Item Segments** blank, and click **Next**.
6. At the Add Online Content step, select an **Online Completion Status** from the drop-down menu.
7. Check the **Mark item complete when all objects are complete** checkbox.
8. In the Content section, click the **Exam** radio button.
9. Search for and select the content ID.
10. Enter a title that the learners can view.
11. Click the other checkboxes to set additional settings as appropriate.
12. Click the radio button to set the **After** scoring exam options.
13. Click **Add**.
14. Click **Next**.
15. Add the item to the appropriate catalogs so learners can search for the item.
16. Click **Next**.
17. Review the item information.



18. Click **Save**.
19. Select the **Online Settings** tab.
20. Check the **Item is Online** checkbox.
21. Check any other options, as desired.
22. Click **Apply Changes**.

---

## GENERATING PRINTED EXAMS

You can create a printed exam for learners from any existing exam module that has been associated with an item. Once completed, an admin can record each learner's answer choices manually through the system. SATERN automatically grades each exam and a learning event is recorded for each. You can only print exams if you have active questions associated with the exam.

Each time a new exam is generated for printing, it is assigned a unique exam sequence ID. The questions for each printed exam are selected based on the settings established for the exam on the various tabs in the Exam Objects section. The sequence of the exam questions for each exam sequence is always randomized regardless of the settings in the Exam Objects section. An instructor can either give each person in the class a completely different printed exam or give each learner a copy of exactly the same exam.

To print an exam:

1. Navigate to **Content > Exam Objects**.
2. Enter search criteria to search for an exam and click **Search**.

3. Click the **edit icon** (Figure 17).

Exam Name ▲		Description
ARC-001-03_Exam01	 	Hazard Communications (Office Workers)
ARC-001-05_Exam01	 	Lead Awareness
ARC-001-06_Exam01	 	Compressed Gas Safety
ARC-001-07_Exam01	 	Respiratory Protection
ARC-002-03_Exam01	 	Hazardous Waste and Spill Response (Waste Generators)
ARC-002-05_Exam01	 	Asbestos Awareness

Figure 17. Search Results

4. Select the **Printed Exams** tab (Figure 18).

Custom Fields

Summary

Messages

Questions

Item Usage

User Usage

**Printed Exams**

**Edit the Exam**

---

**Print an Exam**

There are no printed exam templates for this exam object.

---

**Generate Unique Exams**

Enter the number of unique printed exam templates to be generated:  
(1 to 999)

**Generate Printed Exams**

Figure 18. Printed Exams Tab

5. Enter the number of exams to generate and print in the **Generate Unique Exam** textbox.

6. Click **Generate Printed Exams**.

Your exam is listed in the Print an Exam section of the screen (Figure 19).

Custom Fields

Summary Messages Questions Item Usage Learner Usage **Printed Exams**

Edit the Exam and Survey

Print an Exam

Apply Changes Reset

Select All / Deselect All

Exam Sequence ID	Generation Date	Print	Record Scores	Remove
1	10/6/2009	<input type="checkbox"/>	<a href="#">Score</a>	<input type="checkbox"/>
2	10/6/2009	<input type="checkbox"/>	<a href="#">Score</a>	<input type="checkbox"/>
3	10/6/2009	<input type="checkbox"/>	<a href="#">Score</a>	<input type="checkbox"/>

Select All / Deselect All

Print Apply Changes Reset

Generate Unique Exams

Enter the number of unique printed exam templates to be generated:  
(1 to 999)

Generate Printed Exams

Figure 19. Print an Exam

7. Click the **Print** checkbox for each exam you want to print.
8. Click **Print** to displays the exam in a separate browser window in a printable format (Figure 20).

Exam Name : ARC-001-05\_Exam01      Exam Sequence Id : 1

Date : 10/6/2009

User ID : \_\_\_\_\_      User Name : \_\_\_\_\_

**Question #1**

Occupations with potential for lead exposure include printing and battery manufacturing:

a. True

b. False

**Question #2**

Figure 20. Exam in Printable Format

---

## RECORDING PRINTED EXAMS

Before recording a learner's exam results, the exam must be associated with an item. Before scoring the exam, you will be informed that the item will be added to the learner's Learning Plan if it is not already assigned to the learner.

To record the exam, click the **Score** link on the Printed Exams tab of the exam object record.

Complete the grading wizard for the learner ID, entering the answers from the printed exam. For True/False questions, enter "a" for the first answer listed (usually True) and "b" for the second.

If the exam question has multiple answers, enter all learner choices, separated by commas, such as "a, b, d".

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## RUN REPORTS RELATED TO EXAMS

The following reports in SATERN relate to topics presented in this lesson:

- ◆ Exam Item Analysis
- ◆ Exam Objects
- ◆ Learner Exam Data

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## CONCLUSION

In this lesson, you learned how to create an exam object. Using the step-by-step instructions provided, you created an exam, placed the questions into the exam, and modified the appropriate learner and system parameters. Additionally, you created an online item and included the exam object.

You should now be able to:

- List the steps involved in implementing an online exam
- Describe the main concepts of exam objects
- Generate and configure online exams
- Create an exam object
- Associate an exam to an item

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## LESSON CHECK

Use what you learned in this lesson to answer the following questions.

1. What are the two types of exams?

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2. True or false:  
Exams can be timed.

3. True or false:  
An exam object can be directly assigned to learners.

# Course Summary

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Through lecture, activities, and hands-on computer lab work, you learned the concepts and terminology associated with SATERN online exams. You created exams using questions created in PQE, and included the exam in an online item.

You should now be able to:

- Create an exam object and associate questions with the exam
- Associate an exam with an online item
- Learn how SATERN online exams and content objects support adaptive learning

# Notes



# Optional Topic: How to Implement Adaptive Learning

Adaptive tests use the objective as a connection between content objects and test questions in an item. If a learner passes an objective, he/she also passes the content object.

Objectives provide a way for the system to identify learner learning needs, based on exam results:

1. Define a content object with desired objectives.
2. Configure an exam with questions that test these objectives.
3. Add the content object and the exam object to an item.
4. Set up the item so objective status matches exam results:
  - If learner passes the objectives associated with a content object, the status of the content object is set to *Complete*.
  - If learner fails the objectives associated with a content object, the content object is *Incomplete*

## OBJECTIVES SUPPORT QUESTION POOLS

Objectives can be used to generate a pool of question variants available for an exam. Consider the following scenario:

You associated objective ABC with five questions:

Question	Variant	Question Stem
101	1	The Earth has this many oceans...
	2	Which of the following is not an ocean?
102	1	How many continents are there?
	2	There are _____ continents.
103	1	China is on the continent...

Question	Variant	Question Stem
	2	Asia includes which country?
	3	China is not on the continent of Asia. (true/false)
104	1	How many continents are on the western hemisphere?
105	1	Is a continent a body of water or land?

You define rules for the system to use when selecting questions, such as:

- ◆ Question 105, variant 1 must always appear in the exam
- ◆ System should select a minimum of 3 and maximum of 5 questions

Here is how the objective-based questions display in two exam iterations (Figure 21):

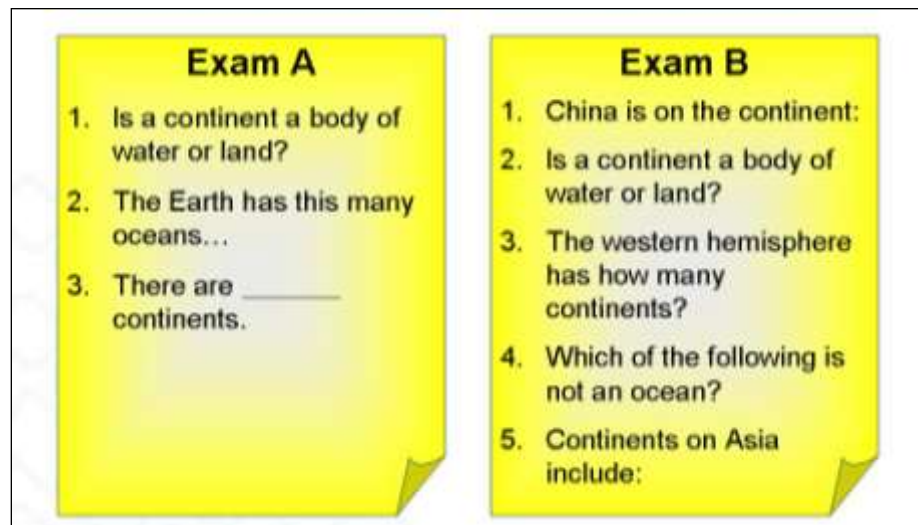


Figure 21. Two Iterations of an Objective-Based Exam

### ***NASA Business Rule***

If SATERN admins want to set up adaptive learning, you should work with the NSSC staff who will create the questions and objectives. Then provide instructions so that the NSSC can set up the relationships.

## QUESTION POOLING/RANDOMIZATION

Question pooling/randomization occurs when an exam is created by the assignment of questions through objectives. As a rule, the smaller the difference between the number of available questions and the minimum questions assigned to be used, the lesser the degree of randomness.

For example, if an exam is defined to include 10 questions, and the available number of questions (based on the objectives that have been assigned) is 20; that makes a pool of 10 questions available for use in the exam.

Available = 20 in the pool

Minimum = 10 total to be used in exam

If you specify the same value for minimum questions to be used as the value for available questions, randomness is eliminated.

Available = 10 in pool

Minimum = 10 total to be used in exam

You also set the number of points associated with each objective. So if you set the points = 50 and there are 10 questions, each question is worth 5 points. If you set a range for the number of questions to be asked per objective, the points are distributed equally amongst each question presented to the learner.

Objective Points = 50

- a. 5 questions presented, each question = 10 points
- b. 7 questions presented, each question = 7.14 points
- c. 10 questions presented, each question = 5 points

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## TOPIC CHECK

Use what you learned in this lesson to answer the following questions.

1. True or false:

A question can be tied to more than one objective.

2. True or false:

An objective can be tied to more than one content object.

3. Which of the following can you **not** do when a learner fails an exam and adaptive learning has been established?

- a) Clear the flags for all failed objectives.
- b) Set the completion flags for all passed objectives.
- c) Lock the exam.
- d) Remove the item from the Learning Plan.