

# **11i Oracle Process Manufacturing Formula and Laboratory Management**

**Student Guide**

14536GC20

Edition 1.1

March 2001

D32070

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**This book was published using:**

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# Preface

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## Profile

### Before You Begin This Course

Before you begin this course, you should have the following qualifications:

- Thorough knowledge of navigating Oracle applications
- Working experience with production processes

### Prerequisites

- There are no prerequisites for this course.

### How This Course Is Organized

*11i Oracle Process Manufacturing Formula and Laboratory Management* is an instructor-led course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

## Related Publications

### Additional Publications

- System release bulletins
- Installation and user's guides
- *read.me* files
- *Oracle Magazine*



# Typographic Conventions

## Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The <b><i>algorithm</i></b> inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: <code>debug.set ('I', 300);</code> Directory: <code>bin (DOS), \$FMHOME (UNIX)</code> Filename: Locate the <code>init.ora</code> file. Password: User <code>tiger</code> as your password. Pathname: Open <code>c:\my_docs\projects</code> URL: Go to <code>http://www.oracle.com</code> User input: Enter <code>300</code> Username: Log on as <code>scott</code>
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address ( <i>but</i> Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do <i>not</i> save changes to the database. For further information, see <i>Oracle7 Server SQL Language Reference Manual</i> . Enter <code>user_id@us.oracle.com</code> , where <i>user_id</i> is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish.  This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.

Convention	Element	Example
Arrow	Menu paths	Select File—> Save.

Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

## Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	When-Validate-Item
Lowercase	Column names, table names	SELECT last_name FROM s_emp;
	Passwords	DROP USER scott IDENTIFIED BY tiger;
	PL/SQL objects	OG_ACTIVATE_LAYER (OG_GET_LAYER ( 'prod_pie_layer' ) )
Lowercase italic	Syntax variables	CREATE ROLE <i>role</i>
Uppercase	SQL commands and functions	SELECT userid FROM emp;

## Typographic Conventions in Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select Invoice > Entry > Invoice Batches Summary.
2. (M) From the menu, select Query > Find.
3. (B) Click the Approve button.

### Notations :

(N) = Navigator

(M) = Menu

(T) = Tab

(I) = Icon

(H) = Hyperlink

(B) = Button

## Typographical Conventions in Help System Paths

This course uses a “navigation path” convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

(Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.
2. Under the General Ledger entry, expand Journals.
3. Under Journals, select Enter Journals.
4. Review the Enter Journals topic that appears in the document frame of the help system window.

## Getting Help

Oracle Applications provides you with a complete online help facility.

Whenever you need assistance, simply choose an item from the Help menu to pinpoint the type of information you want.

### To display help for a current window:

1. Choose Window Help from the Help menu, click the Help button on the toolbar, or hold down the Control key and type 'h'.

A web browser window appears, containing search and navigation frames on the left, and a frame that displays help documents on the right.

The document frame provides information on the window containing the cursor. The navigation frame displays the top-level topics for your responsibility, arranged in a tree control.

2. If the document frame contains a list of topics associated with the window, click on a topic of interest to display more detailed information.

3. You can navigate to other topics of interest in the help system, or choose Close from your web browser's File menu to close help.

## **Searching for Help**

You can perform a search to find the Oracle Applications help information you want. Simply enter your query in the text field located in the top-left frame of the browser window when viewing help, then click the adjacent Find button.

A list of titles, ranked by relevance and linked to the documents in question, is returned from your search in the right-hand document frame. Click on whichever title seems to best answer your needs to display the complete document in this frame. If the document doesn't fully answer your questions, use your browser's Back button to return to the list of titles and try another.

# **Course Introduction**

## **Chapter 1**

# 11i Oracle Process Manufacturing Formula and Laboratory Management

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## **11i Oracle Process Manufacturing Formula and Laboratory Management**

### **Course Introduction**

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### Course Objectives

**After completing this course, you should be able to do the following:**

- **Describe the concepts and flows that drive Oracle Process Manufacturing (OPM) Formula Management**
- **Navigate through the Formula Management responsibility**
- **Perform required setups**
- **Create formulas, routings, and effectivities**
- **Define formula modifications**

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### Course Objectives

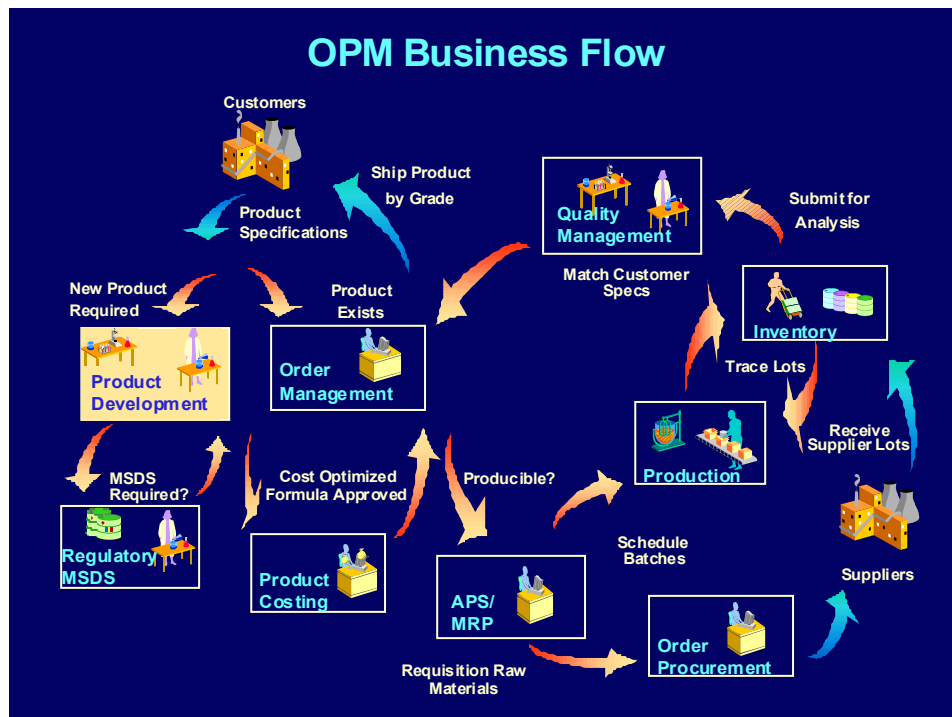
**After completing this course, you should also be able to do the following:**

- **Use Formula Management online inquiries and reports**
- **Streamline new product development**
- **Integrate research and development operations**

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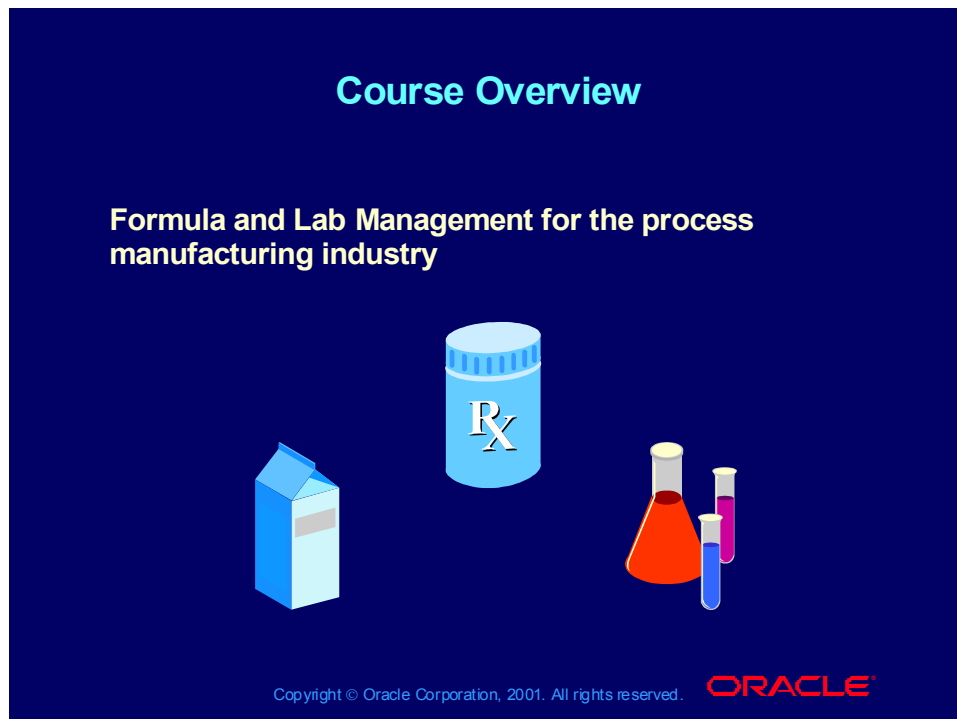
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## Course Overview

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### Oracle Process Manufacturing Overview

The Formula and Lab Management applications are part of the suite of applications in OPM. The following list represents the major groupings that compose the suite of OPM applications:

- Financials
- Inventory
- Logistics
- Process Execution
- Process Planning
- Product Development
- System Administration

The Formula and Lab Management applications are components of Product Development.

## Formula Management Goals

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### Formula Management Goals

Understand and establish the following:

- Products
- Co-products
- By-products
- Formula use
- Routings
- Effectivities



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### Goals

You use the Formula Management responsibility to define the formulas that drive your manufacturing process. Formulas form the basis of production. Every batch created in the Production Management responsibility is based on a formula created in Formula Management. Formulas are lists of products and ingredients, and their associated quantities.

#### Goal Definitions

The following is a list of requirements and definitions that you will need to understand and be able to establish in the Formula Management responsibility.

Products: Items that are created from a process

Co-products: Multiple items created from a process

By-products: Unplanned items created from a process

Formula use: The area of the process that uses the formula

Routings: The machine process that the items go through to create a product

Effectivities: The who, what, where, when, and how of the formula

### Formula and Product Terms

- Formula
- Formula version
- Product
- Ingredient
- By-product
- Co-product
- Effectivity
- Formula use



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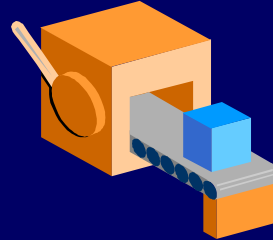
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## Formula Routing Terms

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### Formula Routing Terms

- Routing
- Resource
- Activity
- Cost analysis code
- Operation



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## Ingredient and Product Modification Terms

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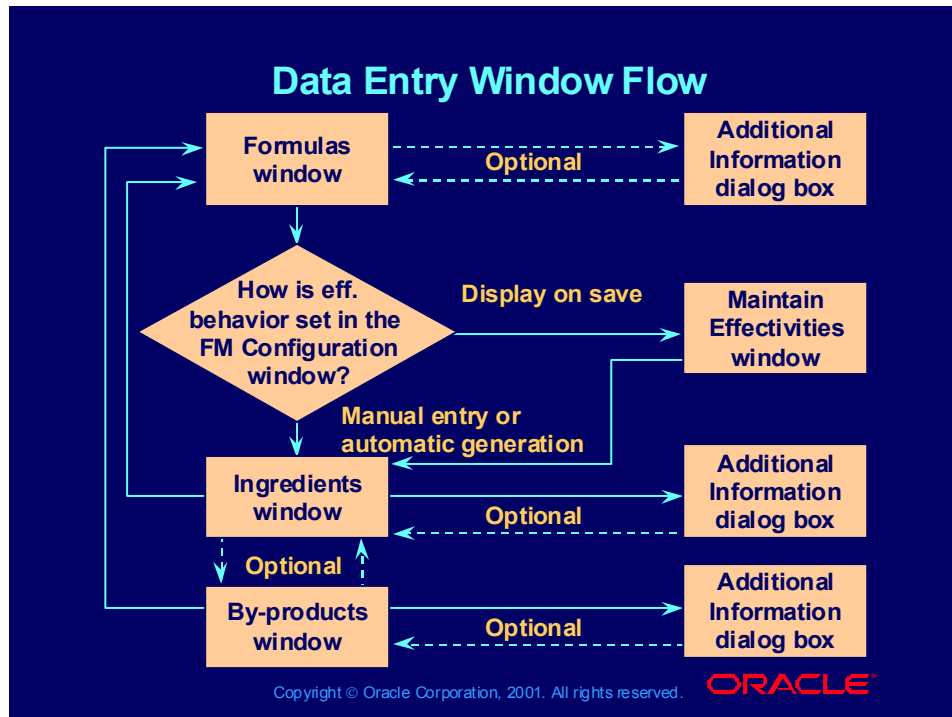
### Ingredient and Product Modification Terms

- **Scaling**
- **Theoretical yield**
- **Component class**

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## Data Entry Window Flow

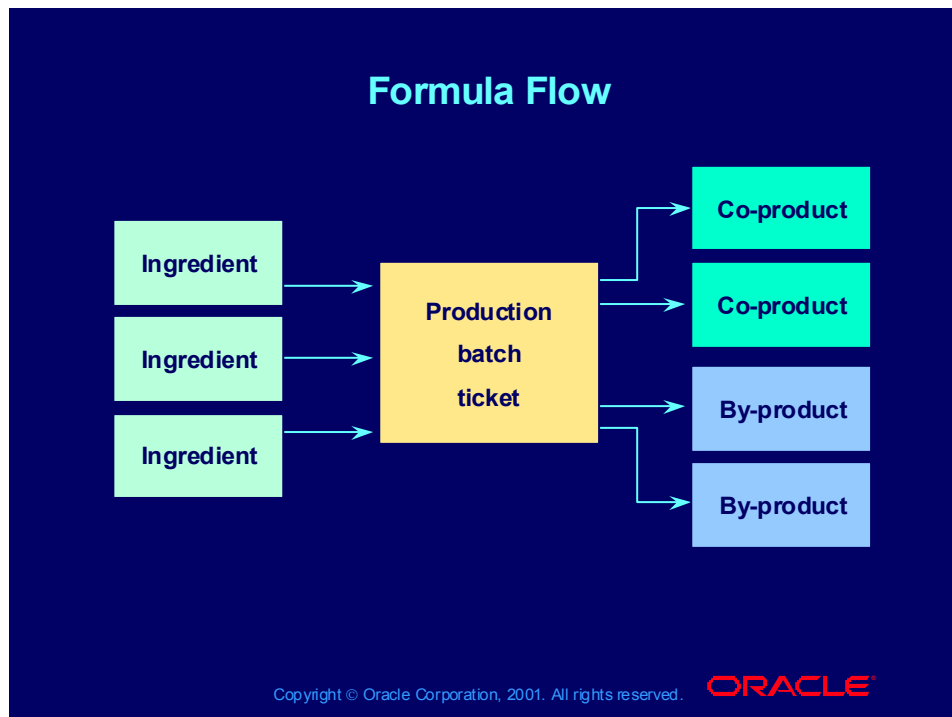


### Data Entry Window Flow

Several windows are used to define a formula. The diagram above depicts the windows that are used and the flow of data entry within Formula Management.

## Formula Flow

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### Formula Flow

A formula establishes the relationship between ingredients and products.

A batch record is a working copy of a formula.

A batch ticket represents a production batch.

Ingredients are consumed by production.

Products, co-products, and by-products are yielded by a production batch.

Material planning is driven by products and co-products.

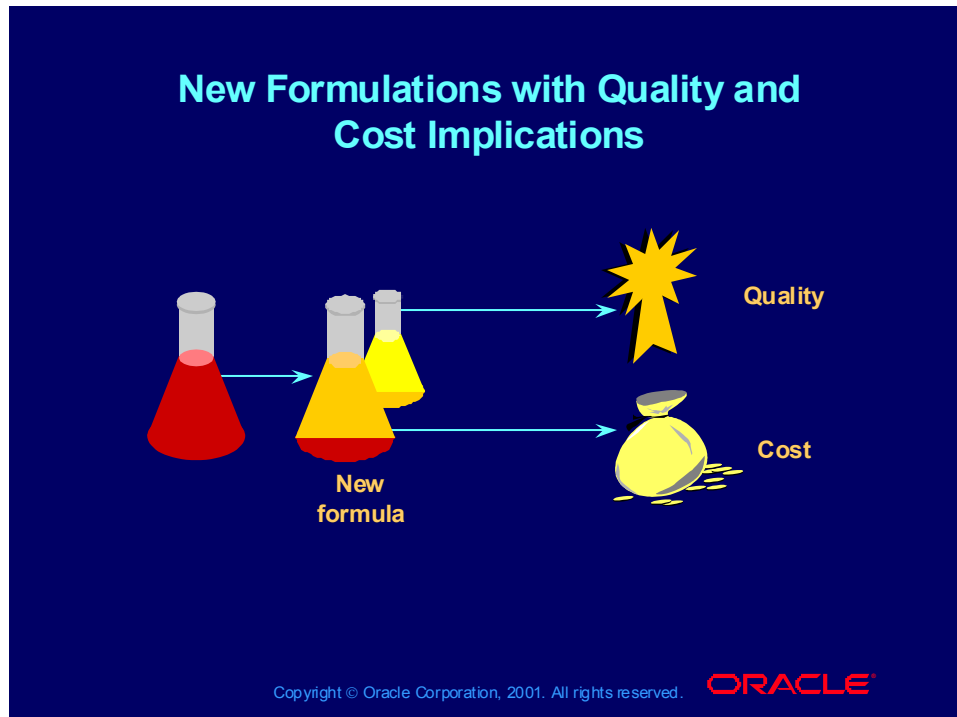
Process/Material Requirements Planning (P/MRP) does not consider by-products when suggesting material replenishment.

The cost of production can be distributed over co-products.



## New Formulations with Quality and Cost Implications

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### Modeling and Analyzing with OPM Laboratory Management

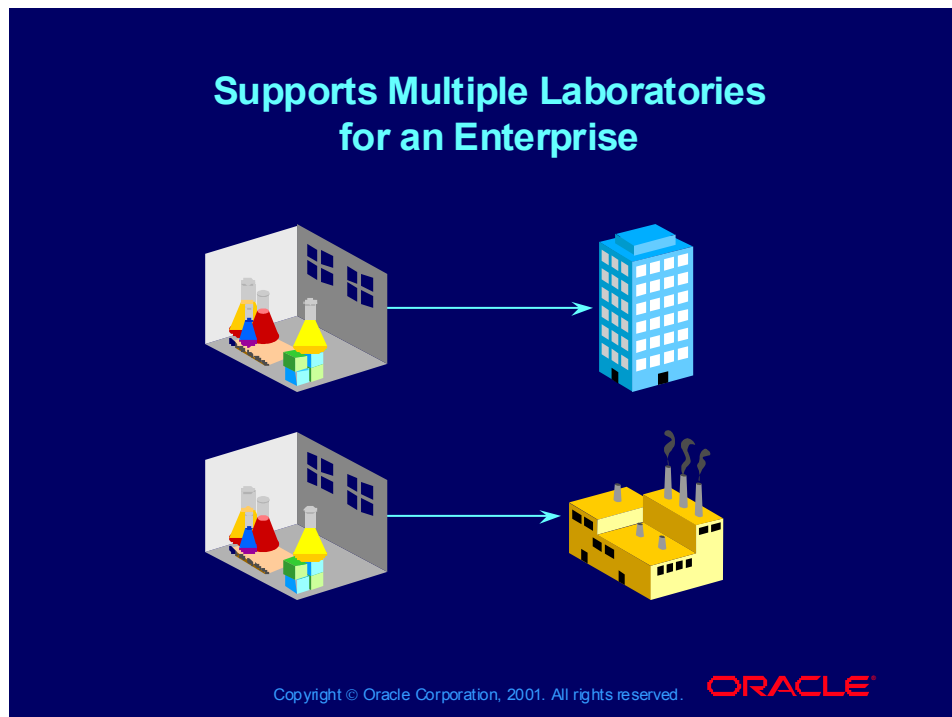
OPM Laboratory Management (Lab Management) provides process manufacturers with the ability to develop new products and revise existing formulas based on reported experience with manufacturing batches.

Using OPM Lab Management, you can quickly and easily model new formulations and analyze the quality and cost implications of specific formula changes before production.

You have the flexibility to define the technical properties your products must demonstrate, ensuring your ability to respond to changing market or regulatory requirements.

## Supports Multiple Laboratories for an Enterprise

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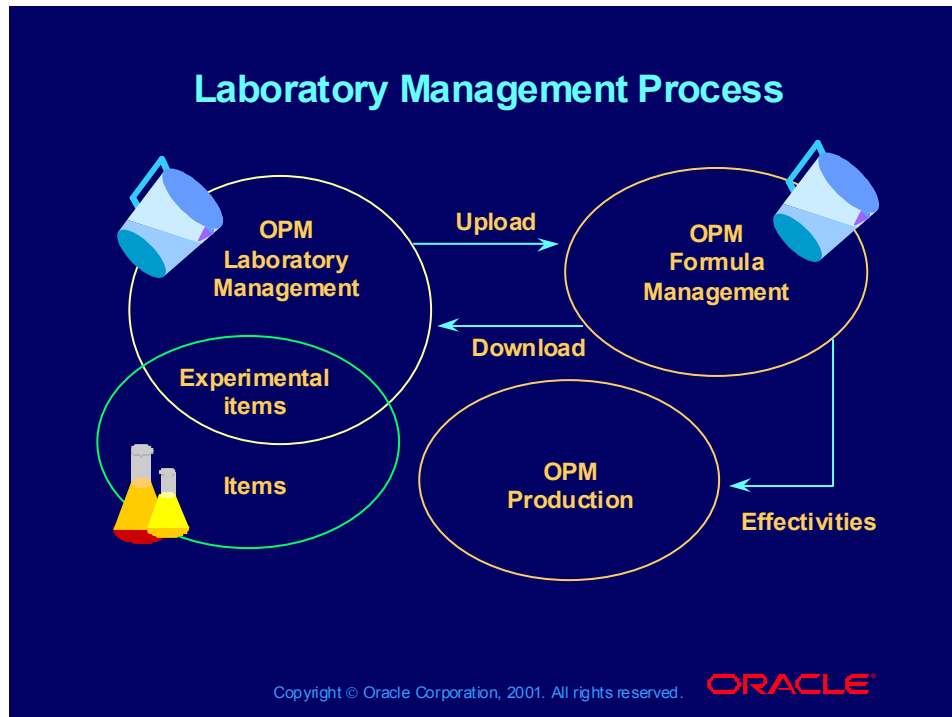
### Supporting Multiple Laboratories

Using OPM Lab Management, you can support multiple laboratories within a single enterprise. You can then standardize your global laboratory network on a single formula development platform and gain the following advantages:

- Easier data administration
- Greater information integrity
- More efficient maintenance of multiple products and product lines

## Laboratory Management Process

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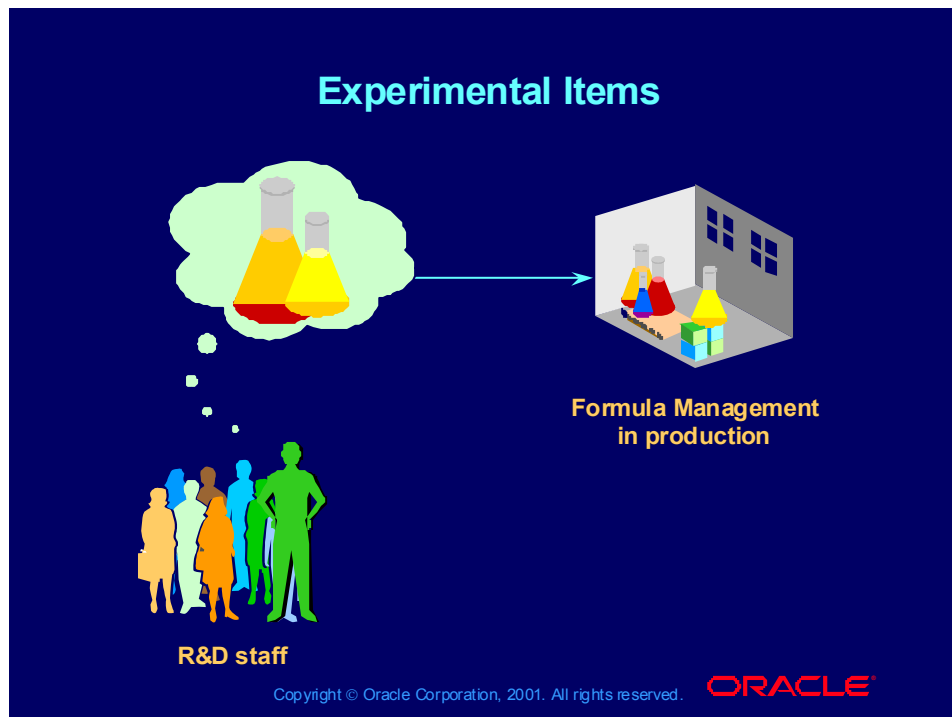
### The Laboratory Management Process

Using OPM Laboratory Management, you can reduce the costs associated with creating and modifying formulas. By integrating with OPM Formula Management, you can characterize and simulate the properties of formula ingredients and their effects on formulas.

By using multiple laboratory types across the organizations, the laboratory types provide a collection of grouped technical parameters.

## Experimental Items

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### Formula Experimentation

Using OPM Lab Management, you can designate experimental items that are maintained independently of your live formulation and production areas. This way, you can model new formulations without inadvertently sending experimental formulas to production. When you are ready, you can upload the formula developed with OPM Lab Management to Formula Management for use in production.

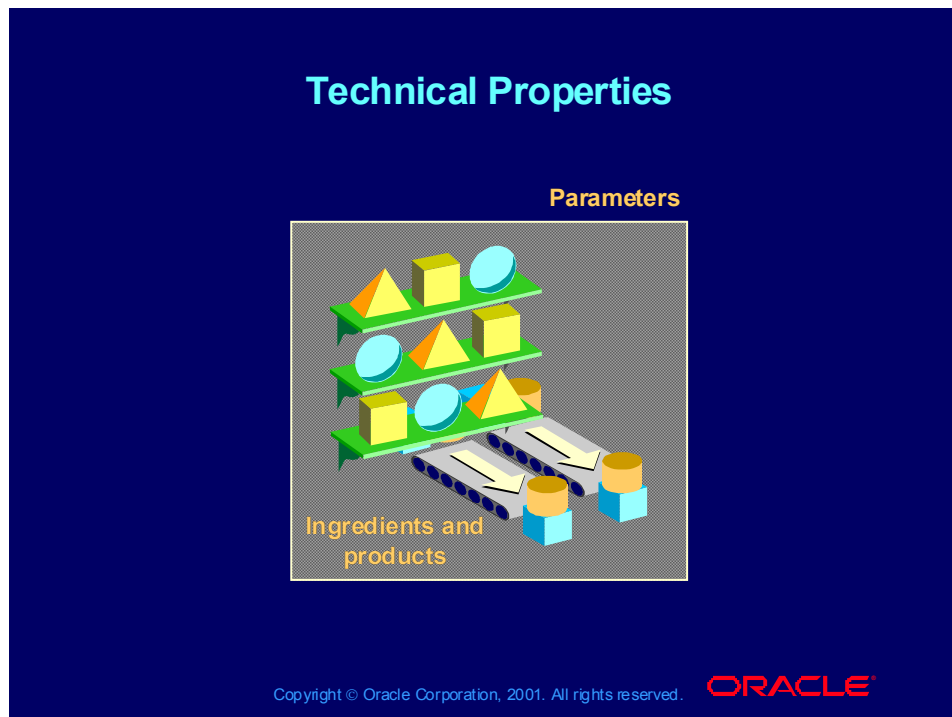
Your research and development (R&D) staff can use OPM Lab Management to achieve the following:

- Establish new formulations
- Adjust ingredient quantities
- Experiment with new ingredients
- Calculate product specifications before producing expensive, time-consuming lab test batches

Reformulation or revision of existing formulas can be based on the existing product formulations in OPM Formula Management, which can be sent directly to OPM Laboratory Management.

## Technical Properties

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### Defining Relevant Measurable Technical Properties

OPM Lab Management enables you to define relevant, measurable technical properties for your own ingredients and products.

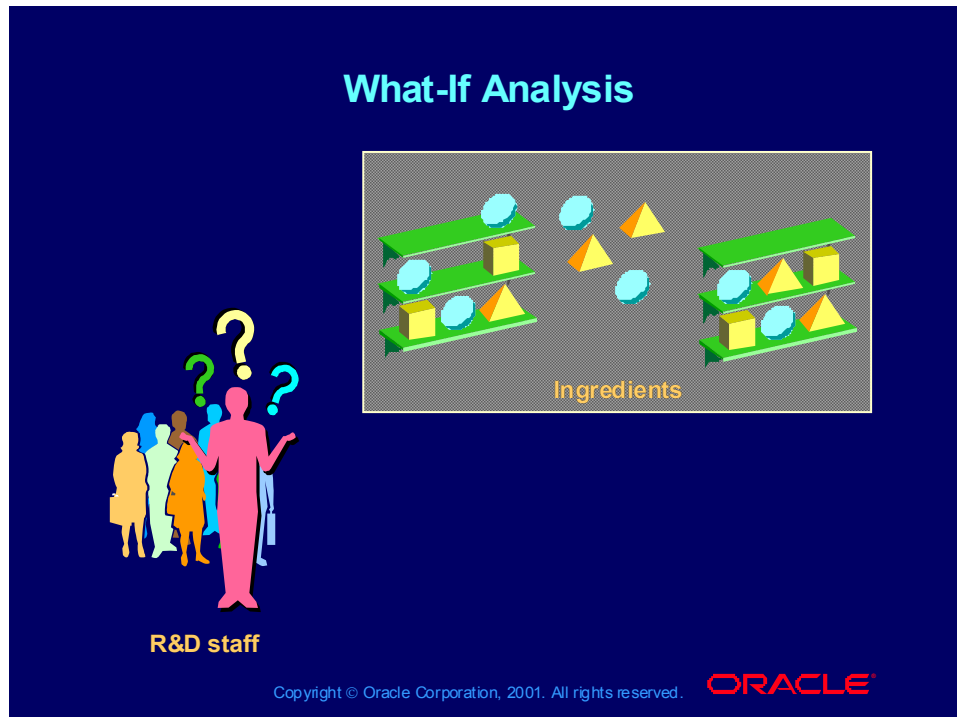
These technical parameters can include density, viscosity, acidity and concentration, and quality control assays defined in OPM Quality Management. This feature simplifies the calculation of technical parameters for finished products and the calculation of the contributions of individual ingredients.

With technical parameters you can do the following:

- Calculate the contributions of individual ingredients to overall technical parameters
- Specify acceptable minimum and maximum value ranges for technical parameters
- Change technical parameters to respond to new market demands or regulatory requirements

# What-If Analysis

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## Performing What-If Analysis

With OPM Lab Management, your R&D staff has a laboratory spreadsheet. Using this, the staff can manipulate ingredient quantities, substitute ingredients, or add new ingredients to the formulation while measuring the effects of each change on product quality and technical properties.

OPM Lab Management enables R&D to do the following:

- Model multiple lab formula versions by calculating ingredient changes on a laboratory spreadsheet
- Project product technical and quality specifications before producing test batches
- Adjust formulations based on quality and technical characteristics of inventory ingredients from OPM Inventory Management
- Perform cost analyses during formulation or reformulation

# **Formula Management Setup**

## **Chapter 2**

# 11i Oracle Process Manufacturing Formula and Laboratory Management

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## **11i Oracle Process Manufacturing Formula and Laboratory Management**

### **Setup**

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### Objectives

**After completing this lesson, you should be able to do the following:**

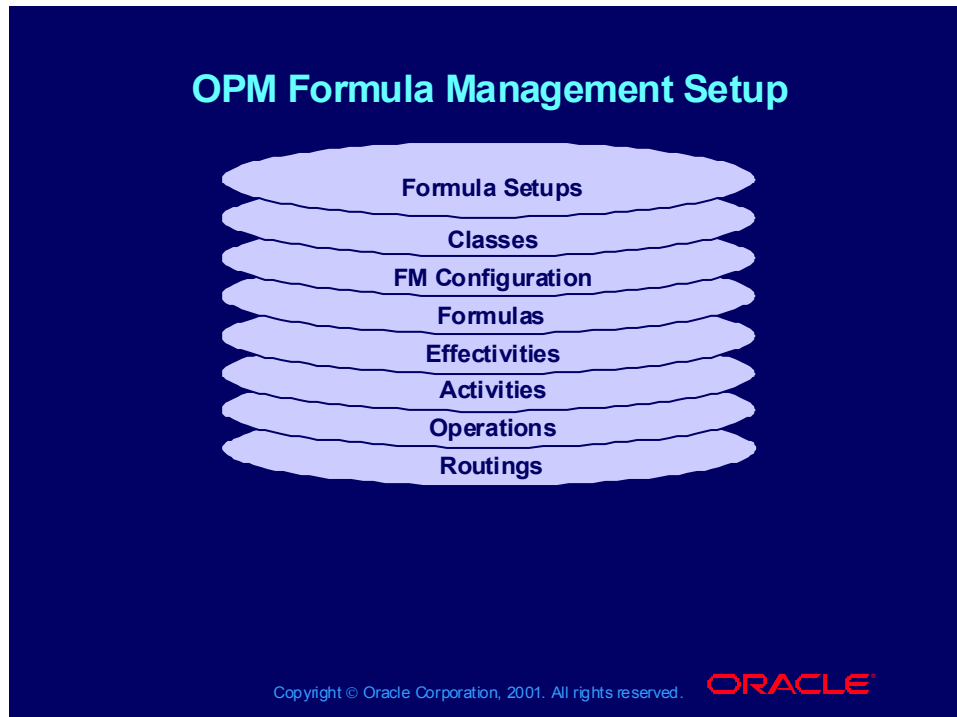
- **Perform formula classification code setups:**
  - **Formula classes**
  - **Operation classes**
  - **Routing classes**
- **Understand and define Formula Management (FM) Configuration**

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# OPM Formula Management Setup

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## Formula Setup

After completing the required setup in other OPM responsibilities, you can now begin working in the Formula Management responsibility. In the graphic above only these features are needed to use Formula Management:

- Classes
- FM Configuration
- Formulas
- Effectivities

Three features are optional but must be set up in the order they are presented:

- Activities
- Operations
- Routings

## Defining Formula Classification Codes

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### Defining Formula Classification Codes

**Go to the Formula Classes window to enter classes that group formulas with similar characteristics and requirements for reporting purposes**

**OPM Product Development Responsibility  
Formula Management (N) Setup > Formula Classes**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Management Prerequisites > Setting Up Formula Classes (Optional)  
... > Setting Up Formula Classes (Optional) Procedure  
... > Formula Classes Field Reference

### Formula Class Details

Classification codes categorize formulas, operations, and routings with similar characteristics for grouping and reporting purposes. For example, you can classify all formulas for acrylic paints and all formulas for water-based paints. Defining classification codes is optional.

In the Formula Classes window, enter the formula class and a brief description to which a formula may belong.

## Defining Operation Classes

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### Defining Operation Classes

**Go to the Operation Classes window to group operations with similar characteristics and requirements for reporting purposes.**

**OPM Product Development Responsibility  
Formula Management (N) Setup > Operation Classes**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Management Prerequisites > Setting Up Operations Classes

... > Setting Up Operations Classes Procedure

... > Operation Classes Field Reference

## Defining Routing Classes

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### Defining Routing Classes

**Go to the Routing Classes window to group routings with similar characteristics and requirements for reporting purposes.**

**OPM Product Development Responsibility  
Formula Management (N) Setup > Routing Classes**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Management Prerequisites > Setting Up Routing Classes (Optional)

... > Setting Up Routing Classes (Optional) Procedure

... > Routing Classes Field Reference

## Setting Up Formula Management Configuration

---

### Setting Up Formula Management Configuration

Go to the Configurations window to enter parameters that control the creation of effectivity records in Formula Management. Effectivity records specify when and in what circumstances a formula can be used.

OPM Product Development Responsibility  
Formula Management (N) Setup > Configuration

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(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Formula Management User's Guide > Formula Management Prerequisites > Setting Up Configurations for Effectivity Records

... > Setting Up Configurations for Effectivity Records Procedure

... > Configurations Field Reference

**Note:** If you do not fill out the Configurations window, effectivity records must be entered manually.

### Practice 2-1

The practice covers defining classification codes for formulas, operations, and routings.



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### Practice 2-1

#### Defining Classification Codes

Classification codes are used for grouping or reporting purposes, and setup is optional.

In all of the following practices, substitute your unique identifier, such as your initials or terminal number, where you see *XX*.

#### Formula Classes

Create three formula classes that represent packaged formulas, bulk formulas, and intermediate formula groups (each identifier cannot exceed eight characters):

- *XXPACK*
- *XXBULK*
- *XXINTER*

#### Operation Classes

Create two operation classes that represent bulk and intermediate operation groups (each identifier cannot exceed four characters):

- *XXBK*
- *XXIN*

#### Routing Classes

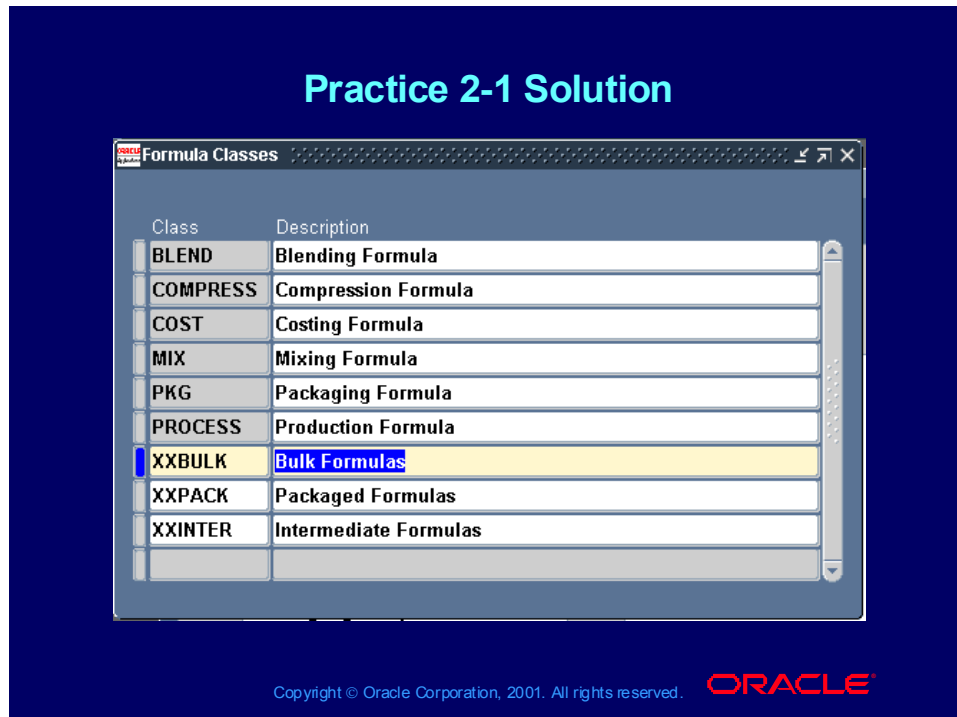
Create two routing classes that represent simple and complex formula routings (each identifier cannot exceed four characters):

- *XXSM*
- *XXCX*



## Practice 2-1 Solution

---



### Practice 2-1 Solution

#### Defining Classification Codes

Classification codes are used for grouping or reporting purposes, and setup is optional. In all the following practices, substitute your unique identifier, such as your initials or terminal number, where you see *XX*.

#### Formula Classes

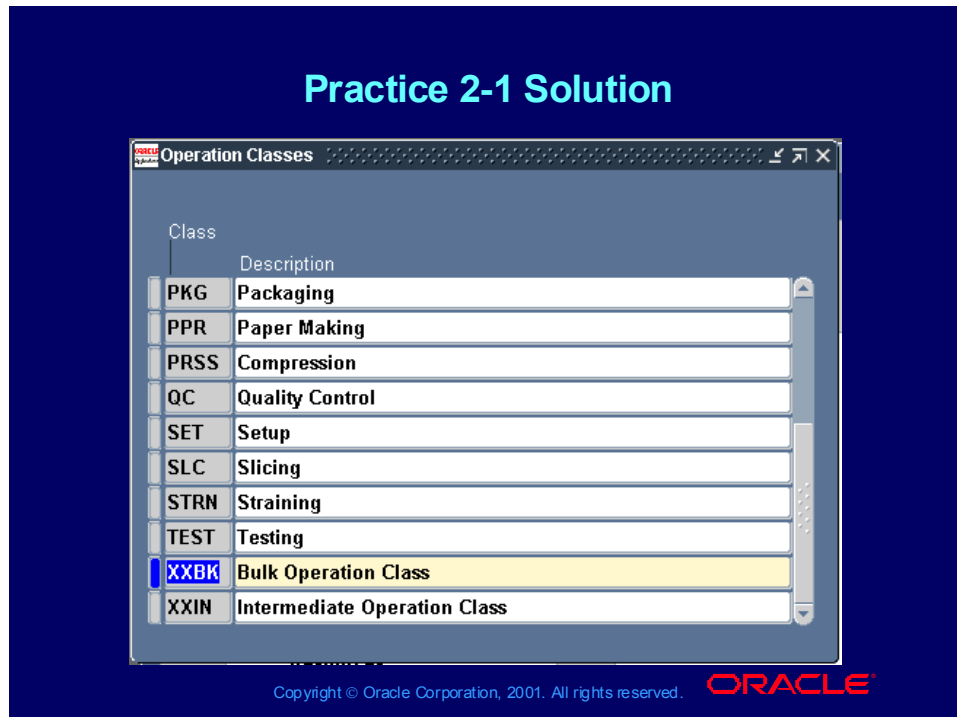
Open the Formula Class window:

(N) OPM Product Development>Formula Mgmt>Setup>Formula Classes

1. Enter your unique identifier for each formula class (*XXPACK*).
2. Enter a description for this classification.
3. Save your work.

## Practice 2-1 Solution

---



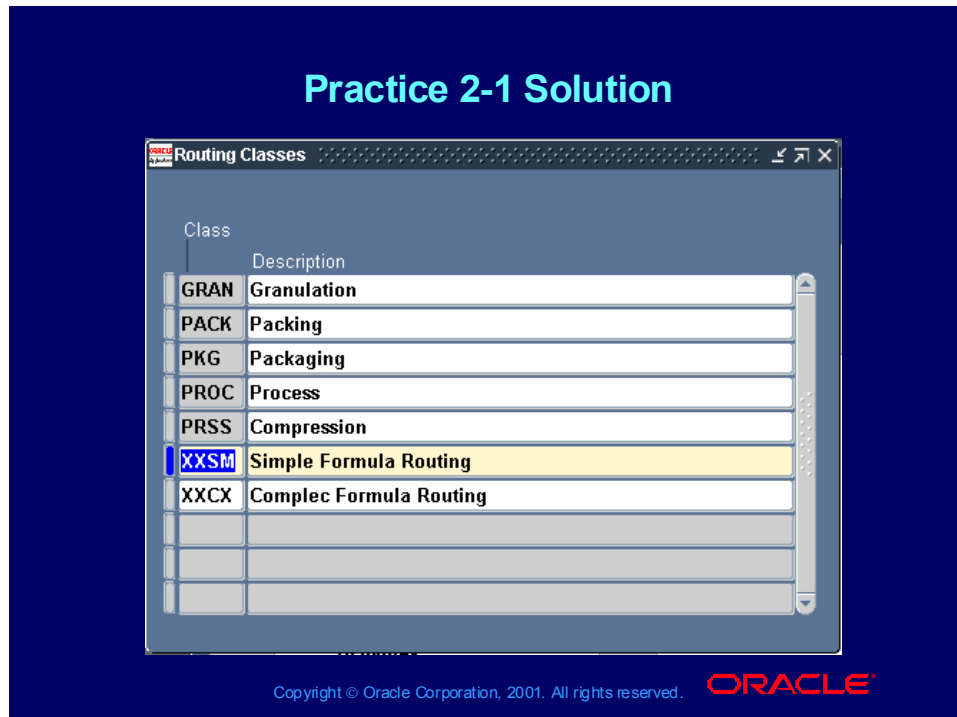
### Practice 2-1 Solution (continued)

#### Operation Classes

1. Open the Operation Classes window:  
(N) OPM Product Development > Formula Mgmt > Setup > Operation Classes
2. Enter your unique identifier for each operation class (*XXBK*).
3. Enter a description for this classification.
4. Save your work.

## Practice 2-1 Solution

---



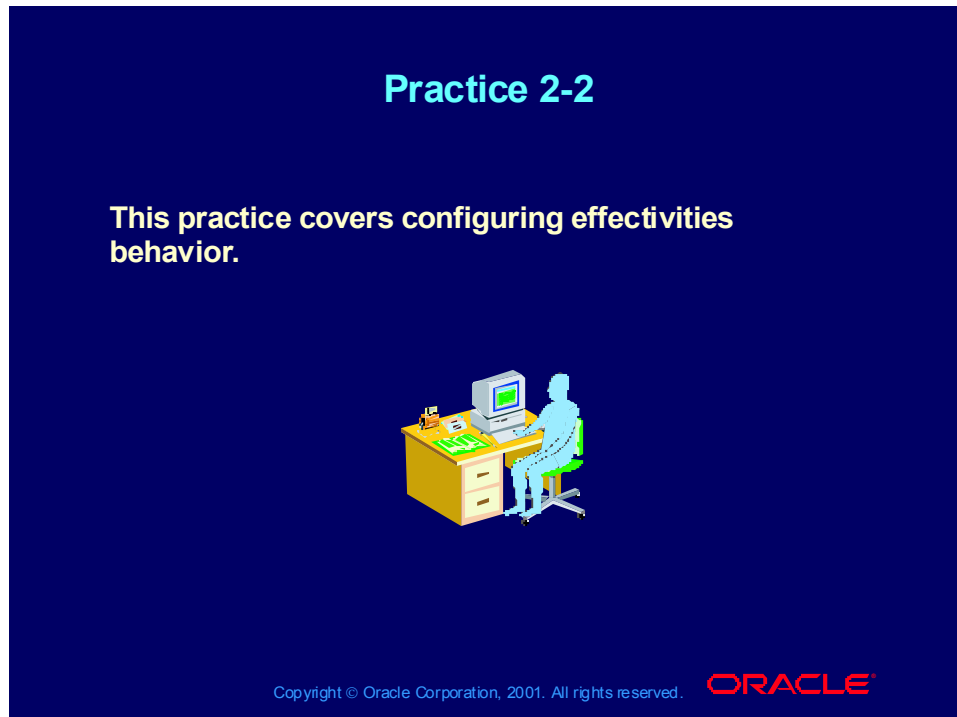
### Practice 2-1 Solution (continued)

#### Routing Classes

Open the Routing Classes window:

(N) OPM Product Development > Formula Mgmt > Setup > Routing Classes.

1. Enter your unique identifier for each routing class (*XXSM*).
2. Enter a description for this classification.
3. Save your work.



### Practice 2-2

#### Defining Formula Management Configuration

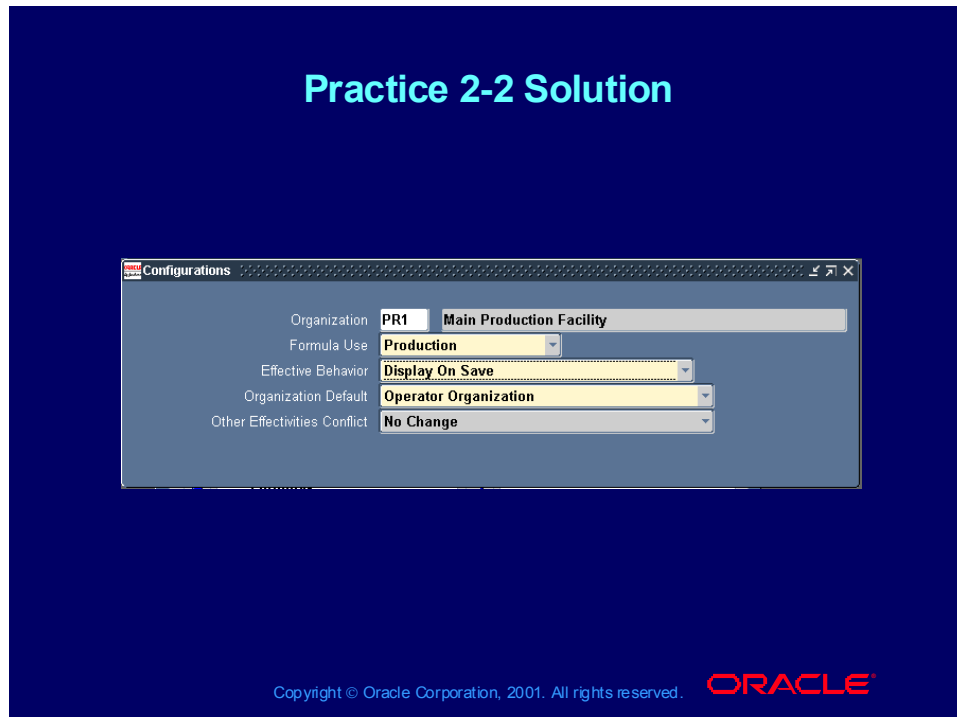
Enter the parameters that control the creation of effectivity records in Formula Management.

**Note:** If you do not fill out the Configurations window, effectivity records must be entered manually.

- 1 Set the organization to your unique identifier (*XXPI*) and specify that the formulas be used for production.
- 2 What happens when you set the effective behavior to Manual Entry?
- 3 Now set the effective behavior to Automatic Generation. Which fields remain?
- 4 Have OPM prompt you to enter an effectivity for this class. Make this effectivity valid for only your organization.

## Practice 2-2 Solution

---



### Practice 2-2 Solution

#### Defining Formula Management Configuration

Enter the parameters that control the creation of effectivity records in Formula Management.

**Note:** If you do not fill out the Configurations window, effectivity records must be entered manually.

- 1 Set the organization to your unique identifier (*XXPI*) and specify that the formulas be used for production.
  - a. Open the FM Configuration window:  
(N) Product Development > Formula Mgmt > Setup > Configuration
  - b. Enter the organization with your unique identifier.
  - c. Select Production from the drop-down list in the Formula Use field.
  - d. Select Manual Entry from the drop-down list in the Effective Behavior field.
- 2 What happens when you set the effective behavior to Manual Entry? The Other Effectivities Conflict field is not accessible.
- 3 Now set the effective behavior to Automatic Generation. Which fields remain?

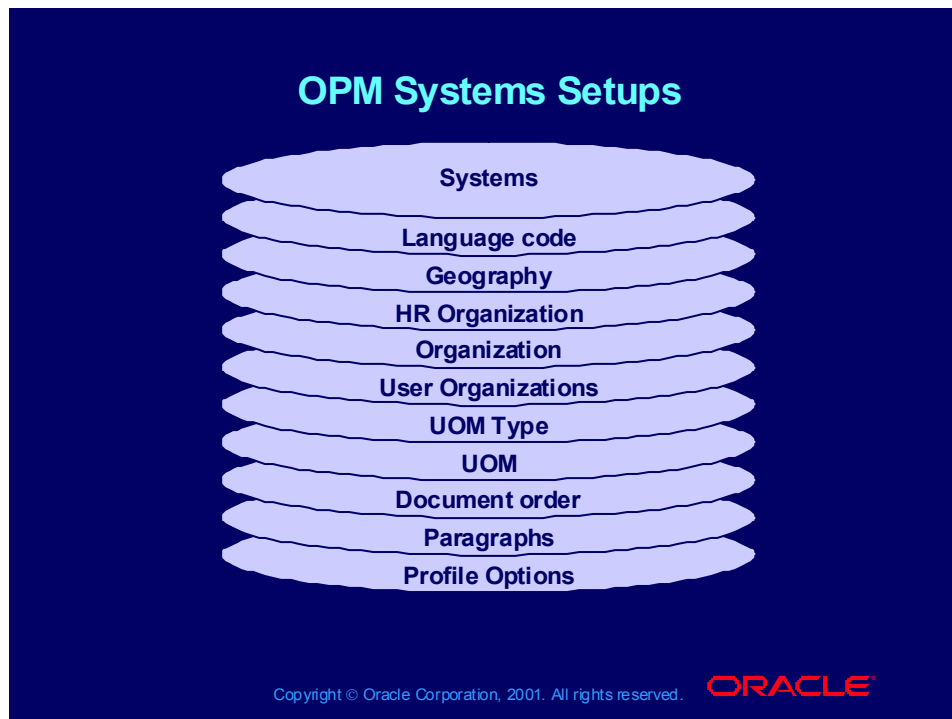
Select Automatic Generation from the drop-down list in the Effective Behavior field. All fields are now accessible.

- 4 Have OPM prompt you to enter an effectivity for this class. Make this effectivity valid for only your organization.

- a. Select Display on Save from the drop-down list in the Effective Behavior field.
- b. Select Operator Organization from the Organization Default field.
- c. Save your work.

## OPM Systems Setups

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### Systems Setup

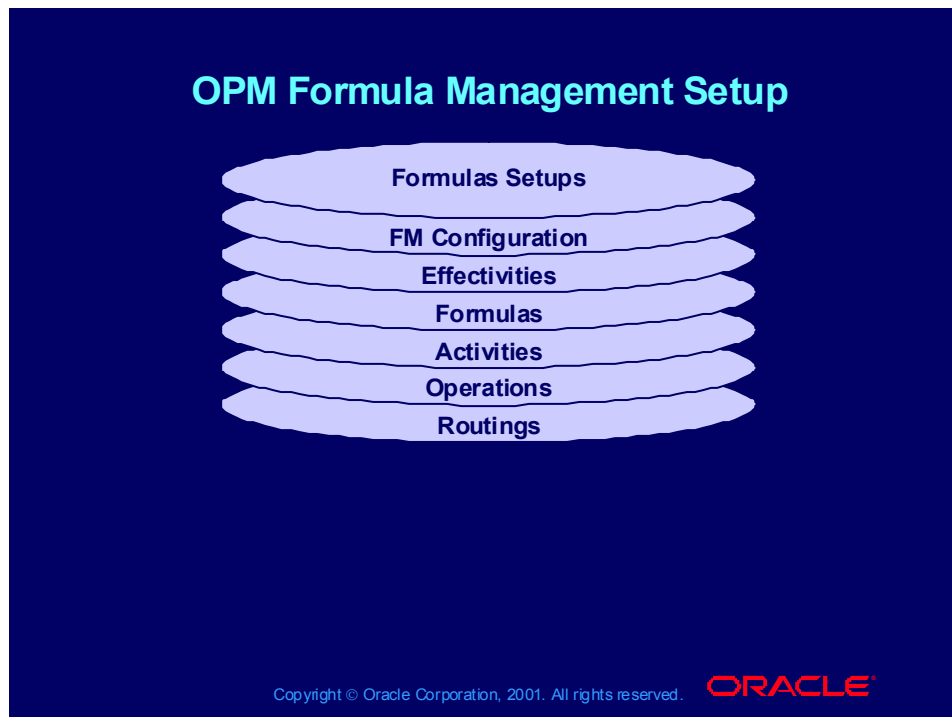
You would not be able to use OPM Formula Management without the setup described in this lesson. Before you can define the formulas to be used in OPM, you must define the raw material items to be included in those formulas. Also, you must define the final product items and any by-products and co-products that will result from processing the formula.

You establish this data in two of the other OPM core responsibilities: OPM Systems and OPM Inventory. It is recommended that you have a working understanding of these core responsibility functions and how they are applied in your enterprise. This will enhance your understanding of how the data in these modules is used in Formula Management.

The diagram in the slide gives the order in which the setups should be performed. For more information about each of these functions, see the Oracle Process Manufacturing Implementation Guide and the online Help for each form.

## OPM Formula Management Setup

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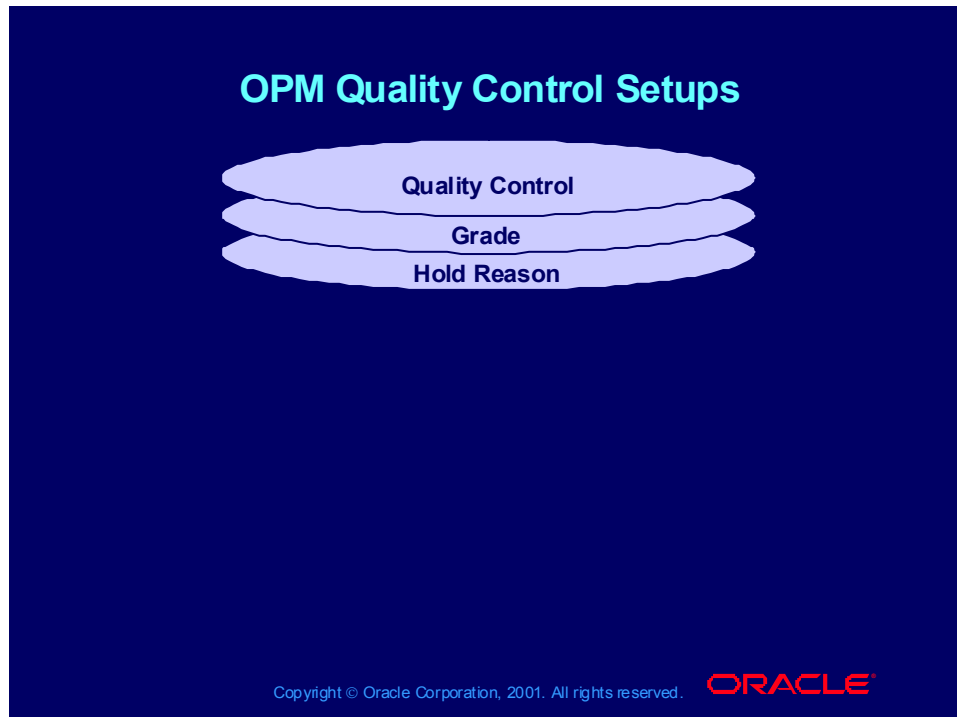
### OPM Formula Management Setup

FM Configuration is an optional setup. Prior to setting up formulas, set up configurations for the effectivity records. You use the Configurations window to enter parameters that control the creation of effectivity records in Formula Management. If you do not use the Configurations window to specify how effectivity records are to be created, you must enter effectivities manually. For more information on configurations and effectivities, see the Oracle Process Manufacturing Formula Management User's Guide and the online Help for each form.



## OPM Quality Control Setups

---

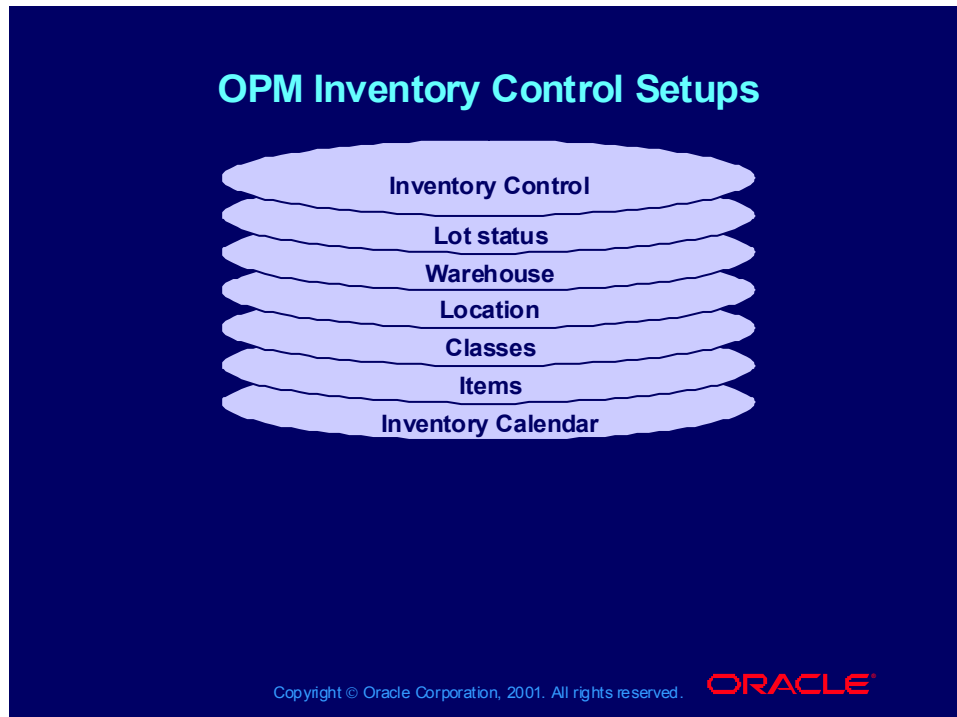


### Quality Setup

Following the OPM Systems setup, there is additional setup that needs to be performed in the Quality Control responsibility. Although this setup can be considered optional, if you are going to use OPM Quality Control, you must enter the minimum required setup of grades and hold reason codes before you begin entering your setup data in OPM Inventory. The diagram in the slide depicts the minimum required setup for Quality Control. For more information about OPM Quality Control, see the Oracle Process Manufacturing Quality Management User's Guide and the online help for each form.

## OPM Inventory Control Setups

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### Inventory Setup

After completing the required setup in OPM Systems and OPM Quality Control, you must set up data in the OPM Inventory responsibility. The diagram in the slide depicts the sequence of the setup, although the Inventory Classes are optional. For more information about the Inventory responsibility, see the Oracle Process Manufacturing Inventory Management User's Guide and the online help for each form.

## Summary

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### Summary

**In this lesson, you should have learned how to:**

- **Create formula classification codes for reporting and sorting purposes**
- **Identify requirements for the FM Configurations window**

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### Summary

Although this lesson identifies setup that is completed before creating formulas, classifications and FM Configuration are all optional setup. Classifications are primarily used for sorting and reporting. Classes can be added or changed at any time. You are not required to use the Configurations form. If you do not use this form to specify how effectivity records are to be created, you must enter formula effectivities manually.



# **Creating Formulas**

## **Chapter 3**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Creating Formulas**

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### Objectives

**After completing this lesson, you should be able to do the following:**

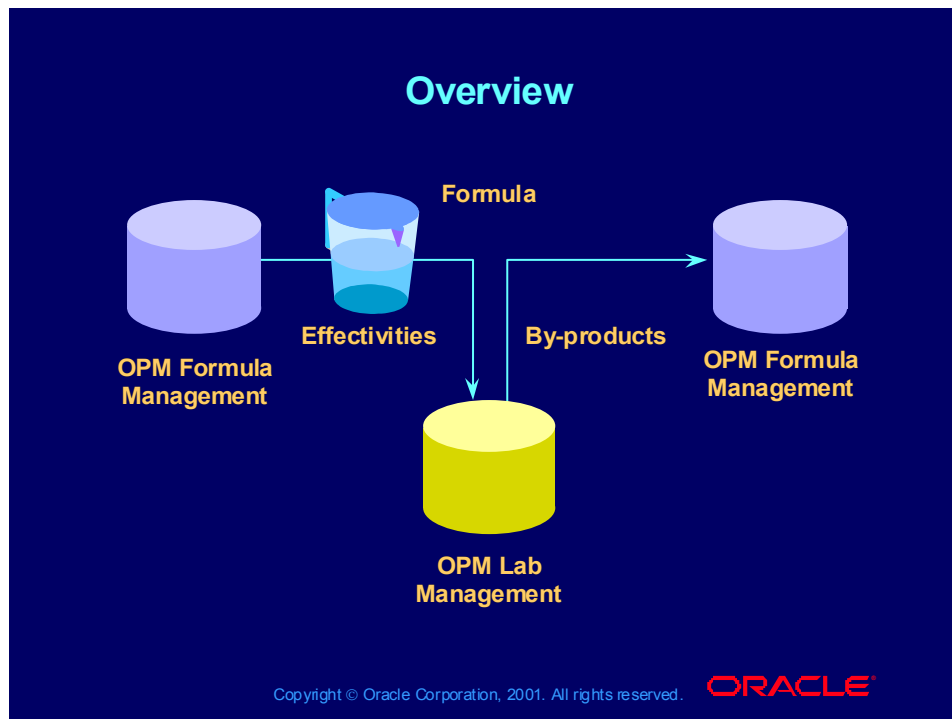
- **Describe formula features**
- **Describe formula effectivities**
- **Create formulas**

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## Overview

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## Defining a Formula and the Products It Yields

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### Defining a Formula and the Products It Yields

**Go to the Formulas window to enter header and product information for a formula.**

**OPM Product Development Responsibility  
Formula Management (N) Formulas**

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## Designating Formula Ingredients

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### Designating Formula Ingredients

**Go to the Formula Ingredients window to enter ingredients and ingredient quantities for a formula.**

**OPM Product Development Responsibility  
Formula Management (N) Formulas (B) Ingredients**

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### Defining Formula By-Products

**Go to the Formula By-products window to enter by-products and by-product quantities for a formula. By-products are items produced by a formula. However, they differ from products in that you do not plan your production to make by-products, and you cannot cost by-products.**

**OPM Product Development Responsibility  
Formula Management (N) Formulas (B) By-products**

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## Defining Additional Formula Header Information

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### Defining Additional Formula Header Information

Go to the Formula Additional Information window to add or inquire about additional information for a specific product or coproduct in a formula.

OPM Product Development Responsibility  
Formula Management (N) Formulas (M) Actions > Additional  
Information

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## Defining Additional Formula Ingredient Information

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### Defining Additional Formula Ingredient Information

**Go to the Formula Additional Information window to add or inquire about additional information for a specific ingredient or by-product in a formula.**

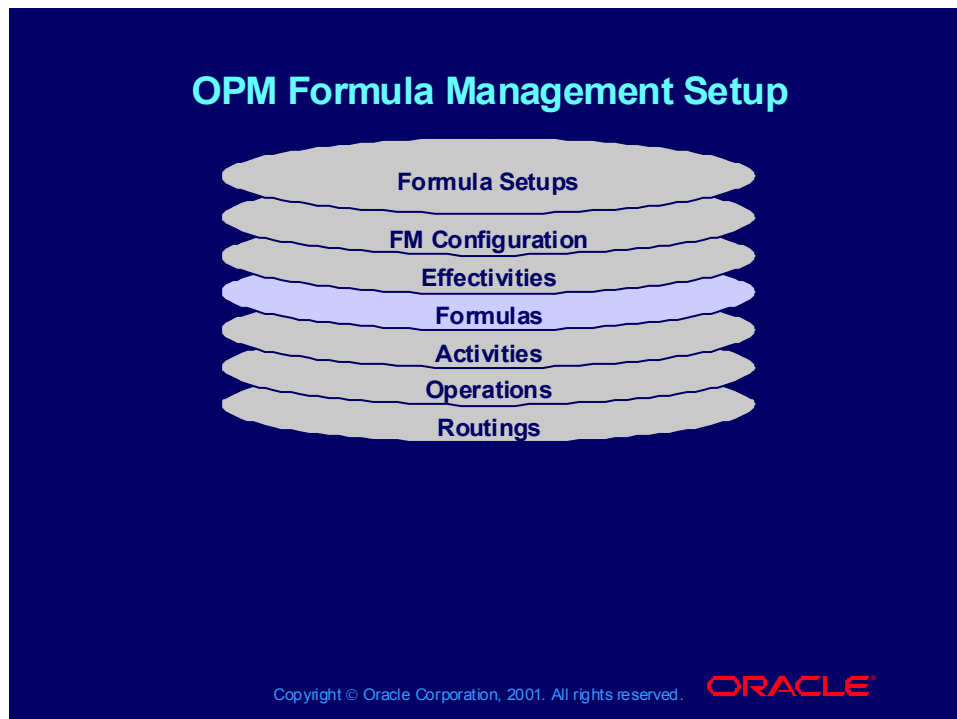
**OPM Product Development Responsibility  
Formula Management (N) Formulas (B) Ingredients (M) Actions >  
Additional Information**

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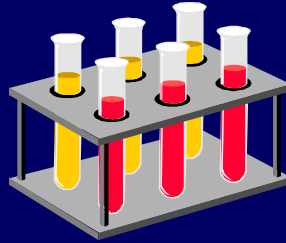
## OPM Formula Management Setup

---



### Practice 3-1

This hands-on practice covers creating formulas.

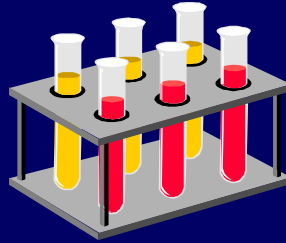


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### Practice 3-1 Solution

This hands-on practice covers creating formulas.



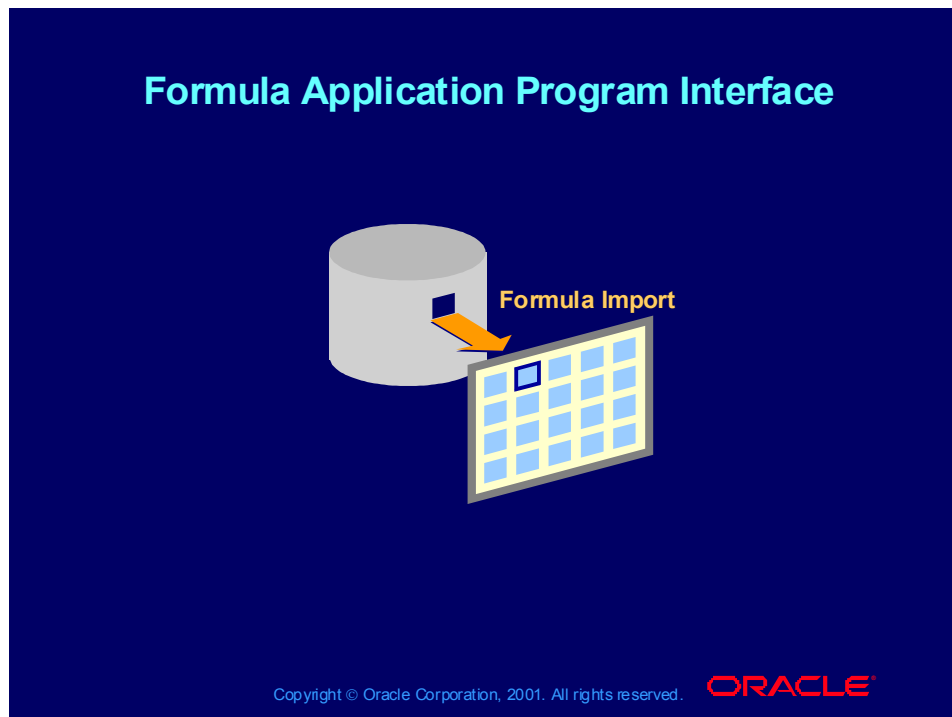
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# Formula Application Program Interface

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## Formula Application Program Interface (API)

A new Application Program Interface (API) has been added to enable the import of formulas from outside sources (legacy systems, other third-party systems, spreadsheets, RF devices, etc.) into the OPM database. The following provides a brief description of the functions available from the API:

- **Create Formula:** Handles the creation of formula header, formula detail, and formula effectivity records. Also handles update and delete functions on the formula header.
- **Formula Detail:** Handles inserts, updates, and deletes of products, ingredients, and by-products.
- **Formula Effectivity:** Handles inserts, updates, and deletion of effectivity records.
- **Sample Wrapper Function:** Parses the formulated information from a flat (text) file and structures the data into PL/SQL table format that is then passed as a parameter to the API.

### Summary

**In this lesson, you should have learned how to:**

- **Differentiate the features of a formula**
- **Explain formula effectivities**
- **Enter formulas**

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# **Creating Routings**

## **Chapter 4**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Creating Routings**

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## Objectives

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**Objectives**

**After completing this lesson, you should be able to do the following:**

- Explain formula routings
- Create formula routings

```
graph TD; Routing[Routing] --> Operation1[Operation]; Routing --> Operation2[Operation]; Operation1 --> Resource1[Resource]; Operation1 --> Activity1[Activity]; Operation2 --> Resource2[Resource]; Operation2 --> Activity2[Activity];
```

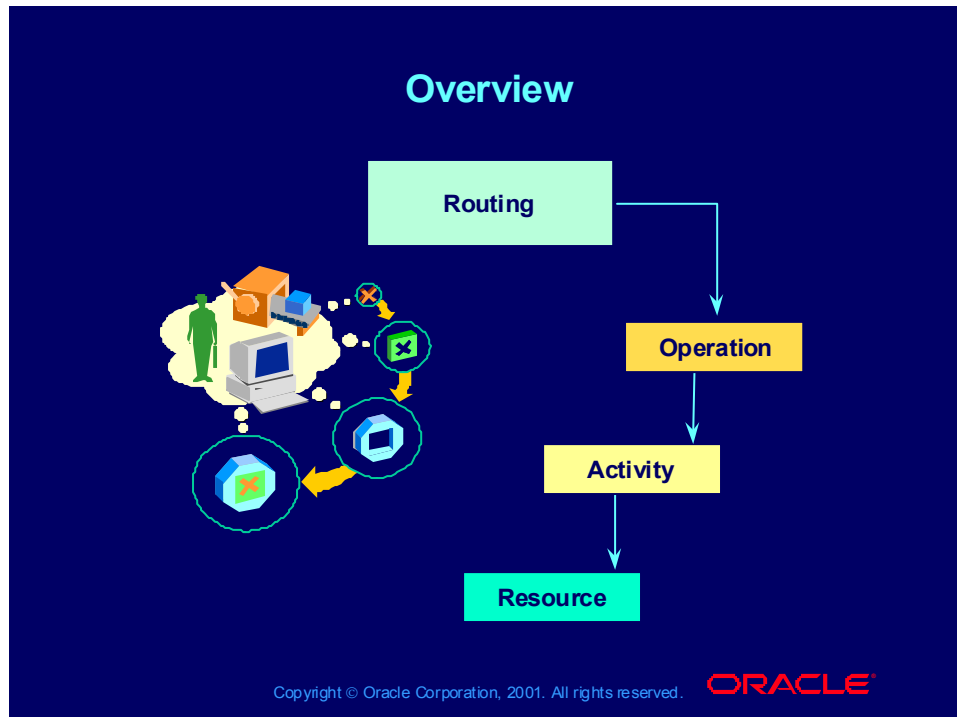
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### Objectives

This lesson discusses what a routing is, how a routing is defined, and how a routing is associated with a formula. OPM uses routings to include the noninventory costs associated with the manufacturing process as part of product cost rollups. For more information on cost rollups, see the Oracle Process Manufacturing Cost Management User's Guide and the online help for each form.

## Overview

---



### Overview

While a formula defines the ingredients that are used to manufacture a product, a routing defines the noninventory resources that are used to manufacture that product. Within each routing are the operations that are performed at each step of production, and the noninventory resources (such as equipment or labor) that are required to perform the operations. These operations use resources to change ingredients into products.

#### Definitions

**Routing:** A sequence of operations

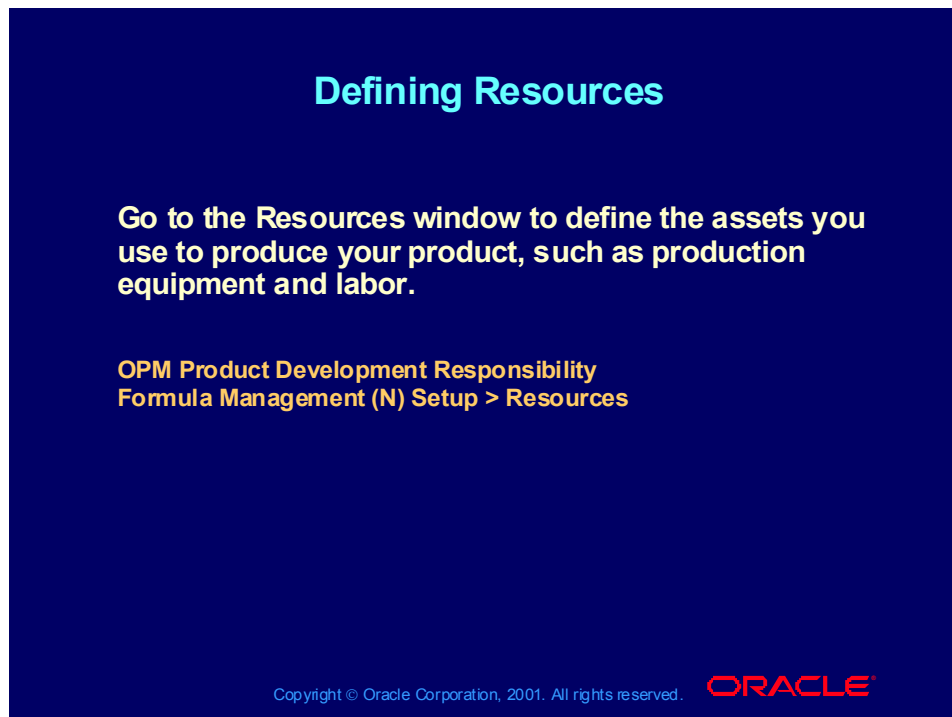
**Operation:** A resource, or group of resources, performing activities at specified rates

**Activity:** An action performed during the manufacturing process with a resource

**Resource:** Any noninventory items consumed in production (for example, equipment, labor, and energy)

## Defining Resources

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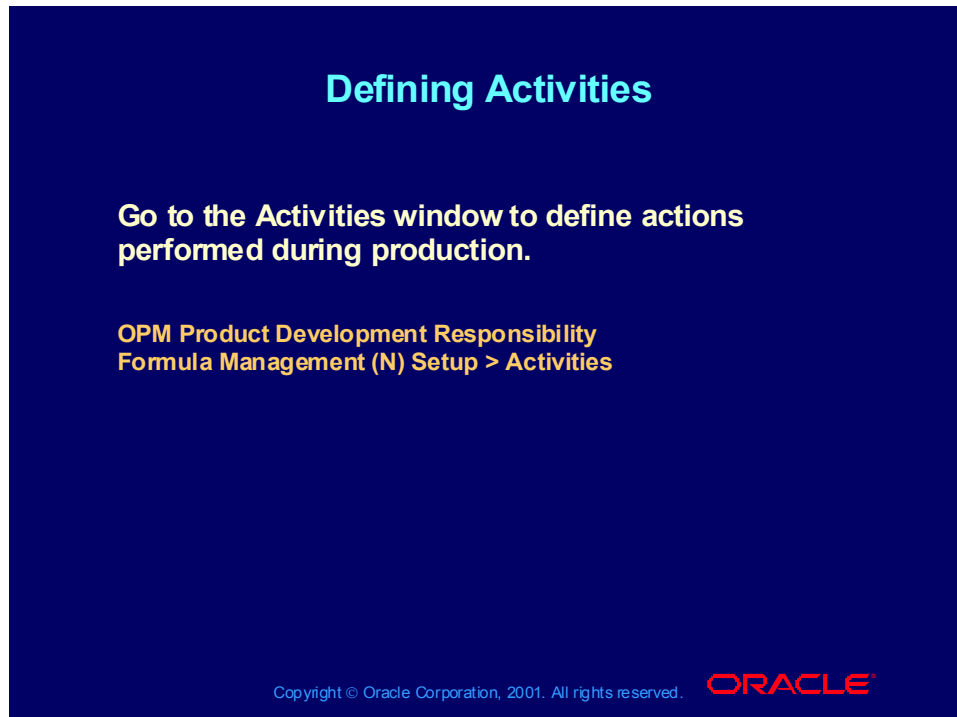


(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Setup > Routings Setup > Setting Up Resources  
... > Setting Up Resources Procedure  
... > Resources Field Reference

**Note:** The use of resources as a consumable element of the process enables OPM to calculate product cost based on materials and resources consumed to yield a product. By associating resource and rate information with a formula, you can also perform finite resource capacity planning, using a capacity planning application, based on product quantities scheduled for production.

## Defining Activities

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Routings Setup > Setting Up Activities  
... > Setting Up Activities Procedure  
... > Activities Field Reference



## Defining Routing Operations

---

### Defining Routing Operations

**Go to the Operations window to define operations.  
An operation is a combination of one or more  
activities performed in production batches, and the  
resources used to perform those activities.**

**OPM Product Development Responsibility  
Formula Management (N) Operations**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Routings Setup > Setting Up Operations  
... > Setting Up Operations Procedure  
... > Operations Field Reference

## Defining Production Routings

---

### Defining Production Routings

**Go to the Routings window to set up the sequence of operations or steps used during the manufacturing process.**

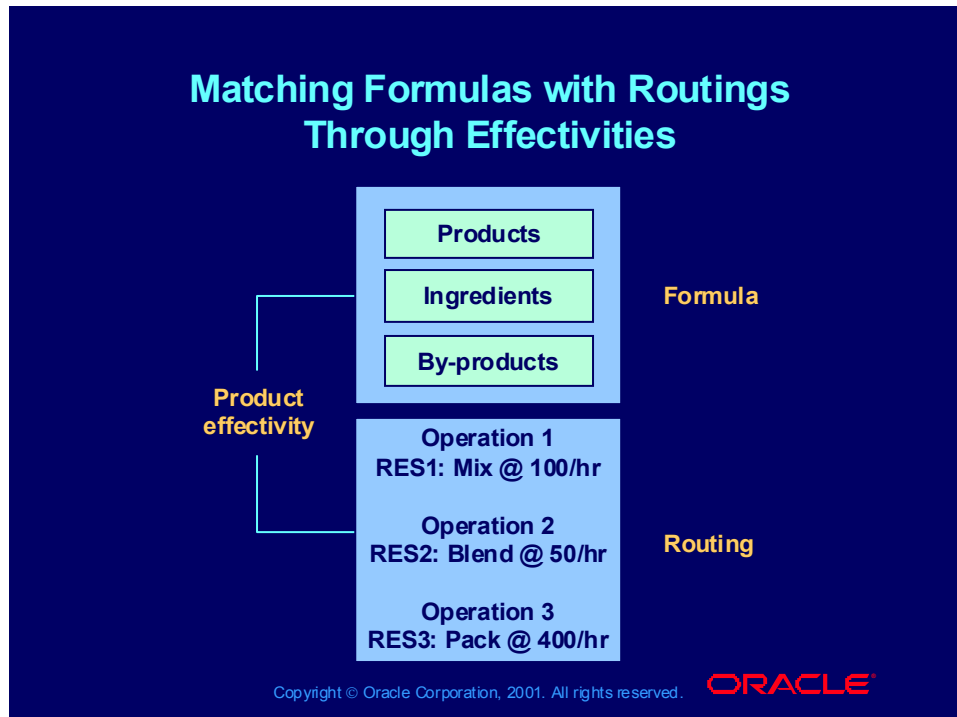
**OPM Product Development Responsibility  
Formula Management (N) Routings**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Routings Setup > Setting Up Routings  
... > Setting Up Routings Procedure  
... > Routings Field Reference

## Matching Formulas with Routings Through Effectivities



### Formula Effectivities

After you have set up routings, associate formulas used to manufacture products with the routings used with those formulas. That is, link the list of ingredients and products (the formula) with the sequence of operations (the routings) performed on the ingredients to manufacture the products.

Formulas and routings are linked in the Maintain Effectivities window.

## Practice 4-1

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### Practice 4-1

This practice covers defining activities, resources, and operations to create routings.



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### Practice 4-1

#### Creating Routings

In addition to telling OPM how to process the raw materials, you must provide information about your resources (the people and equipment you have available), the sequence in which you use those resources, and in what quantity.

Define the activities, resources, operations, and routings that will be used to capture that information.

#### Activities

Code	Description	AnCd
<i>XXACT1</i>	Name Process 1	VAL
<i>XXACT2</i>	Name Process 2	VAL
<i>XXACT3</i>	Name Process 3	VAL
<i>XXACT4</i>	Name Process 4	VAL

#### Resources

Resource	Description	UOM	Standard Class	Cost Component
<i>XXRES1</i>	Name Machine Resource 1	HR	From list of values	
<i>XXRES2</i>	Name Machine Resource 1	HR	From list of values	
<i>XXRES3</i>	Name Machine Resource 1	HR	From list of values	

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<i>XXRES4</i>	Name Machine Resource 1	HR	From list of values
<i>XXRES5</i>	Name Machine Resource 1	HR	From list of values
<i>XXRES6</i>	Name Machine Resource 1	HR	From list of values

### Operations

OPERATION	Operation 1	Operation 2	Operation 3	Operation 4
Operation	<i>XXOP1</i>	<i>XXOP2</i>	<i>XXOP3</i>	<i>XXOP4</i>
Description	Operation 1	Operation 2	Operation 3	Operation 4
Process Qty	LB	LB	LB	LB

### Resource Details

Resource	<i>XXRES5</i>	<i>XXRES5</i>	<i>XXRES5</i>	<i>XXRES6</i>
Activity	<i>XXACT1</i>	<i>XXACT2</i>	<i>XXACT3</i>	<i>XXACT4</i>

### Throughput

Process Quantity	100 LB	50 LB	100 LB	200 LB
Usage Quantity	1	1	1	1
UOM	HR	HR	HR	HR

### Scheduling Information

Plan Type	Secondary	Secondary	Secondary	Secondary
Count	1	1	1	1
Offset	0	0	0	0
Scale Type	Linear	Linear	Linear	Linear

### Resource Details

Resource	<i>XXRES1</i>	<i>XXRES2</i>	<i>XXRES3</i>	<i>XXRES4</i>
Activity	<i>XXACT1</i>	<i>XXACT2</i>	<i>XXACT3</i>	<i>XXACT4</i>

### Throughput

Process Quantity	100 LB	50 LB	100 LB	200 LB
Usage Quantity	1	1	1	1
UOM	HR	HR	HR	HR

### Scheduling Information

Plan Type	Primary	Primary	Primary	Primary
Count	1	1	1	1
Offset	0	0	0	0
Scale Type	Linear	Linear	Linear	Linear

**Routings**

ROUTING	<i>XXINTC</i>	<i>XXFGC</i>
Routing Number	<i>XXINTC</i>	<i>XXFGC</i>
Routing Version	1	1
Description	Complex Intermediate	Complex Finished
	Good Routing	Good Routing
Routing Quantity	100	100
UOM	LB	LB

**Routing Steps**

Step	10
Operation	<i>XXOP1</i>
Description	Operation 1
Step Quantity	100
UOM	LB
Step	20

Operation	<i>XXOP2</i>
Description	Operation 2
Step Quantity	100
UOM	LB
Step	30

Operation	<i>XXOP3</i>
Description	Operation 3
Step Quantity	100
UOM	LB

### Practice 4-1 Solutions

**This practice covers defining activities, resources, and operations to create routings.**



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### Practice 4-1 Solutions

#### Creating Routings

In addition to telling OPM how to process raw materials, you must provide information about your resources (the people and equipment you have available), the sequence in which you use those resources, and in what quantity.

Define the activities, resources, operations, and routings that will be used to capture that information.

#### Activities

Perform the following steps for each item:

1. Open the Activities window:  
(N) Product Development > Formula Mgmt > Setup > Activities
2. Enter a code to identify this activity.
3. Enter a description of this activity.
4. Select an analysis code from the list of values.
5. Save your work.

#### Resources

Perform the following steps for each item:

1. Open the Resources window:  
(N) Product Development > Formula Mgmt > Setup > Resources
2. Enter a code that identifies the resource.
3. Enter a description of the resource.

4. Select a valid unit of measure from the list of values.
5. (Optional) Select a resource class from the list of values.
6. Select a cost component class from the list of values.
7. Save your work.

### **Operations**

Perform the following steps for each item:

1. Open the Operations window:  
(N) Product Development > Formula Mgmt > Operations
2. Enter a code to identify this operation
3. Enter a description of this operation.
4. (Optional) Select an operation class from the list of values.
5. Enter the process quantity unit of measure.
6. Select the Throughput tab.
7. Enter a code for the resource being used.
8. Enter the activity that the resource will be performing.
9. Enter the process quantity of this resource.
10. Enter the usage quantity of this resource.
11. Enter the unit of measure for the usage quantity of the resource.
12. Select the Scheduling Information tab.
13. Select Primary from the list of values.
14. Enter the number of resources used for this resource and activity.
15. Enter the time delay (offset) between resources.
16. Select linear from the Scale Type drop-down list.
17. Select the Cost Information tsb to view the cost analysis code and cost component class retrieved.
18. Save your work.

### **Routings**

Perform the following steps for each item:

1. Open the Routings window:  
(N) Product Development > Formula Mgmt > Routings
2. Enter the routing number and routing version to identify this routing.
3. Enter a description of this routing.
4. (Optional) Select a routing class from the list of values.
5. Enter the process quantity and the unit of measure of this routing.
6. Enter a step number for the step.
7. Enter the operation code for the step.
8. Enter the quantity associated with this routing step.
9. Save your work.



### Summary

**In this lesson, you should have learned how to:**

- Describe formula routings
- Enter routings

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# **Defining Effectivities**

## **Chapter 5**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Defining Effectivities**

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## Objectives

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### Objectives

**After completing this lesson, you should be able to do the following:**

- **Describe effectivities**
- **Define a formula effectivity**
- **Maintain formula effectivities**

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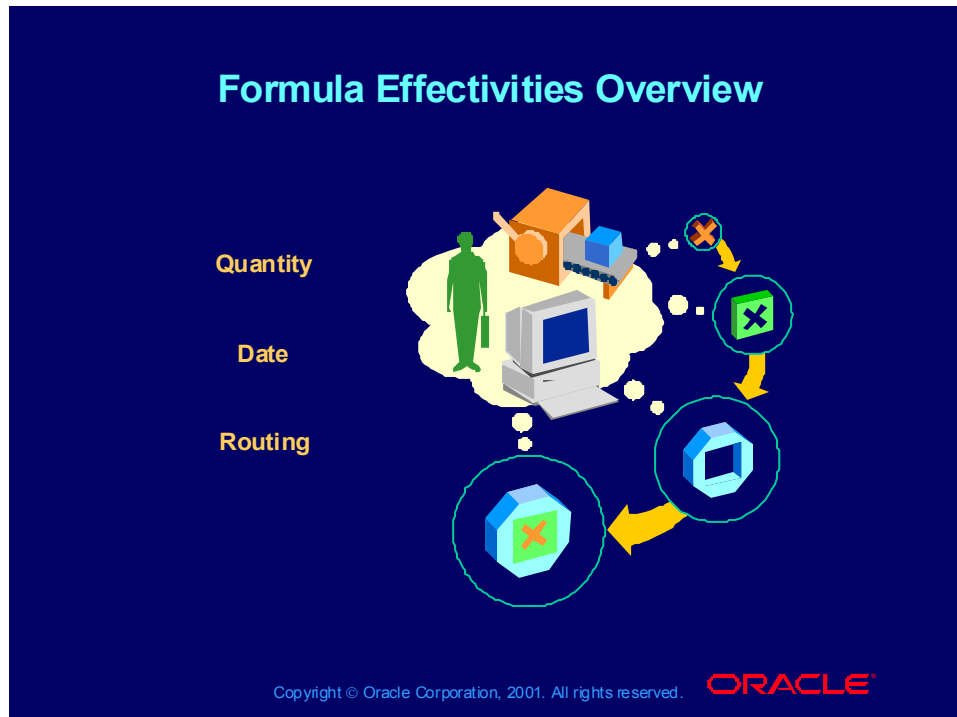
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### Objectives

This lesson discusses effectivity records, which specify when, under what conditions, and for what purpose a particular formula can be used. A formula effectivity can be based on organization, quantity ranges, date ranges, preferences, or routings.

## Formula Effectivities Overview

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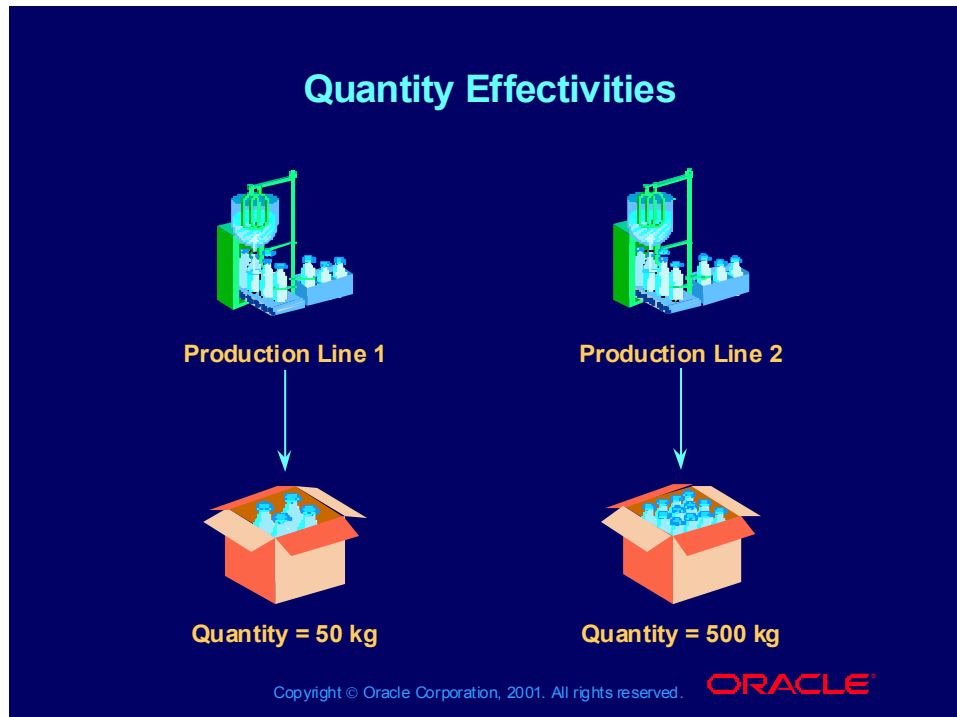


### Overview

Effectivities specify the conditions under which formulas can be used. They also specify the purpose for which formulas can be used (Formula Use). Effectivity behavior is controlled either automatically or manually, depending on criteria that has been setup prior to working with effectivities. If effectivities are to be created manually, there are two ways to access the Effectivities window: Retrieve a formula and select Effectivities from the Special menu, or select Effectivities directly from the Formula Management responsibility menu. If effectivities are to be created automatically, you must define this behavior in the FM Configurations window. Creating effectivities is required, because formulas cannot be used until an effectivity record is set up.

## Quantity Effectivities

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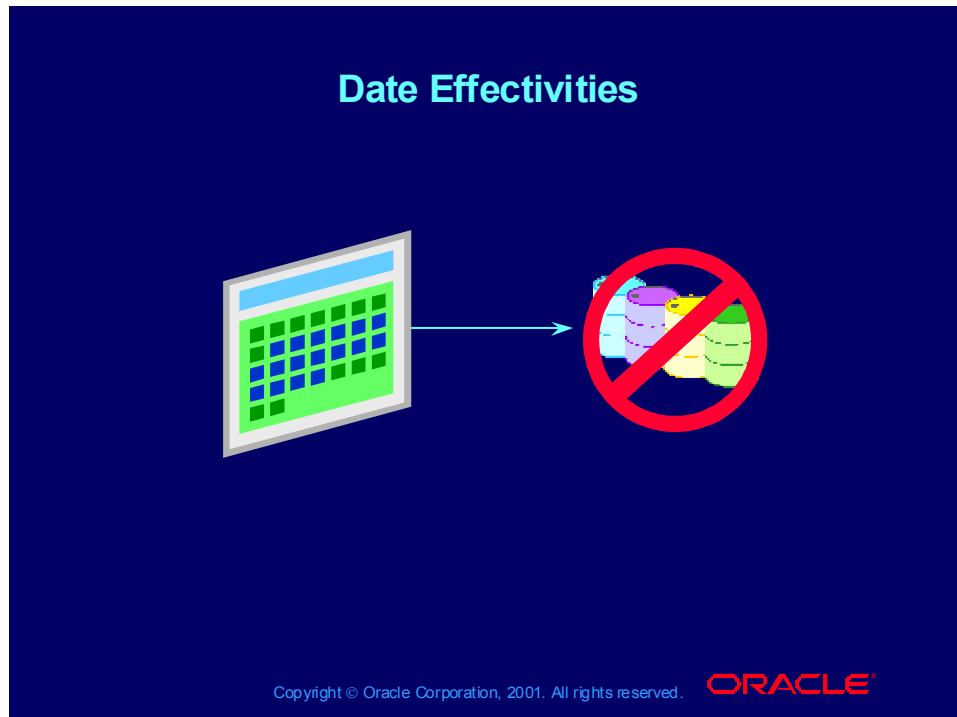


### Example of Quantity Effectivities

Two different production lines produce the same product. One line produces 50-kilogram batches, and the other produces 500-kilogram batches. The ratio of the ingredient quantities can differ depending on the size of the batch. You need either two formulas, or two versions of one formula, to produce the product. You must specify, by creating effectivity records, that the first formula is used when producing a 50-kilogram batch, and that the second formula is used when producing a 500-kilogram batch.

## Date Effectivities

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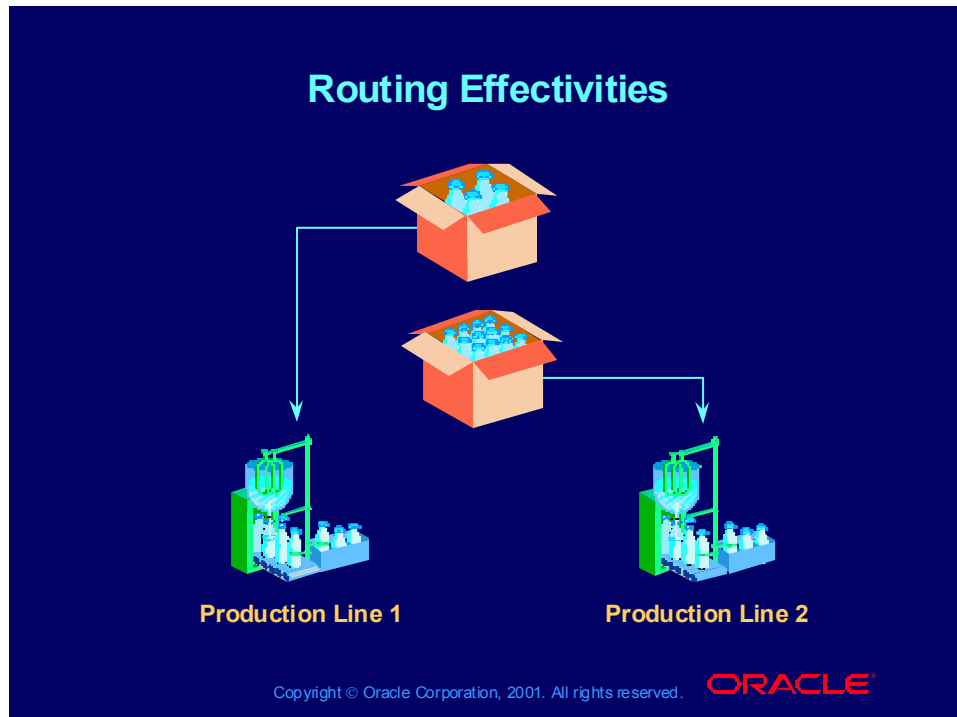
### Example of Date Effectivities

A formula uses chlorofluorocarbon. Government regulations state that this compound cannot be used after a certain date. You must define a formula that uses a substitute compound. You intend to use the old formula until the new rules take effect, then switch to the new formula. You would set the end date of the effectivity for the old formula to the last date on which the chlorofluorocarbon can be used. The start date of the effectivity for the new formula would be set to the date on which the new rules take effect.



## Routing Effectivities

---



### Example of Routing Effectivities

Effectivities can specify that 50-kilogram batches use production line 1, and that batches of 500 kilograms or more use production line 2. You would specify production lines by entering the routing that corresponds to the first line in the effectivity record for the first formula and the routing that corresponds to the second line in the effectivity record for the second formula.

## Creating a Formula Effectivity

---

### Creating a Formula Effectivity

Go to the **Select Effectivities** window to specify the item for which you want to view, add, or edit effectivities.

**OPM Product Development Responsibility**  
**Formula Management (N) Effectivities**

**OPM Product Development Responsibility**  
**Formula Management (N) Formulas (M) Actions > Effectivities**

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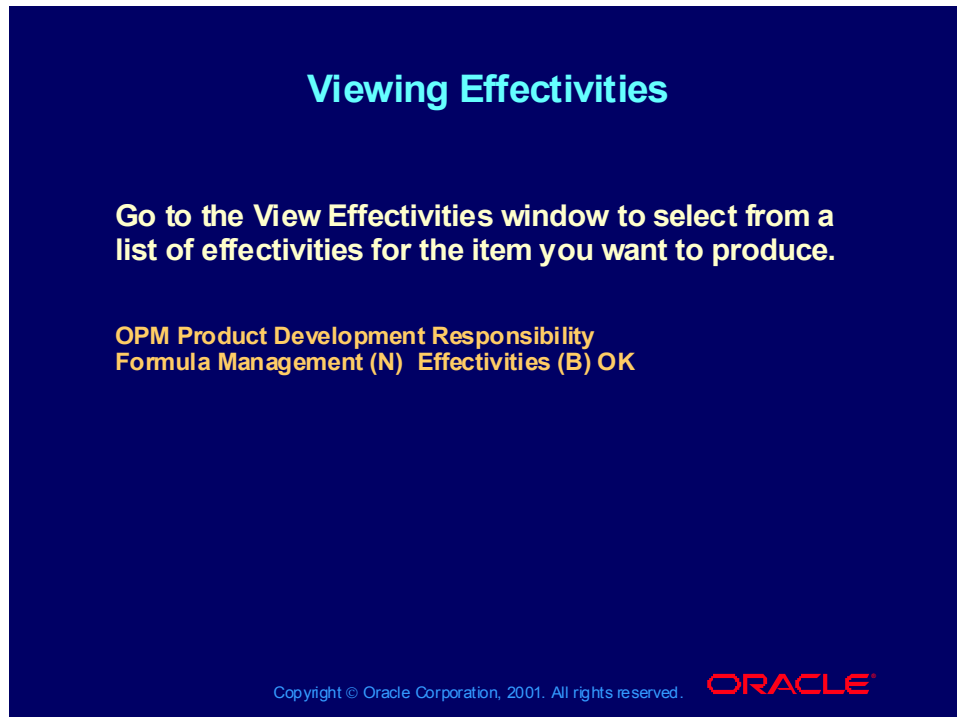
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Effectivities > Setting Up Formula Effectivities  
... > Setting Up Formula Effectivities Procedure  
... > Select Effectivities Field Reference

**Note:** The first step in manually creating a new formula effectivity is to define the effectivity criteria. If one or more formula effectivities already exist for the criteria that you enter, they are listed for your review. If no effectivities exist for the criteria, you can define a new one.

If more than one effectivity record meets the specified criteria, the View Effectivities window opens. If no effectivity record meets the criteria, the Maintain Effectivities window opens.

## Viewing Effectivities

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Formula Management User's Guide > Effectivities > Viewing Effectivities  
... > View Effectivities Field Reference

**Note:** After entering your criteria in the Select Effectivities window, the View Effectivities window opens if more than one effectivity record has been defined for the item and the criteria you entered. If only one effectivity matched the criteria, then the Maintain Effectivities window opens with the data populating the existing fields.

All fields in the View Effectivities window are display only. Use the scroll bar to advance through the list.

## Maintaining Formula Effectivities

---

### Maintaining Formula Effectivities

**Go to the Maintain Effectivities window to define the conditions under which a formula can be used.**

**OPM Product Development Responsibility  
Formula Management (N) Effectivities**

**OPM Product Development Responsibility  
Formula Management (N) Formulas > (M) Actions > Effectivities**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Effectivities > Adding To or Editing Effectivities  
... > Adding To or Editing Effectivities Procedure  
... > Maintain Effectivities Field Reference

**Note:** The Maintain Effectivities window is used to define the conditions under which a formula can be used. A formula cannot be used until an effectivity record is set up for it.

Effectivity records can be set up in several ways, depending on the option you select for effective behavior in the FM Configurations window.

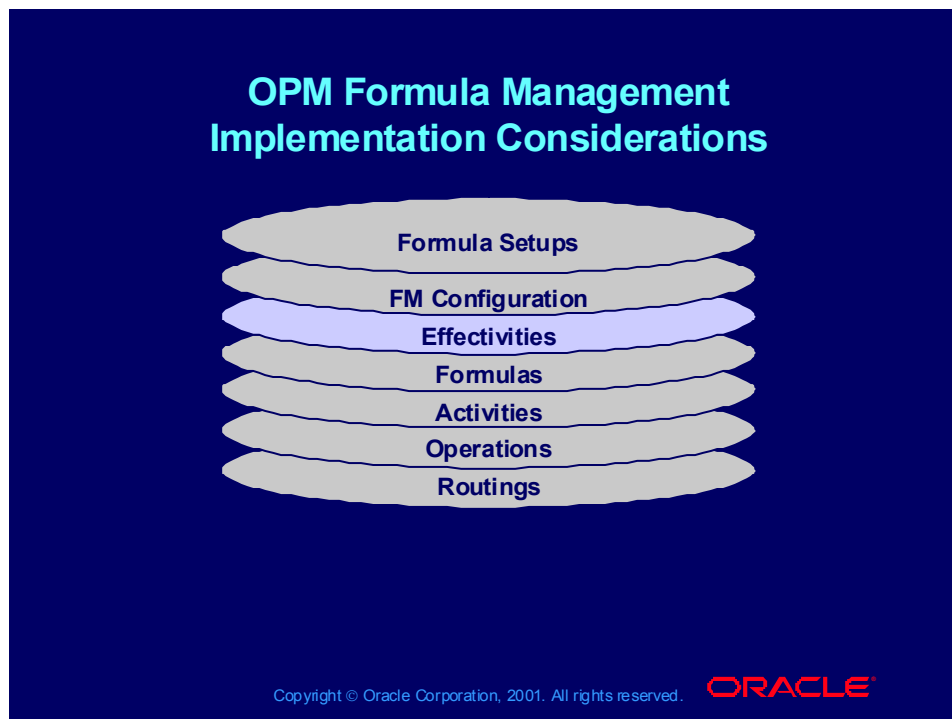
If you select manual entry, you must set up effectivity records manually after you save a formula.

If you choose to maintain effectivities displays on formula creation, the Maintain Effectivities window opens automatically when you try to access the Formula Ingredients window when entering a formula. You can still edit or add effectivities manually.

If you select automatic generation, an effectivity record is created automatically when you save a new formula. You can still edit or add effectivities manually.

# OPM Formula Management Implementation Considerations

---



## Effectivities Setup

You define effectivities to specify the exact conditions (date, plant, customer, or quantities) under which a formula is applied. These factors enable you to anticipate seasonal variations in product formulations, accommodate the production constraints of different facilities, guarantee appropriate product to each customer, and ensure the use of the correct formula in production, planning, and costing. These unique features eliminate the possibility of using a formula inappropriately.

## Practice 5-1

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### Practice 5-1

This practice covers defining formula effectivities.



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### Practice 5-1

#### Defining Effectivities

OPM requires that you specify effectivities for each produced item. Create two effectivities for *XXFGS* and one effectivity each for *XXINTC* and *XXFGC*.

ITEM	<i>XXFGS</i>	<i>XXFGS</i>	<i>XXINTC</i>	<i>XXFGC</i>
Formula	<i>XXFGS</i>	<i>XXFGS</i>	<i>XXINTC</i>	<i>XXFGC</i>
Version	1	1	1	1
Des.	Simple	Simple	Complex	Complex
	Finished	Finished	Intermediate	Finished
	Good Formula	Good Formula	Good Formula	Good Form.
Form Use	Production	Production	Production	Production
Product	<i>XXFGS</i>	<i>XXFGS</i>	<i>XXINTC</i>	<i>XXFGC</i>
Des.	Simple	Simple	Complex	Complex
	Finished Good	Finished Good	Intermediate Good	Finished Good
Preference	1	1	1	1
Organization	<i>XXPI</i>	<i>XXPI</i>	<i>XXPI</i>	<i>XXPI</i>

#### Quantities

---

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Standard	100	100	100	100
Minimum	0	100	0	0
Maximum	500	999999.99999	999999.99999	999999.99999

### Effective Dates

From

To

### Lower Region

Routing (Default)                      *XXINTC*                      *XXFGC*

Version (Default)                      1                      1

Customer Code (Optional)

### Practice 5-1 Solutions

**This practice covers defining formula effectivities.**



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### Practice 5-1 Solutions

#### Defining Effectivities

OPM requires that you specify effectivities for each produced item. Create two effectivities for *XXFGS*, and one effectivity each for *XXINTC* and *XXFGC*.

Perform the following steps for each item:

1. Open the Effectivities window:

(N) OPM Product Development > Formula Mgmt > Formulas

(M) Actions > Effectivities.

2. Enter the formula and version number that identify the formula to which this effectivity record applies.
3. Select an option from the Formula Use drop-down list.
4. Accept or change the product displayed in the Product field. The product description is automatically populated.
5. Enter the preference number of this effectivity.
6. Select an organization from the list of values or leave this field blank for all organizations.
7. Enter the standard processing quantity for the item produced.
8. Enter the unit of measure of the processing quantity.
9. Enter the minimum quantity that can be produced with this formula.
10. Enter the maximum quantity that can be produced with this formula.
11. Enter the effective dates of this formula.



12. (Optional) Enter the routing number and version that this formula will use.  
The description is automatically populated.
13. (Optional) Select a customer code from the list of values if you wish to search formulas by a customer.
14. Save your work.

## Summary

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### Summary

**In this lesson, you should have learned how to:**

- **Explain effectivities**
- **Create formula effectivities**
- **Manage formula effectivities**

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### Summary

Effectivities are the link between formulas and routings. They enable formulas to be available for use in other OPM responsibilities. Creating separate effectivities for other responsibilities preserves the integrity of your data. If you copy a formula whose effectivity record was entered manually, you must enter an effectivity for the new formula. But if the copied formula has an effectivity that was automatically generated, then the new formula will have an effectivity already defined.

# Scaling Formulas

## Chapter 6

## 11i Oracle Process Manufacturing Formula and Laboratory Management

---

### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Scaling Formulas**

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## Objectives

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### Objectives

**After completing this lesson, you should be able to do the following:**

- **Describe scaling**
- **Scale formulas by:**
  - **Percent**
  - **Quantity**

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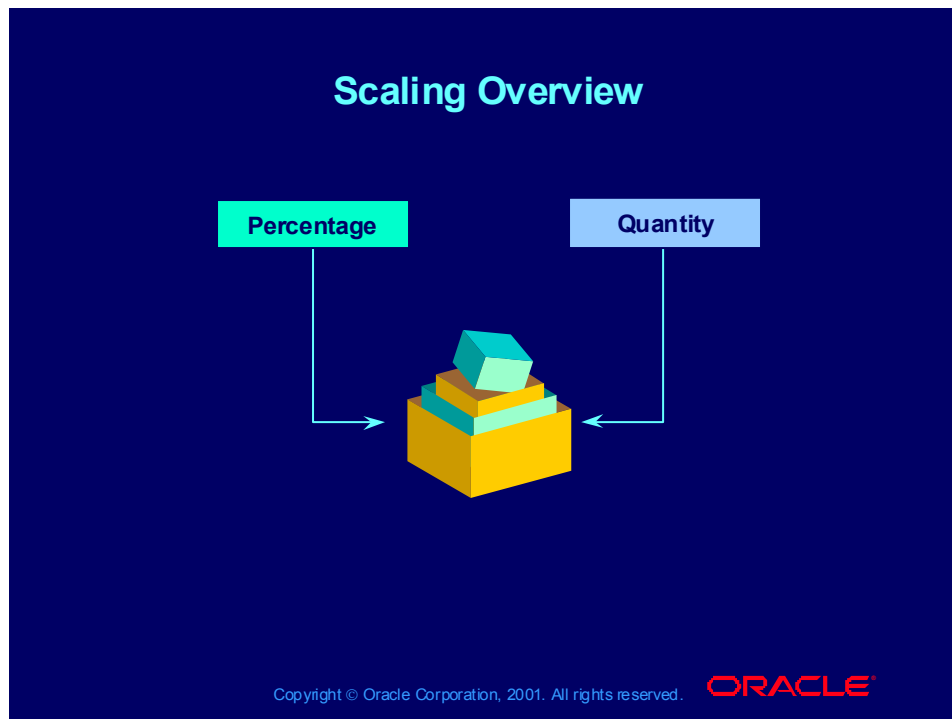
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### Objectives

This lesson discusses scaling formulas. Scaling is a useful feature that directly affects how production batch processing occurs. Several methods of scaling are discussed and demonstrated.

## Scaling Overview

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### Overview

Scaling is the proportional increase or decrease of formula ingredients, products, and by-products. A formula can be scaled only if the Scaling Allowed option is selected in the Formulas window. The only items that are scaled are those in a formula with the scale type, in the Additional Information window set to Linear Scaling. The quantity of items with the scale type set to Fixed Quantity remains unchanged. To scale a formula with fixed scale items, the system must convert the quantities of the ingredients, products, and by-products to a common unit of measure.

**Note:** For a formula that has a fixed scale item, the unit of measure (UOM) used for calculating conversions is the base UOM for the unit of measure type specified by the FM\_YIELD\_TYPE profile option. To scale a formula or batch, UOM conversions to this unit must be set up for all items in the formula or batch. For more information on item conversions, see the Oracle Process Manufacturing Inventory Management User's Guide and the online Help for each form.

Formulas can be scaled using two methods: percentage and quantity.

#### The Percentage Method

All products and ingredients quantities, set to linear scaling, are increased or decreased by the percentage that you specify.

Example:

Enter 100%, and if the product quantity is scaled up by 100% (the quantity is doubled), the ingredient quantities increase accordingly.

Enter –50% (negative 50%), and the product quantity is decreased by half.

For all products and ingredients set to linear scaling, scale by 100%.

Type	Before Scaling	After Scaling
Product 1	30 kilograms	60 kilograms
Ingredient	110 kilograms	20 kilograms
Ingredient	220 kilograms	40 kilograms

### The Quantity Method

Formulas can also be scaled by a specific item quantity. This item is used as the basis for scaling all the items that are set to linear scaling.

Example 1:

Scale ingredient 1 (by item quantity) from 10 to 20 kilograms:

Type	Before Scaling	After Scaling
Product 1	30 kilograms	60 kilograms
Ingredient 1	10 kilograms	20 kilograms
Ingredient 2	20 kilograms	40 kilograms

Example 2:

Ingredient 1 is set to a fixed quantity, and product 1, ingredient 2, and ingredient 3 are set to linear scaling. Scale by 100 percent.

Type	Before Scaling	After Scaling
Product 1	50 kilograms	100 kilograms
Ingredient 1	10 kilograms	10 kilograms
Ingredient 2	20 kilograms	45 kilograms
Ingredient 3	20 kilograms	45 kilograms

**Note:** Ingredients 2 and 3 are scaled to the quantities necessary to increase the product quantity by 100%. Because ingredient 1 was fixed, quantities of ingredients 2 and 3 were increased by more than the scale factor. This method could be used when one of your ingredients (ingredient 1) is a catalyst. The quantity of a catalyst does not need to be increased to produce more of the product, but the quantities of the other ingredients do need to be increased.

## Scaling Formulas by Percent or Quantity

---

### Scaling Formulas by Percent or Quantity

**Go to the Scale Formula window to increase or decrease formula ingredients, products, and by-products proportionately .**

**OPM Product Development Responsibility  
Formula Management (N) Formulas (M) Actions > Scale**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Scaling and Theoretical Yield Calculations > Scaling Formulas  
... > Scaling By a Percentage  
... > Scaling By an Item Quantity  
... > Scaling With a Fixed Quantity  
... > Scaling Formulas Procedure  
... > Scaling Field Reference

### **Percentage Scaling**

You use the Scale Formula dialog box to scale ingredient and product quantities in a formula. To open this dialog box, select Scale from the Actions menu in the Formulas, Formula Ingredients, or Formula By-products window. Only line items for which linear scaling is allowed can be scaled (as specified in the Formula Additional Information dialog box).



## Switching from Percent Scaling to Quantity Scaling

---

### Switching from Percent Scaling to Quantity Scaling

**Go to the Scale Formula window to select Item  
Quantity scaling.**

**OPM Product Development Responsibility  
Formula Management (N) Formulas (M) Actions > Scale**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Scaling and Theoretical Yield Calculations > Scaling Formulas  
... > Scaling By a Percentage  
... > Scaling By an Item Quantity  
... > Scaling With a Fixed Quantity  
... > Scaling Formulas Procedure  
... > Scaling Field Reference

### **Quantity Scaling**

This is useful if you have a set quantity of a particular ingredient and want to scale the entire formula based on that available ingredient quantity.

## Practice 6-1

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### Practice 6-1

This practice covers scaling a formula.



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### Practice 6-1

#### Formula Scaling

1. How many methods of scaling are there?
2. Name the different methods.
3. Where do you tell the system to allow scaling?
4. What is the navigation path for entering scaling information?
5. Use your *XXFGC* formula to perform the following calculations:
  - If you scale by percent and you enter 100 in the box, what will the other item quantities be?
  - If you scale by percent and you enter -25 in the box, what will the other item quantities be?
  - If you scale Ingredient 1 (by item quantity) from 100 to 150, what will the other item quantities be?

## Practice 6-1 Solutions

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### Practice 6-1 Solutions

This practice covers scaling a formula.



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### Practice 6-1 Solutions

1. How many methods of scaling are there?

**Two.**

2. Name the different methods.

**Scale by percent and by item quantity.**

3. Where do you tell the system to allow scaling?

**The Scaling Allowed option in the Formulas window.**

4. What is the navigation path to enter scaling information?

**(N) OPM Product Development > Formula Mgmt > Formulas**

**(M) Special > Scale.**

5. Use your *XXFGC* formula to perform the following calculations:

- If you scale by percent and you enter 100 in the box, what will the other item quantities be?

Item	Before Scaling	After Scaling
<i>XXFGC</i>	100 LB	200 LB
<i>XXINTC</i>	100 LB	200 LB
<i>XXPKGK</i>	4 EA	8 EA

- If you scale by percent and you enter -25 in the box, what will the other item quantities be?

<b>Item</b>	<b>Before Scaling</b>	<b>After Scaling</b>
<b><i>XXFGC</i></b>	<b>100 LB</b>	<b>75 LB</b>
<b><i>XXINTC</i></b>	<b>100 LB</b>	<b>75LB</b>
<b><i>XXPKGKGC</i></b>	<b>4 EA</b>	<b>3 EA</b>

- If you scale Ingredient 1 (by item quantity) from 100 to 150, what will the other item quantities be?

<b>Item</b>	<b>Before Scaling</b>	<b>After Scaling</b>
<b><i>XXFGC</i></b>	<b>100 LB</b>	<b>150 LB</b>
<b><i>XXINTC</i></b>	<b>100 LB</b>	<b>150 LB</b>
<b><i>XXPKGKGC</i></b>	<b>4 EA</b>	<b>6 EA</b>

## Summary

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### Summary

In this lesson, you should have learned how to:

- Explain scaling
- Assign scale factors by:
  - Percent
  - Quantity

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### Summary

Scaling is a useful feature of OPM Formula Management. This feature provides flexibility when developing formulas that drive your manufacturing process. By truly understanding the scaling feature, you eliminate processing errors during production.



# **Formula Theoretical Yield**

## **Chapter 7**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Formula Theoretical Yield**

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## Objectives

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### Objectives

**After completing this lesson, you should be able to do the following:**

- **Describe theoretical yield**
- **Attach theoretical yield to a formula**
- **Explain how theoretical yield is calculated**

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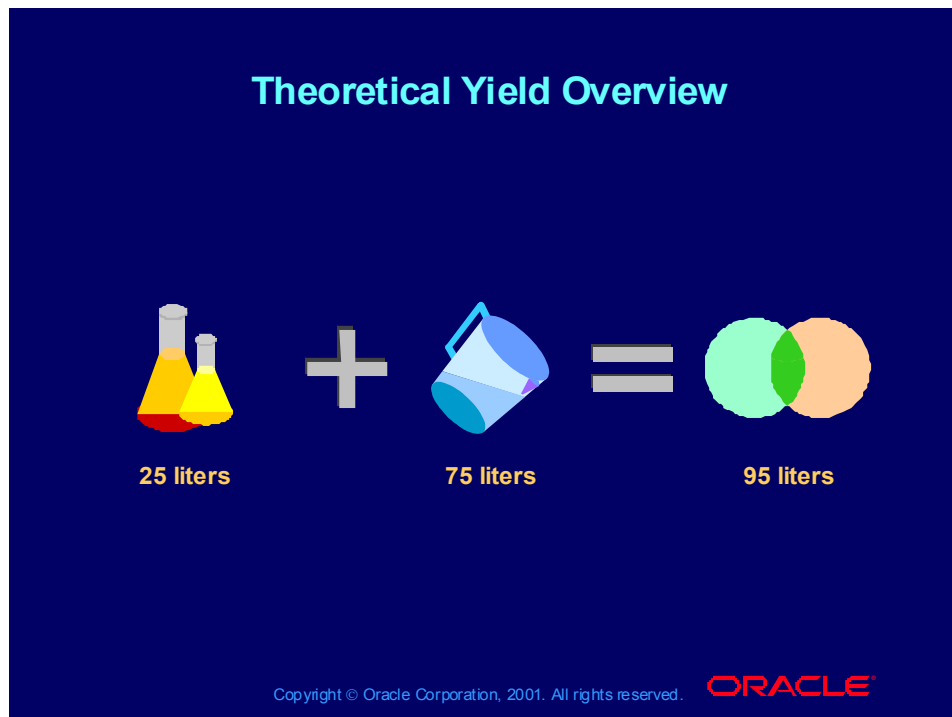
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### Objectives

This lesson discusses the concept of theoretical yield. You will also learn how to attach theoretical yield to a formula and understand the calculations.

## Theoretical Yield Overview

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### Overview

In process manufacturing, the product quantities in a formula do not necessarily equal the sum of the ingredient quantities. For example, during batch processing you might know that 5% of the mass is lost to evaporation. OPM uses this information to calculate the theoretical yield (adjusted product quantities) for a formula. You can then decide if you want to scale the formula (in this case, higher) to compensate for the expected loss during processing.

Example:

If you specify a yield percentage of 95 liters, OPM calculates the following yields:

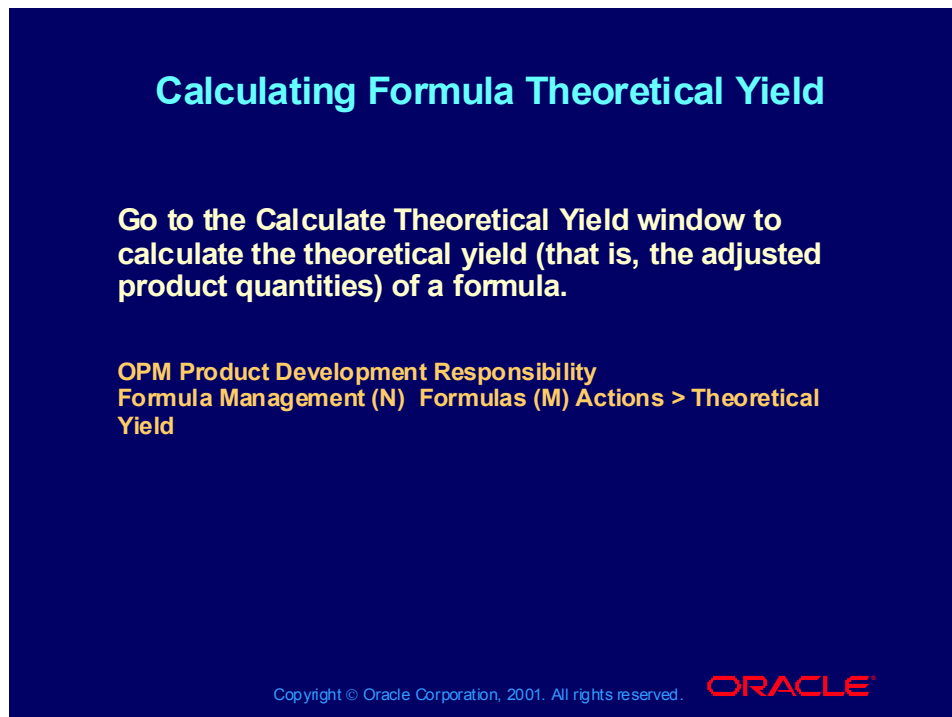
- Ingredient 25 liters
- Ingredient 75 liters
- Product 95 liters

OPM adds the ingredient quantities and multiplies by the yield percentage. You should view the anticipated yield before processing begins. Do the necessary formula scaling to ensure that the desired quantity is yielded.

If the ingredient totals appear correct, you should also use the theoretical yield at 100 to check the totals.

## Calculating Formula Theoretical Yield

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Formula Management User's Guide > Formula Scaling and Theoretical Yield > Calculating Theoretical Yield  
... > Calculating Theoretical Yield Procedure  
... > Calculating Theoretical Yield Field Reference

**Note:** To calculate a theoretical yield, OPM converts quantities of ingredients, products, and by-products to a common unit of measure. The unit of measure used is the base unit for the unit of measure type (usually mass) specified by the FM\_YIELD\_TYPE profile option. The base unit of measure for a unit of measure type is the first unit of measure of that type entered into OPM. To calculate a theoretical yield, the unit of measure conversions to this unit must be set up for all of the items in the formula. For more information on item conversions, see the Oracle Process Manufacturing Inventory Management User's Guide and the online help for each form.

## Practice 7-1

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### Practice 7-1

This practice covers assigning theoretical yield to a formula product.



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### Practice 7-1

#### Calculating Theoretical Yield

During batch processing, there is a 5% loss of your *XXINTC* due to evaporation. Assign the theoretical yield percentage to your product.

## Practice 7-1 Solutions

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### Practice 7-1 Solutions

**This practice covers assigning theoretical yield to a formula product.**



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### Practice 7-1 Solutions

#### Calculating Theoretical Yield

During batch processing, there is a 5% loss of your *XXINTC* due to evaporation. Assign the theoretical yield percentage to your product.

1. Open the Formulas window:  
(N) OPM Product Development>Formula Mgmt>Formulas
2. Query and find your *XXINTC* formula.
3. Select Theoretical Yield from the Special menu.
4. Type 95 in the percent box.
5. View the quantity change of your product in the Formula window.
- 6 Save your work.

## Summary

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### Summary

In this lesson, you should have learned how to:

- Explain theoretical yield
- Assign theoretical yield to a formula
- Explain how theoretical yield is calculated

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### Summary

Theoretical yield demonstrates one of the unique features of process manufacturing. This feature can be critical to the outcome of the production process. Understanding theoretical yield calculations is key to the success of developing the formulas that drive production.

# **Online Inquiries and Reports**

## **Chapter 8**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Online Inquiries and Reports**

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### Objectives

**After completing this lesson, you should be able to do the following:**

- **Describe the Report dialog box**
- **Define criteria for the Ingredient Where Used report**
- **Define Indented Formulas (Bill of Materials) report criteria**
- **Define selection criteria for the online Formula Inquiry report**
- **View the Intermediate FM Inquiry Summary**
- **Search formulas by using the Ingredient Search and Replace inquiry**

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### Online Inquiries and Reports

The existing online inquiries and reports are:

- Ingredient Used inquiry
- Indented Formulas (Bill of Materials) report
- Formula Inquiry
  - Intermediate FM Inquiry Summary
  - Formula View
  - Intermediate Formula View
  - Expanded Formula
- Item Search/Replace



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### Overview

The Formula module offers various standard inquiries and reports, already formatted and ready to run. You can select these inquiries and reports from the View and Report menus in many windows.

#### The Report Dialog Box

Dialog boxes appear when you select some of the online inquiries and reports. In these dialog boxes you can restrict inquiries based on the selected criteria. Specify the parameters by which your inquiry or report will run, including the desired sort information and the printer to be used.

## Ingredient Used Inquiry

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Formula Management User's Guide > Formula Inquiries and Reports > Ingredient Used Inquiry

... > Ingredient Used Inquiry Procedure

... > Ingredient Search List Field Reference

... > Using the Ingredient - Where Used Window

... > Ingredient Used Field Reference

### Report Data Information

The Ingredient - Where Used window lists all of the formulas that use the item or items entered as ingredients in the Ingredients Search List dialog box. The report uses "or" logic, not "and" logic, to search and display.

## Indented Bill of Materials Report

---

### Indented Bill of Materials Report

**Go to the Indented Bill of Materials Report window to display all of the ingredients and ingredient quantities that are used to produce an item.**

**OPM Product Development Responsibility  
Formula Management (N) Reports > Indented Formulas**

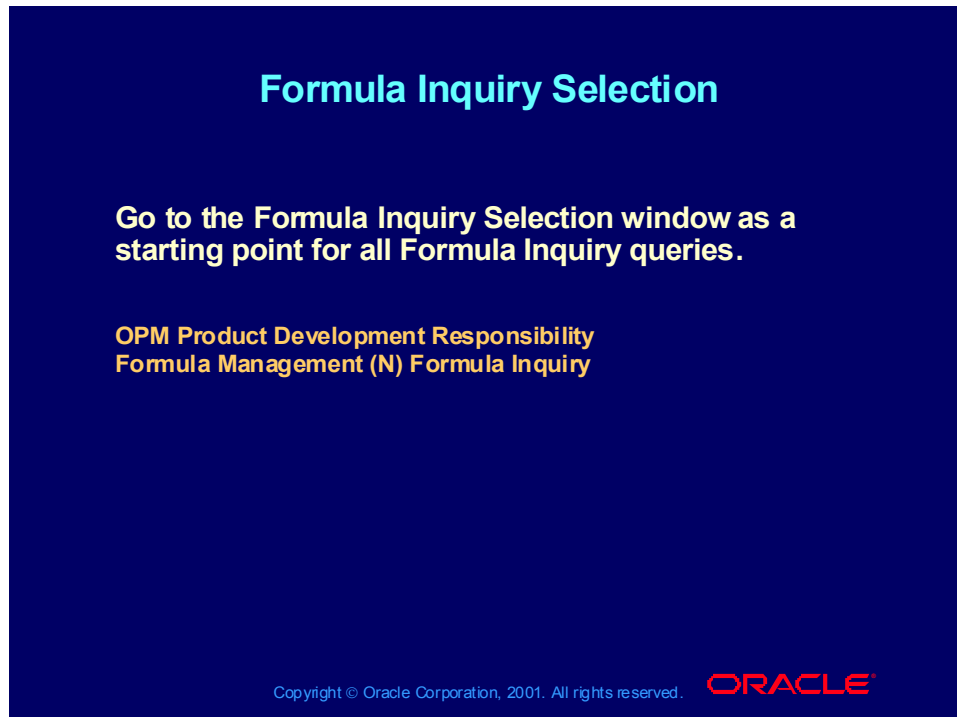
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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Inquiries and Reports > Running the Indented Formulas Report  
... > Submitting the Report  
... > Viewing the Indented Formulas Report Online  
... > Selected Report Parameters  
... > Selected Report Output

## Formula Inquiry Selection

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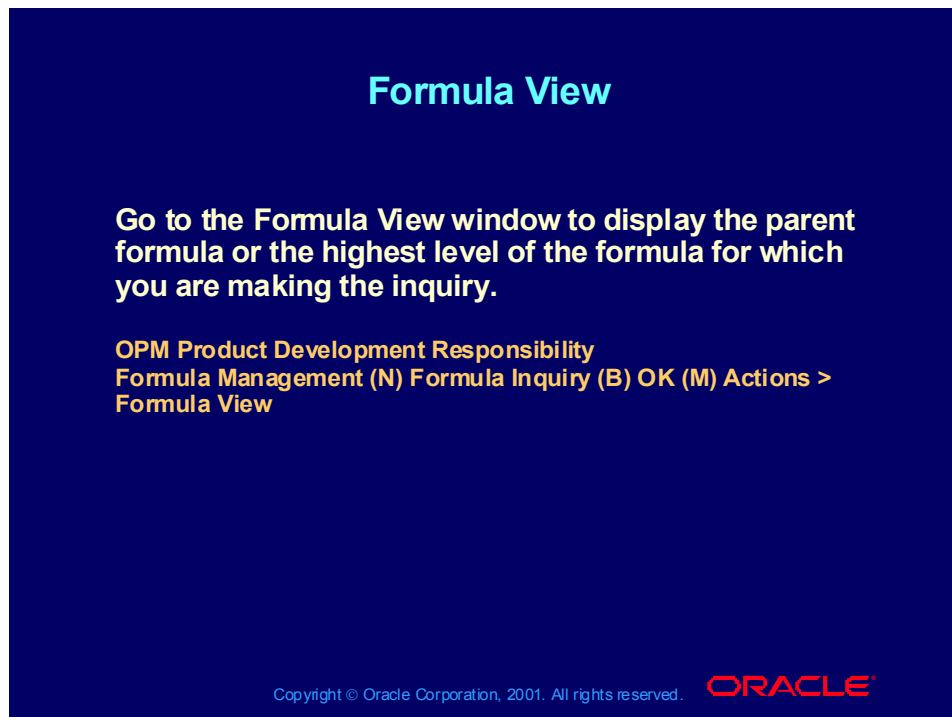
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Inquiries and Reports > Using the Formula Inquiry Selection  
... > Using Formula Inquiry Selection Procedure  
... > Formula Inquiry Selection Field Reference

**Note:** You can view formulas and components without being in edit mode.  
OPM provides formula inquiries that list:

- Expanded formula view, including formula components
- Formula lower-level components (intermediate formulas)

## Formula View

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Inquiries and Reports > Viewing the Formula Queried  
... > Formula View Field Reference  
... > Formula View - Additional Setup in Formula Management

### Formula View Information

When you select a formula from the Formula Inquiry Summary View window, OPM displays the selected formula. If an ingredient in the formula is a product in another formula (an intermediate), it is identified with a plus sign (+). If the item has a pound sign (#) next to it, this indicates there is also another formula, but you do not have access to the organization that the formula is assigned to.

The upper region of this window displays the formula header information. The middle region contains the formula detail information and the list of formula line items, including the lower-level formulas. The lower region displays the additional information for the item highlighted in the middle region.

## Intermediate FM Inquiry Summary

---

### Intermediate FM Inquiry Summary

**Go to the Intermediate Formula Inquiry Summary View window to select the formula that you want to expand or view at a lower level (the intermediate formula on a separate window).**

**OPM Product Development Responsibility  
Formula Management (N) Formula Inquiry (B) OK (M) Actions >  
Formula View > Select ingredient marked with plus sign (+)**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Inquiries and Reports > Viewing Formula Intermediates  
... > Viewing Formula Intermediates Procedure  
... > Intermediate Formula Inquiry Summary Field Reference  
... > Viewing an Intermediate Formula

### Summary Information

If the formula has more than one effectivity, OPM displays the Formula Inquiry Summary View window with all valid effectivities listed. In this window, you view an intermediate formula by selecting the box next to the Organization column, which opens the Intermediate Formula View window.

## Item Search and Replace

---

### Item Search and Replace

**Go to the Ingredients Search and Replace window to change an ingredient in one, all, or a range of formulas.**

**OPM Product Development Responsibility  
Formula Management (N) Item Search/Replace**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Formula Setup > Searching For and Replacing Ingredients  
... > Searching for and Replacing Ingredients Procedure  
... > Ingredient Search and Replace Field Reference - First Window  
... > Ingredient Search and Replace Field Reference - Second Window

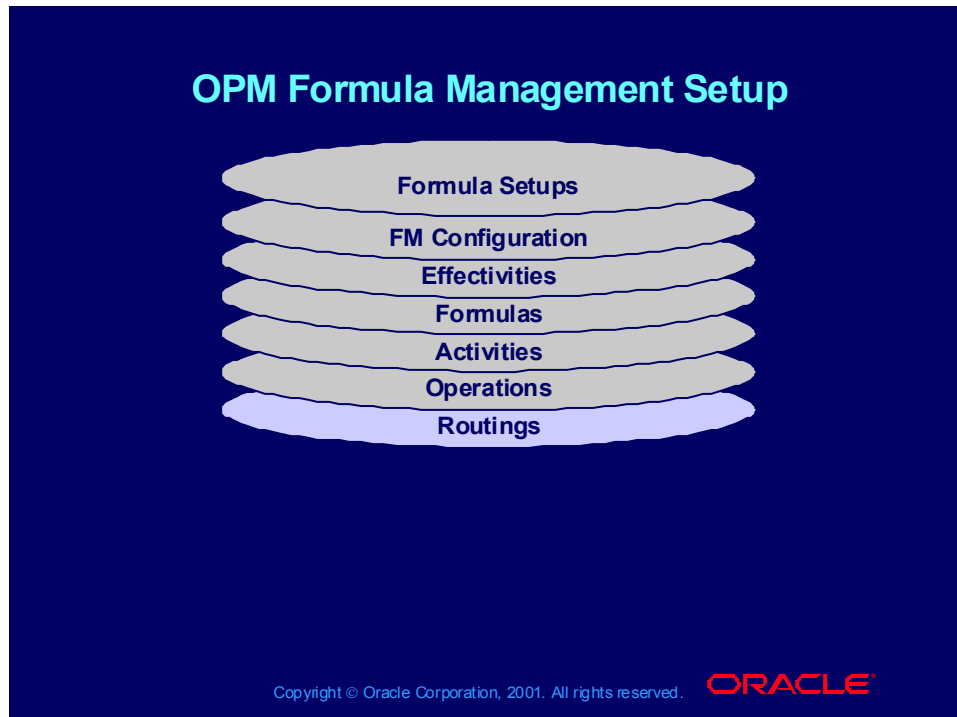
**Note:**

OPM does not replace the ingredient in an existing formula; rather, it creates a new formula version in which the new ingredient is used.



## OPM Formula Management Setup

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## Practice 8-1

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### Practice 8-1

**This practice covers using existing online inquiries and reports within the Formula Management responsibility.**



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### Practice 8-1

#### **Using Online Inquiries and Reports**

Run the following reports as instructed:

1. In the Ingredient Used Inquiry, search for all formulas that use your complex intermediate item.
2. In the Indented Formulas (Bill of Materials) report, run a report on your complex finished good item.
3. In the Formula Inquiry, expand your complex finished good item.

## Practice 8-1 Solutions

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### Practice 8-1 Solutions

**This practice covers using existing online inquiries and reports within the Formula Management responsibility.**



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### Practice 8-1 Solutions

#### Using Online Inquiries and Reports

Run the following reports as instructed:

1. In the Ingredient Used Inquiry, search for all formulas that use your complex intermediate item.
  - a. Open the Ingredient Used Inquiry:  
(N) OPM Product Development > Formula Mgmt > Ingredient Used
  - b. Enter the item code for the search.
  - c. Click the Find button.
  
2. In the Indented Formulas (Bill of Materials) report, run a report on your complex finished good item.
  - a. Open the Indented Formulas (Bill of Materials) Report:  
(N) OPM Product Development > Formula Mgmt > Reports > Indented Formulas
  - b. Select the Interactive check box to select from the formula effectivities.
  - c. Select the Re-Explode check box to have the system check for other reports that have already been run for the same criteria.
  - d. Select the Single Formula option button and enter the formula name and version of your complex finished good formula (*XXFGC* Version 1).
  - e. Accept all other defaults in the window.

---

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- f. Click the OK button.
- g. A Submission History window appears with the name of the report and a request ID number; click the OK button to submit your request.
- h. Select View My Requests from the Help menu.
- i. Complete the Find Requests window or click the Find button to view all your submitted requests.
- j. In the Requests window, highlight the request ID for the request on which you are reporting, and click the View Output button when the Phase column reads Completed and the Status column reads Normal.

3. In the Formula Inquiry, expand your complex finished good item.

a. Open the Formula Inquiry:

(N) OPM Product Development > Formula Mgmt > Formula Inquiry

The Formula Inquiry Selection window opens.

b. Select Active from the Formula Status drop-down list.

c. Select Defined from the Effectivity drop-down list.

d. Select production in the Formula Used In region.

e. Specify your complex finished good formula and version number in the Selection Range region.

f. Click the OK button.

g. In the Formula Inquiry Summary View window, select the formula you want to view.

h. In the Formula View window, select Expand or Lower Level from the Special menu to view additional details on an ingredient with a plus sign (+) in the column next to the Type column.

### Summary

**In this lesson, you should have learned how to:**

- **Enter criteria in the Report dialog box**
- **Use the Ingredient Used inquiry**
- **Use the Indented Formulas (Bill of Materials) report**
- **View formulas by using the Formula Inquiry**
- **Create new versions of formulas by using the Item Search/Replace**

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# **Defining and Entering OPM Lab Management Setup**

## **Chapter 9**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Defining and Entering OPM Lab Management Setup**

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### Objectives

**After completing this lesson, you should be able to do the following:**

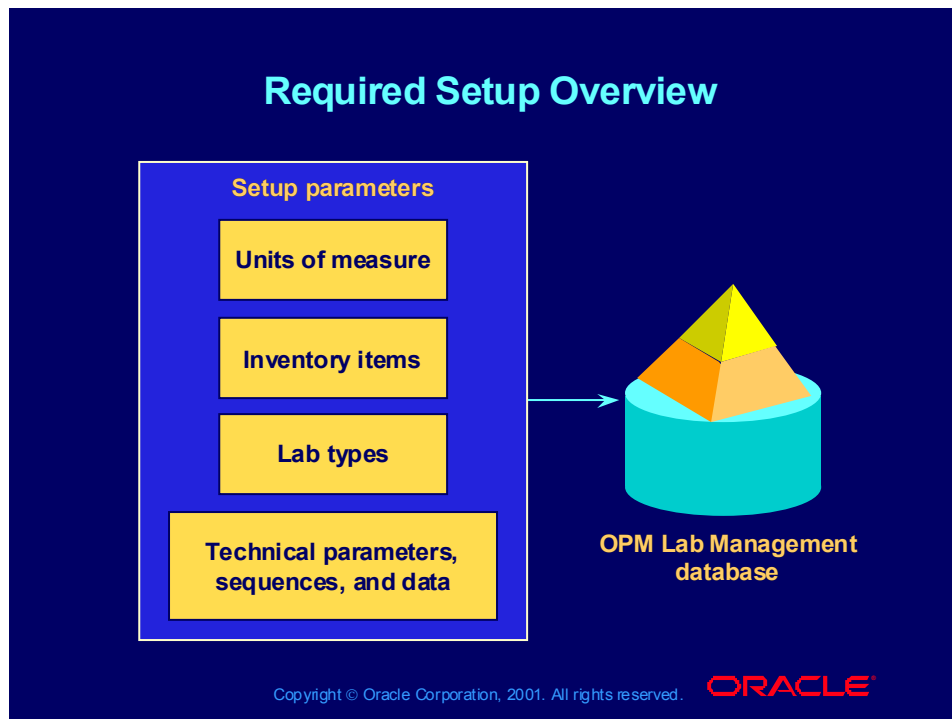
- **Define unit-of-measure types and units of measure**
- **Define inventory items**
- **Define and enter lab types**
- **Define and enter technical parameters, sequences, and data**

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## Required Setup Overview

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### Global Lab Management Setup

To use OPM Lab Management (OPMLM), you must define certain basic, global data values for items and units of measure (UOM). Units of measure must be defined for the following:

- Unit-of-measure types
- Units of measure
- Units of measure for OPM Quality Management

### Lab Management Internal Setup

In addition to the global setup, you must define lab types, technical parameters, technical parameter sequences, and item technical parameter data for OPMLM.

## Defining Unit-of-Measure Types

---

### Defining Unit-of-Measure Types

**Go to the Unit of Measure Types Window to classify UOM groups that measure particular physical characteristics.**

**OPM System Administration Responsibility  
OPM System Setup (N) Unit of Measure Types**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Systems > OPM System Administration User's Guide > OPM System  
Setup > Editing Unit of Measure Types  
... > UOM Type Procedure  
... > UOM Type Field Reference

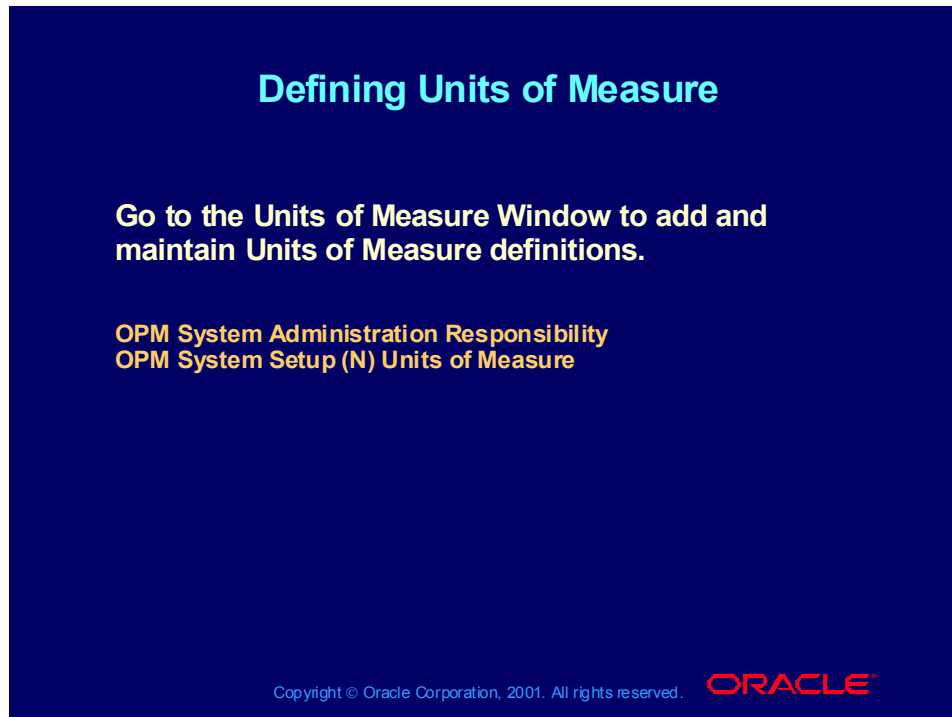
### Defining Unit-of-Measure Types

Before you define units of measure and items, you need to define the UOM types. UOMs are grouped by UOM type, and items are grouped by UOM.

For detailed information for entering data in this window, see the OPM System Administration Release 11i User's Guide.

## Defining Units of Measure

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Systems > OPM System Administration User's Guide > OPM System  
Setup > Editing Units of Measure  
... > Units of Measure Procedure  
... > Units of Measure Field Reference

### Defining Units of Measure

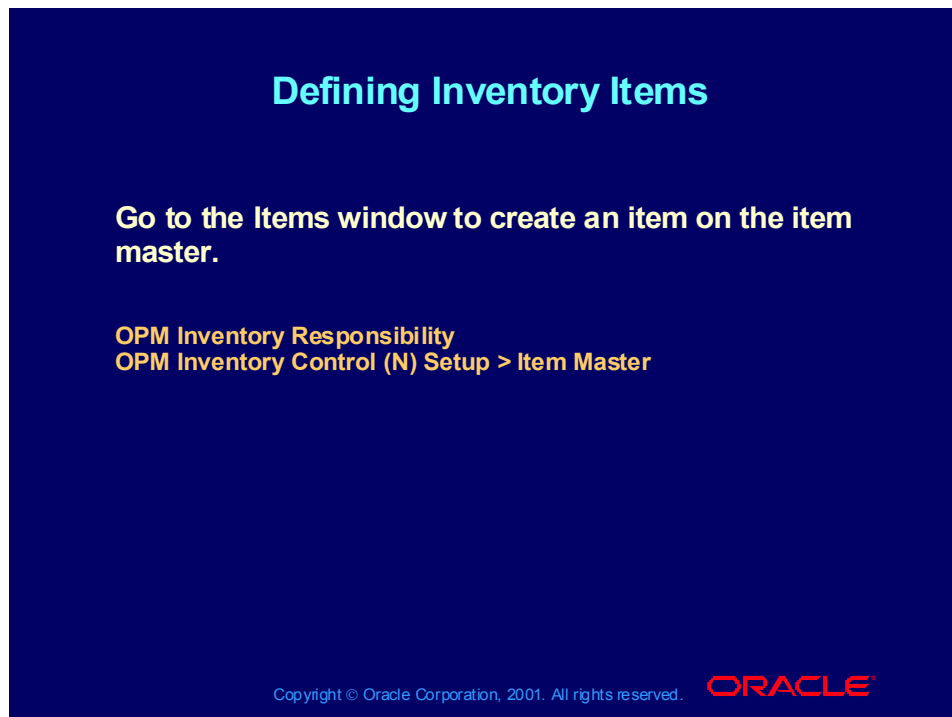
UOM is a prerequisite to entering lab data and inventory items. When you enter a new UOM, note the following:

- Select the UOM type from the UOM Type list of values (LOV).
- In the Conversion region, specify the conversion factor to convert the new UOM to the reference UOM that you entered in the Reference UOM field. The screenshot shows this as a conversion from the UOM code for petroleum barrels to the reference UOM liters.

For detailed information for entering data in this window, see the OPM System Administration Release 11*i* User's Guide.

## Defining Inventory Items

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(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Inventory > OPM Inventory Management User's Guide > Inventory Items > Creating Inventory Items

... > Before Creating Inventory Items

... > Creating Inventory Items Procedure

... > Items Field Reference

... > Items - Additional Setup in Inventory Control

### Defining Inventory Items

Defining inventory items is a prerequisite to entering lab data. When you define inventory items, note the following:

- You must define ingredients, products, and by-products as inventory items for your lab formulas.
- If you want to set up experimental items for lab formulas that are not to be used in OPM Formula Management and OPM Production Management, select the Experimental check box.
- You can access the Controls and Classes alternative regions of the Items window by selecting the alternative region name from a drop-down list. This screenshot shows the Controls alternative region. The next screenshot shows the Classes alternative region.

For detailed information for entering data in this window, see the OPM Inventory Release 11i User's Guide.

## Defining Quality UOMs

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**Defining Quality UOMs**

Go to the Units window to define the units in which to measure QC tests.

OPM Product Development Responsibility  
Quality Control (N) Setup > Units

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Quality Management User's Guide > Test  
Specifications Setup > Setting Up QC Assay Units of Measure  
... > Setting Up QC Assay Units of Measure Procedure  
... > Units Field Reference

### **Defining OPM Quality Management Units of Measure**

You can define the assay units of measure in the Quality Management Units window. The assay units of measure are the units used most frequently by the assays (test specifications) in OPMLM.

UOMs and OPM Quality Management units are not the same.

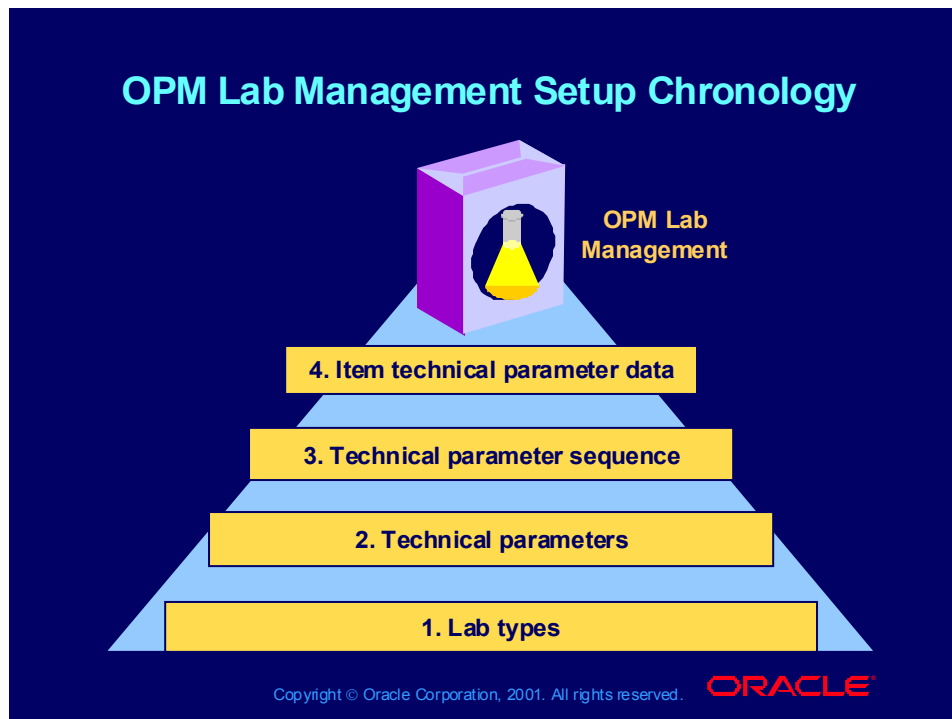
Units of measure (UOMs) are entered into OPM System Administration and used to set up items in OPM Inventory Management for OPM transactions.

Units set up for use in OPM Quality Management and OPM Laboratory Management affect only those modules.

For detailed information for entering data in this window, see the OPM Quality Management Release 11i User's Guide.

# OPM Lab Management Setup Chronology

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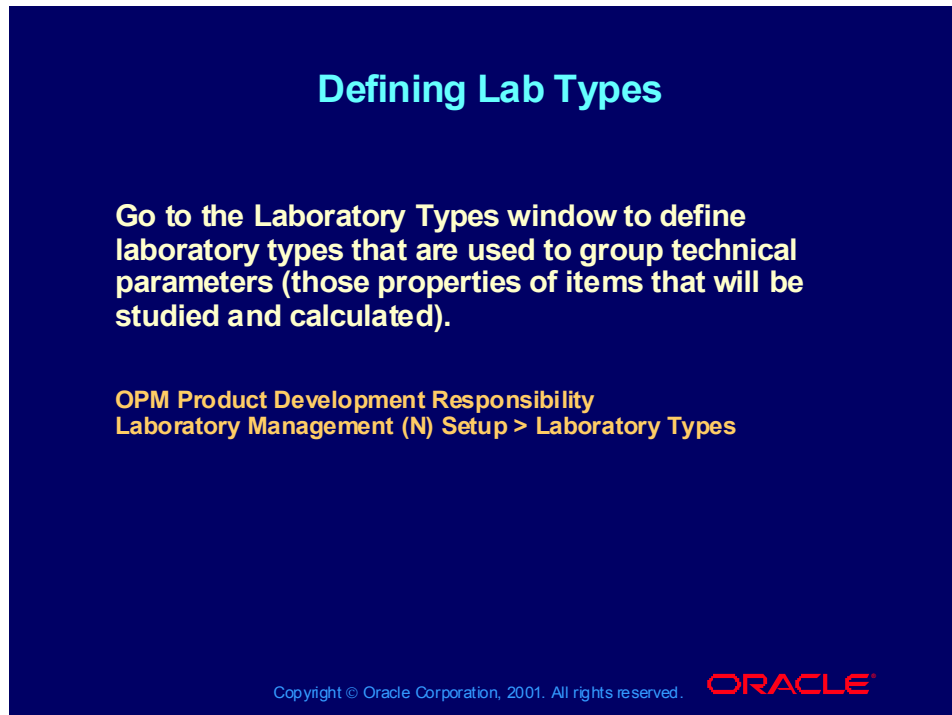
## Setting Up Lab Management Parameters

In addition to ensuring that global setup is complete, you must define parameters within OPMLM:

- Laboratory types: Used to group technical parameters
- Technical parameters: Properties of items for studying and calculating
- Technical parameter sequence: The order in which technical parameters are to be displayed in windows
- Item technical parameter data: The values of your technical parameters for items

## Defining Lab Types

---



**Defining Lab Types**

**Go to the Laboratory Types window to define laboratory types that are used to group technical parameters (those properties of items that will be studied and calculated).**

**OPM Product Development Responsibility  
Laboratory Management (N) Setup > Laboratory Types**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Management Setup > Defining Laboratory Types  
... > Defining Laboratory Types Procedure  
... > Laboratory Types Field Reference

### Defining Lab Types

The first step in setting up Laboratory Management is defining lab types. Lab types are used to group technical parameters, which are the properties of items that will be studied and calculated.

Most organizations manufacture a variety of similar products. These products are often grouped into product lines or families. The same technical parameters are likely to be relevant to products within a product family and to ingredients used to manufacture those products. For example, viscosity is likely to be relevant to all lubricants.

### Lab Type Characteristics

You must define a default lab type for your user code. This lab type becomes the default in the Laboratory Type field. The data for technical parameters associated with a lab type must be entered for each item.

If you want the lab type to be inactive, clear the Active check box. Inactive lab types cannot be used in any window that requires entry of a lab type.



## Practice 9-1

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### Practice 9-1

This hands-on practice covers defining and setting up lab types.



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### Practice 9-1

#### Defining Lab Types

Set up a lab type that represents your student number as *XX-I*.

## Practice 9-1 Solution

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### Practice 9-1 Solution

This hands-on practice covers defining and setting up lab types.



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### Practice 9-1 Solution

#### Defining Lab Types

Set up a lab type that represents your student number as *XX-I*.

1. Open the Laboratory Types window:

(N) OPM Product Development > Lab Management > Setup > Laboratory Types

2. Enter a lab type that represents your student number, *XX-I*, and enter a description.

3. Save your work.

## Defining Technical Parameters

---

### Defining Technical Parameters

**Go to the Technical Parameters window to define characteristics of items that you want to measure and calculate.**

**OPM Product Development Responsibility  
Laboratory Management (N) Setup > Technical Parameters**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Management Setup > Setting Up Technical Parameters  
... > Setting Up Technical Parameters Procedure  
... > Technical Parameters Field Reference

### Defining Technical Parameters

Technical parameters are characteristics that you want to measure and calculate. There are various types of technical parameters that determine the kind of data to be entered or calculated for the technical parameter. For example, a technical parameter for percent solids by weight would be of the type weight percent.

For each type of technical parameter, you specify certain constraints on the data that can be entered, such as the minimum and maximum values.

## Supported Functions for Defining Expressions and Operators

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### Supported Functions for Defining Expressions and Operators

- Addition +
- Subtraction -
- Multiplication \*
- Division \
- Exponentiation ^
- Square root (SQRT)
- Common logarithm (LOG)
- Natural logarithm (LN)

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### Using Expressions and Operators Properly

The following provides examples of the proper use of expressions and operators:

If you are defining a technical parameter that is calculated by multiplying two other technical parameters, PARM\_1 and PARM\_2, then enter (PARM\_1) \* (PARM\_2)

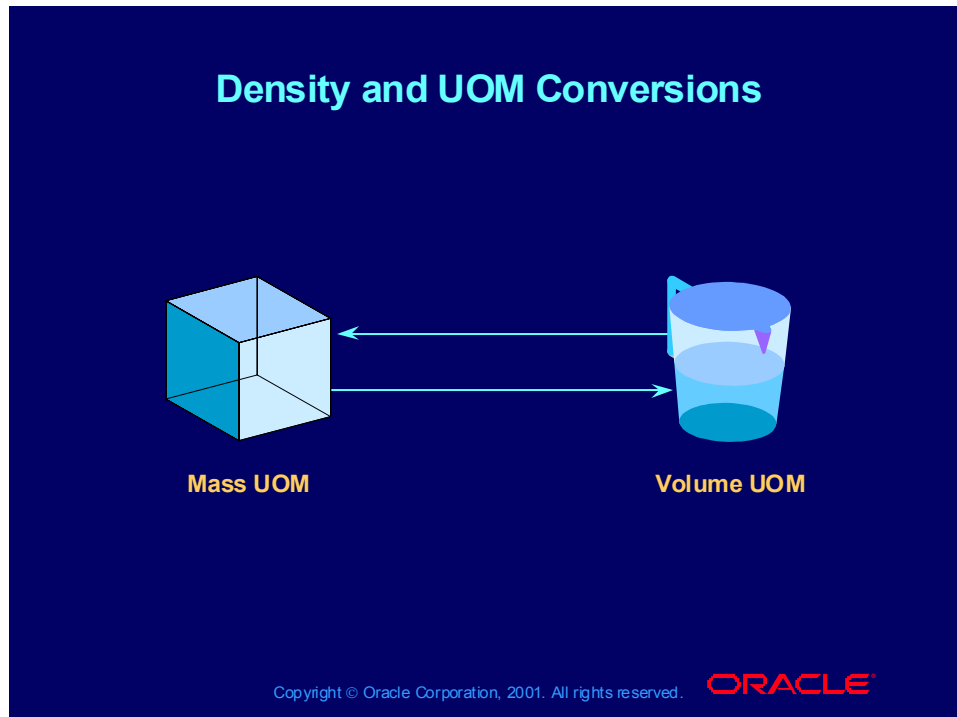
If you want to find the square root of PARM\_1, enter SQRT (PARM\_1)

If you want to raise PARM\_1 to the third power, enter (PARM\_1) ^ 3

**Note:** You cannot enter any blank spaces in the name of a technical parameter used in an expression. For example, (PARM 1) \* (PARM 2) cannot be calculated.

## Density and UOM Conversions

---



### Density and Unit of Measure Conversions

OPM Lab Management automatically creates a technical parameter for density when you define a lab type. This technical parameter is of the specific gravity type.

OPM Lab Management uses this density technical parameter to convert mass units of measure to volume units of measure and vice versa.

OPM Lab Management does not use item-specific unit of measure conversions set up in the Item Lot/Sublot Standard Conversion window:

(N) OPM Systems > System Setup > Item/Lot Conversion

### Technical Note

Be sure to enter density technical parameter data for all items for which the unit of measure conversions from mass to volume (or the reverse) need to be performed.

## Entering the Technical Parameter Sequence

---

### Entering the Technical Parameter Sequence

**Go to the Technical Parameters Sequences window to specify the order in which technical parameters are displayed in other windows.**

**OPM Product Development Responsibility  
Laboratory Management (N) Setup > Technical Parameter Seq**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Management Setup > Setting Up Technical Parameter Sequences  
... > Setting Up Technical Parameter Sequences Procedure  
... > Technical Parameter Sequences Field Reference

### Defining Technical Parameter Sequences

After you have entered the technical parameters for a lab type, you must specify the order in which they are displayed in other windows. All technical parameters defined for a specific lab type are displayed in this window.

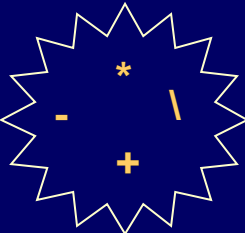
Any expression-type technical parameters that refer to other technical parameters must come after the technical parameters they reference in the sequence. For example, if PARM\_3 is calculated by multiplying PARM\_1 by PARM\_2, then PARM\_3 must come after PARM\_1 and PARM\_2 in the technical parameter sequence.

## Practice 9-2

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### Practice 9-2

**This hands-on practice covers defining and setting up technical parameters and sequences.**



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### Practice 9-2

#### Defining Technical Parameters and Sequences

Now that you have defined your laboratory type number, you can define parameters and sequences. For your laboratory type, set up two parameters (XXPARM1 and XXPARM2) with the following attributes:

XXPARM1 uses hue assay for ice cream, CCB-XX.

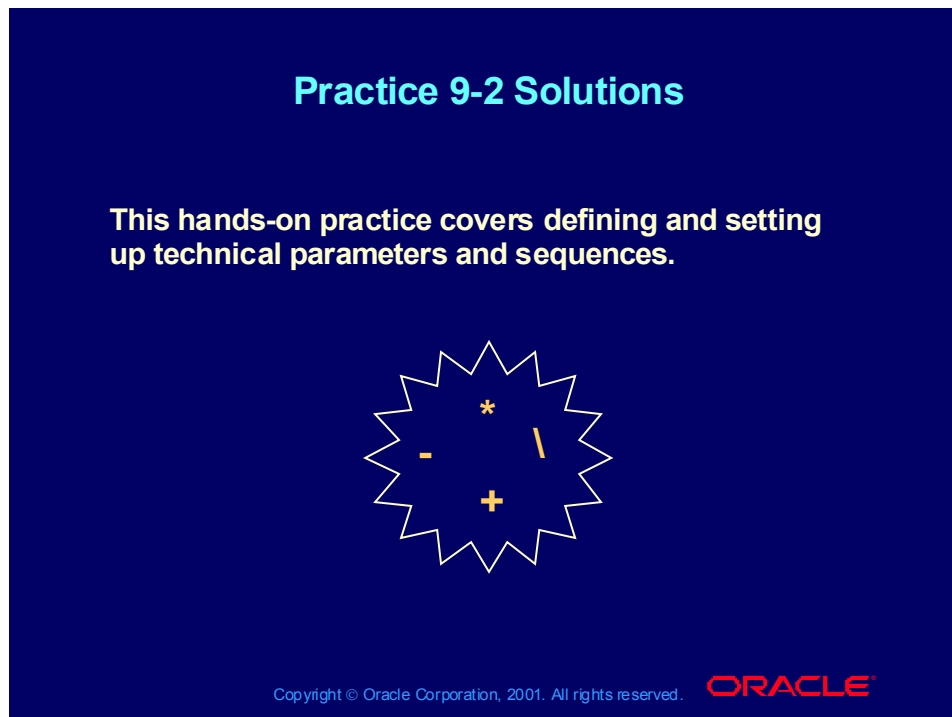
XXPARM2 uses Volume % data type, and UNIT as unit with a numeric range of 80 to 100.

The technical parameters sequencing will be in the following hierarchy:

- DENSITY
- XXPARM1
- XXPARM2

## Practice 9-2 Solutions

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### Practice 9-2 Solutions

#### Defining Technical Parameters and Sequences

Now that you have defined your laboratory type number, you can define parameters and sequences. For your laboratory type, set up two parameters (*XXPARAM1* and *XXPARAM2*) with the following attributes:

*XXPARAM1* uses hue assay for ice cream, *CCB-XX*.

*XXPARAM2* uses Volume % data type, and UNIT as unit with a numeric range of 80 to 100.

The technical parameters sequencing will be in the following hierarchy:

- *DENSITY*
- *XXPARAM1*
- *XXPARAM2*

1. Open the Technical Parameters window:

(N) OPM Product Development > Lab Management > Setup > Technical Parameters

2. Select your laboratory type from the list of values.
3. Enter a parameter name as *XXPARAM1*, and a description.
4. Select the organization from the LOV that has your hue assay for ice cream.
5. Select the assay *CCB-XX* from the assay list of values.
6. Select Save > Continue from the toolbar Action drop-down menu.



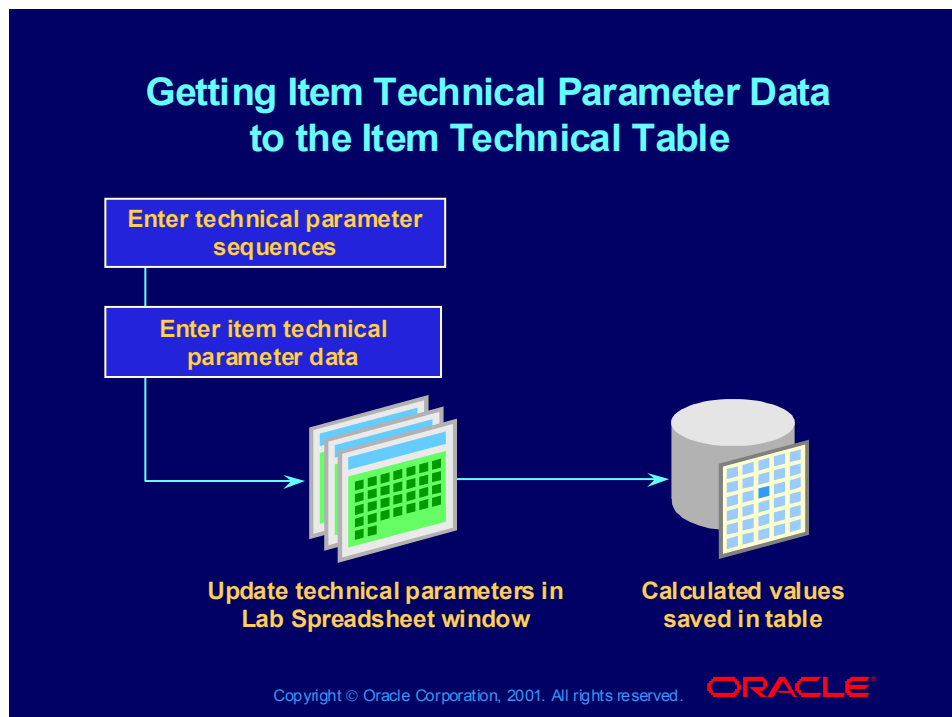
7. Using your laboratory lab type again, enter a second parameter, *XXPARAM2*, and a description.
8. In the Data Type field, select Volume% from the list of values.
9. In the Unit field, select UNIT from the list of values.
10. In the Numeric Range, enter 80 and 100.
11. Save your work.

### **Designating the Technical Parameters Sequence**

1. Open the Technical Parameters Sequences window:  
(N) OPM Product Development > Lab Management > Setup > Technical  
Parameter Sequences
2. Verify that your laboratory type defaults in the Laboratory Type field.
3. In the Sort field of the Parameter Sequence region, enter sequence numbers allowing for space in the sequence.

## Getting Item Technical Parameter Data to the Item Technical Table

---



### Describing Item Technical Parameter Data

After you specify your technical parameter sequence, you can enter the technical parameter data for your items, which are the values of your technical parameters. For technical parameters where the values for products are calculated by the OPM applications, you should generally enter data only for items that are raw materials or by-products.

### Technical Note

The calculated values for a product are not saved to the item technical data table until you bring up the formula in the Lab Spreadsheet window and select Update Technical Parameters from the Special menu. Therefore, those values are not visible in this window and are not available for use in other formulas (if that product is an ingredient in other formulas) until you select Update Technical Parameters.

If you need to enter item technical data for products, be aware that if you recalculate those technical parameter values on the spreadsheet and select Update Technical Parameters from the Special menu, the data that you entered in the Item Technical Data window is overwritten.

## Item Technical Parameter Data Details

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### Item Technical Parameter Data Details

You can enter a technical parameter data value if the technical parameter value is not calculated by an OPM application and does not come from a Quality Control assay.

Maximum value  
Minimum value  
Number of significant figures

Data value constraints

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## Practice 9-3

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### Practice 9-3

**This hands-on practice covers defining and setting up item technical data details.**



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### Practice 9-3

#### **Defining Item Technical Data**

Now that you have specified your sequence, you can enter the technical data for your items, which are the values of your technical parameters. For your lab type, set up item technical data for the ingredient Secret Blend (9410).

## Practice 9-3 Solutions

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### Practice 9-3 Solutions

This hands-on practice covers defining and setting up item technical data details.



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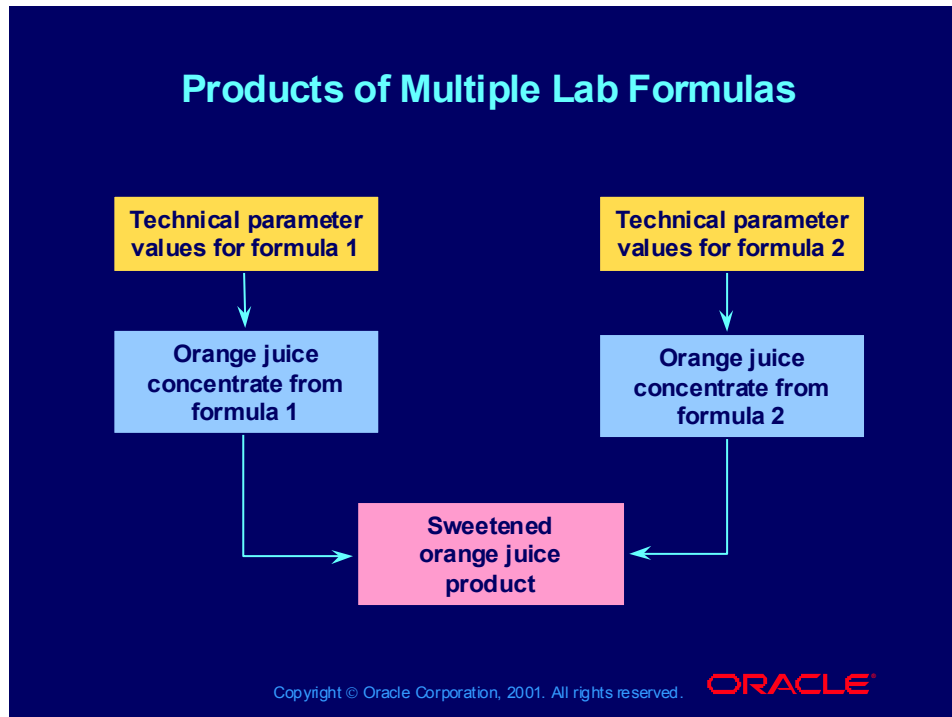
### Practice 9-3 Solutions

#### Defining Item Technical Data

1. Open the Item Technical Data window:  
(N) OPM Product Development > Lab Management > Setup > Item Technical Data
2. Enter your lab type *XX1*
3. Enter the item 9410, Secret Blend. Press [Tab] to populate all the fields excluding the Value field in the Details region.
4. Enter values for the *DENSITY* and *XXPARM2* parameters.
5. Save your work.

## Products of Multiple Lab Formulas

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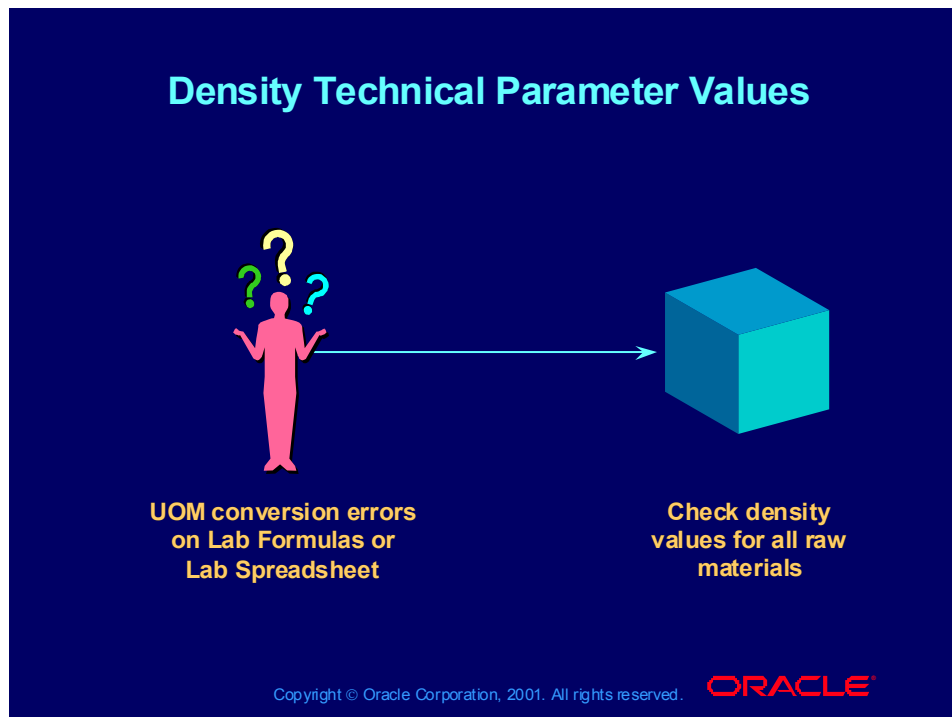
### Entering Items for Products of Multiple Lab Formulas

When you enter an item that is a product of one or more lab formulas, you must specify the formula that you are editing or viewing for that item technical data. Because the item is a product in formulas, its technical parameter values are calculated from those formulas. The calculated values may be different in each formula.

For example, you plan to make orange juice from concentrate using two different formulas, each of which uses a different concentrate. You then plan to use that orange juice in another formula to make a sweetened orange juice drink. The characteristics of the unsweetened orange juice (the technical parameter values) can be different depending on which formula you use. When you enter the unsweetened orange juice as an ingredient in the formula to make the sweetened orange juice drink, you must specify whether to use the technical parameter values from the first unsweetened orange juice formula, or those from the second unsweetened orange juice formula.

## Density Technical Parameter Values

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### The Density Technical Parameter

Because the Laboratory Management module uses the Density technical parameter for UOM conversions, you must enter values for this technical parameter for your raw materials. If you get a UOM conversion error in the Lab Formulas or in the Spreadsheet windows, check that you entered density information for all your raw materials.

The density values should be entered as a ratio between the base (or reference) UOM for the mass UOM type and the base unit of measure for the volume UOM type.

The base unit of measure for each UOM type is the first unit of measure set up for that UOM type. For example, if the base unit of measure for mass is kilograms and the base unit of measure for volume is liters, enter the density in kilograms per liter.

You can determine which units of measure are the base units for mass and volume by entering an item-specific UOM conversion between mass and volume in the Item Lot/Sublot Standard Conversion window (OPM Inventory > Inventory Setup > Item/Lot Conversion). The units displayed underneath the word Conversion are the base units for mass and volume.

## Practice 9-4

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### Practice 9-4

**This essay practice covers setting up multiple lab types.**



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### Practice 9-4

#### **Scenario Discussion Question for Defining Lab Types**

A resin manufacturer makes preblends as the first step in production. The preblend formulation can be occasionally reworked based on lab analysis for lower cost ingredient substitutions.

Three people in the QC Lab department are solely responsible for preblend formula definition. Another group in the QC Lab department is responsible for in-process and finished product development and analysis.

How could the group be structured to have separate lab data and separate working environments for preblends versus in-process/finished goods in OPM Lab Management?

#### **True or False Questions on Multiple Lab Types**

Multiple lab types can be defined for a single shared lab type, but a shared lab type may not be owned by another shared lab type. True or false?



## Practice 9-4 Solutions

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### Practice 9-4 Solutions

**This essay practice covers setting up multiple lab types.**



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### Practice 9-4 Solutions

#### Scenario Discussion Question for Defining Lab Types

A resin manufacturer makes preblends as the first step in production. The preblend formulation can be occasionally reworked based on lab analysis for lower cost ingredient substitutions.

Three people in the QC Lab department are solely responsible for preblend formula definition. Another group in the QC Lab department is responsible for in-process and finished product development and analysis.

How could the group be structured to have separate lab data and separate working environments for preblends versus in-process/finished goods in OPM Lab Management?

**Answer: You can define two separate lab types for preblend and finished goods, and enter the appropriate lab type in the default lab field on each individual's operator code.**

#### True or False Questions on Multiple Lab Types

Multiple lab types can be defined for a single shared lab type, but a shared lab type may not be owned by another shared lab type. True or false?

**Answer: True. Lab type and shared lab types cannot be nested. Only one level of the relationship is permitted. A lab type hierarchy cannot be defined.**

### Summary

In this lesson, you should have learned how to:

- Define unit-of-measure types and units of measure
- Define inventory items
- Define and enter lab types
- Define and enter technical parameters, sequences, and data

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# **Working with Existing Formulas**

## **Chapter 10**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Working with Existing Formulas**

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### Objectives

**After completing this lesson, you should be able to do the following:**

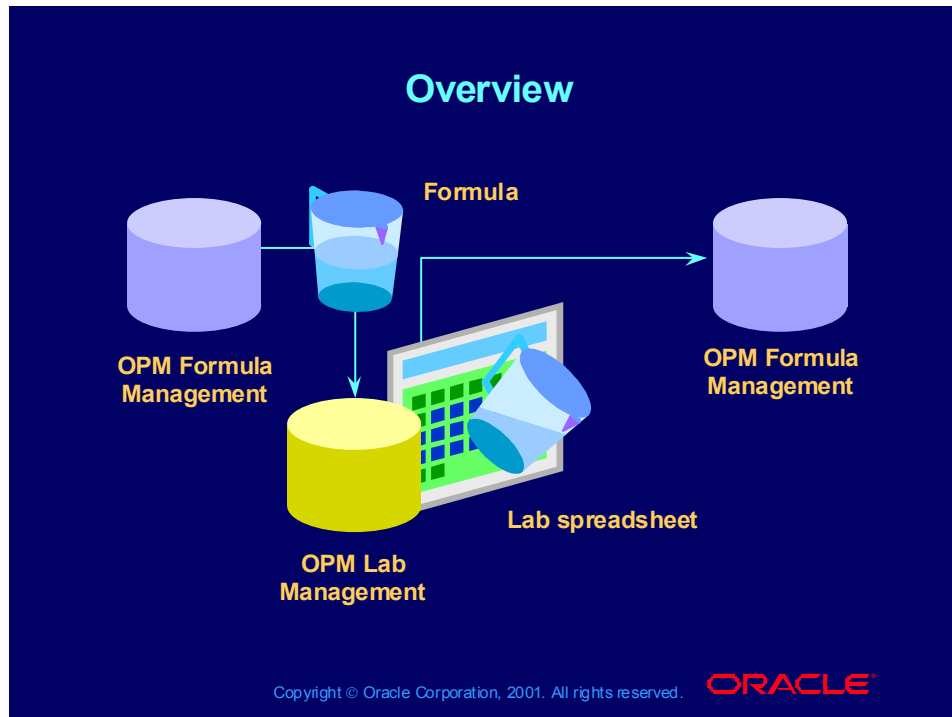
- **Download production formulas to OPM Lab Management**
- **Display ingredient and product technical parameters**
- **Set the item technical data selection**
- **Change and save lab spreadsheet data**
- **View, calculate errors, and save lab spreadsheet data**
- **Upload formulas to OPM Production**

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## Overview

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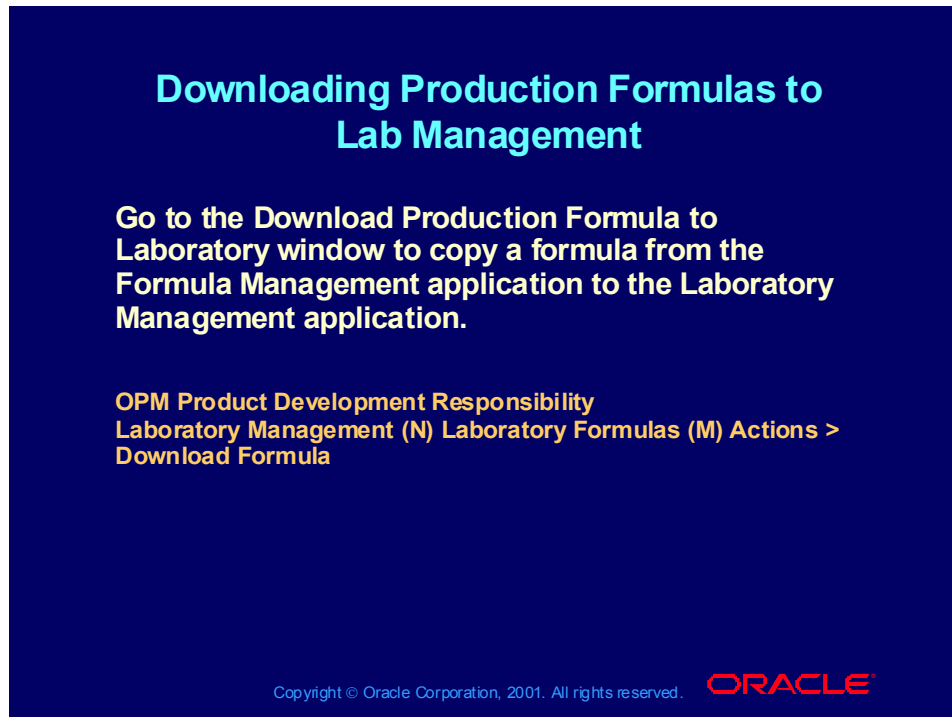
### Introducing Laboratory Formulas

Laboratory (lab) formulas and the windows in which you set them up are identical in format to formulas and windows in the OPM Formula Management application. Lab formulas cannot be used as the basis of a batch in OPM Production Management, and lab formulas do not have effectivity records associated with them. You should use OPM Formula Management to define the formulas that drive your manufacturing process.

You can establish lab formulas in the following manner:

- You can create a lab formula by entering the information in the lab formula windows
- You can download a production formula from OPM Formula Management into Lab Management
- You can upload a lab formula to OPM Formula Management, as long as it does not contain any experimental items

## Downloading Production Formulas to Lab Management



**Downloading Production Formulas to  
Lab Management**

**Go to the Download Production Formula to  
Laboratory window to copy a formula from the  
Formula Management application to the Laboratory  
Management application.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
Download Formula**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Downloading a Production Formula  
... > Downloading a Production Formula Procedure  
... > Download Production Formula to Laboratory Field Reference

## Displaying Ingredient Technical Parameter Values

---

### Displaying Ingredient Technical Parameter Values

**Go to the Ingredient Technical Parameters window to display the values of the technical parameters for the highlighted ingredient.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (B) Ingredients  
> (M) Actions > Ingredient Technical Parameters**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Displaying Ingredient Technical Parameters  
... > Displaying Ingredient Technical Parameters Procedure  
... > Ingredient Technical Parameters Field Reference



## Displaying Product Technical Parameter Value

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### Displaying Product Technical Parameter Value

**Go to the Product Technical Parameters window to display the technical parameter values for a formula product while you are working with a formula.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (B) Ingredients  
> (M) Actions > Product Technical Parameters**

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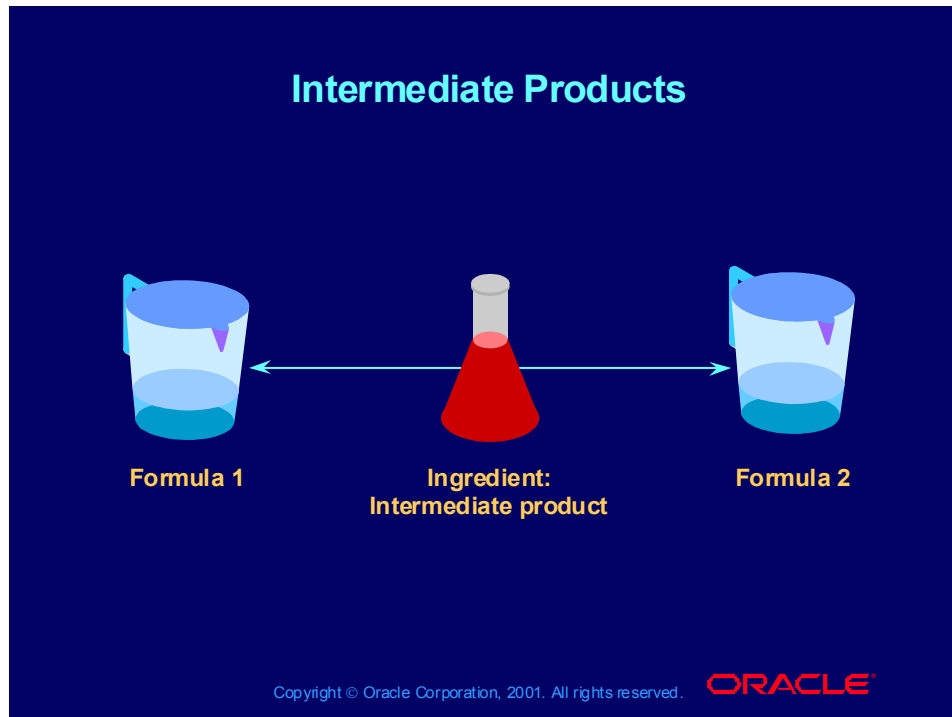
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Displaying Product Technical Parameters  
... > Displaying Product Technical Parameters Procedure  
... > Product Technical Parameters Field Reference

**Note:** Product technical data displayed here is retrieved from the database. It is not calculated when you enter the window, and it cannot be edited. You can only display product technical data after it is saved to the database. You can save product technical data by doing either of the following:

- Using the Lab Spreadsheet to calculate the product technical data and then selecting Update Technical Parameters from the Special menu on the Lab Spreadsheet window.
- Entering the data in the Item Technical Data window.

## Intermediate Products

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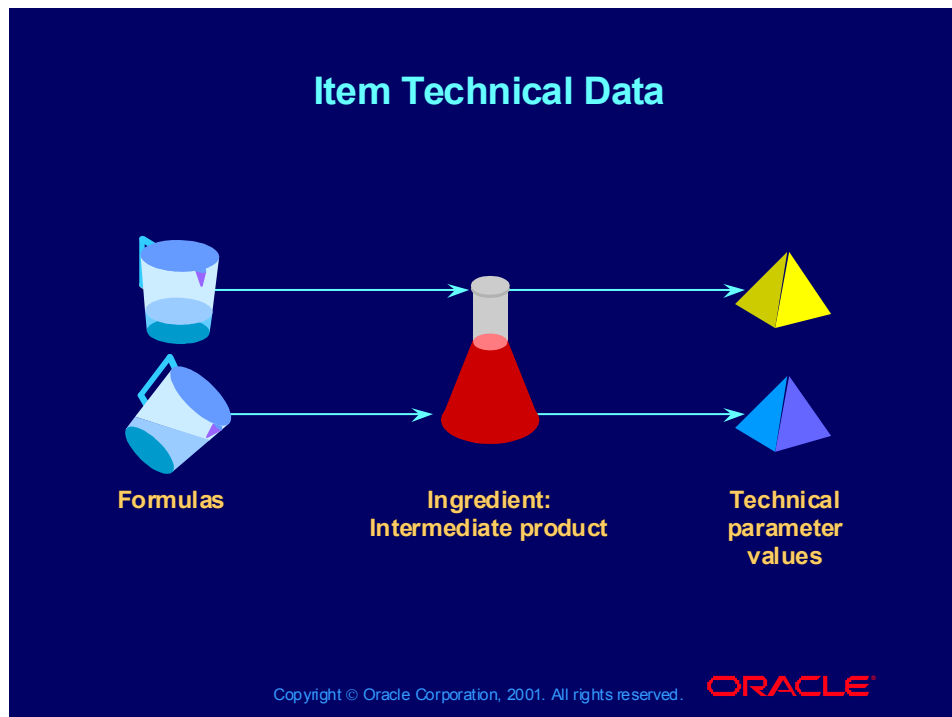
### Working with Item Technical Data Selection

The Item Technical Data Selection dialog box opens whenever you add an ingredient to a lab formula that is a product in one or more other lab formulas. These products are referred to as intermediate products. This can occur from any of the following situations:

- Entering a new formula
- Adding an ingredient to an existing lab formula
- Adding a lab formula through Ingredient Search and Replace
- Downloading a formula from the OPM Formula Management application
- Adding an ingredient to the Lab Spreadsheet window

## Item Technical Data

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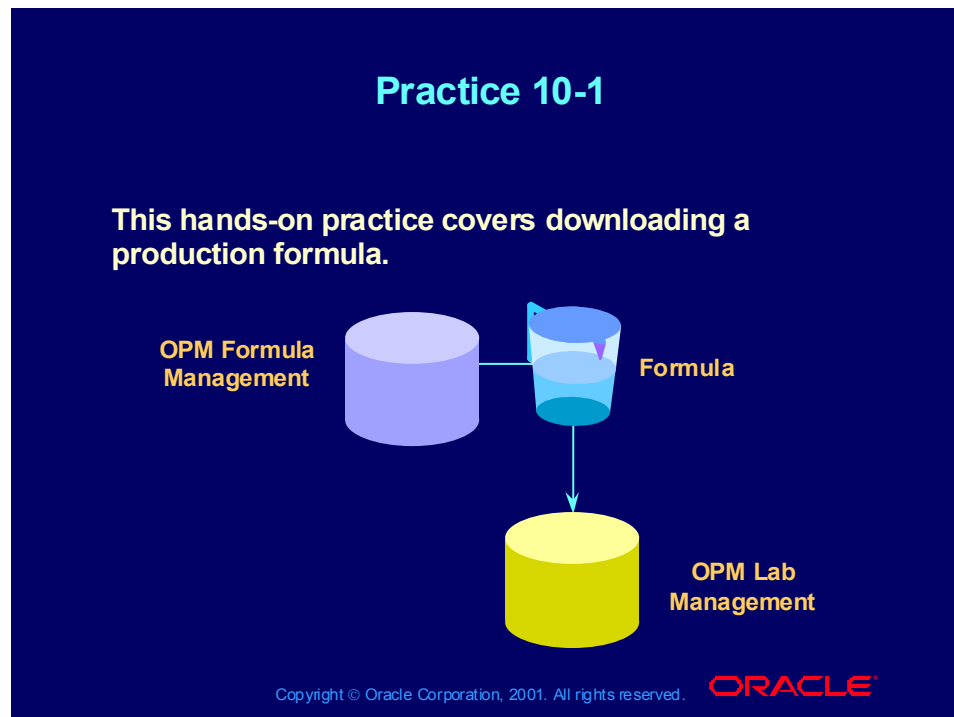
### Working with Item Technical Data Selection (continued)

You can also access this dialog box from the Lab Formula Ingredients window by selecting Technical Data Selection from the Special menu. This enables you to change the formula and version from which OPM gets the technical parameter values. Note the following about the values:

- An intermediate product can have different technical parameter values depending on which formula produces the product
- You must indicate to OPM which formula to use to receive the technical parameter values for the item
- These values can be used in calculating the values of the product technical parameters for the formula in which the item is an ingredient

## Practice 10-1

---



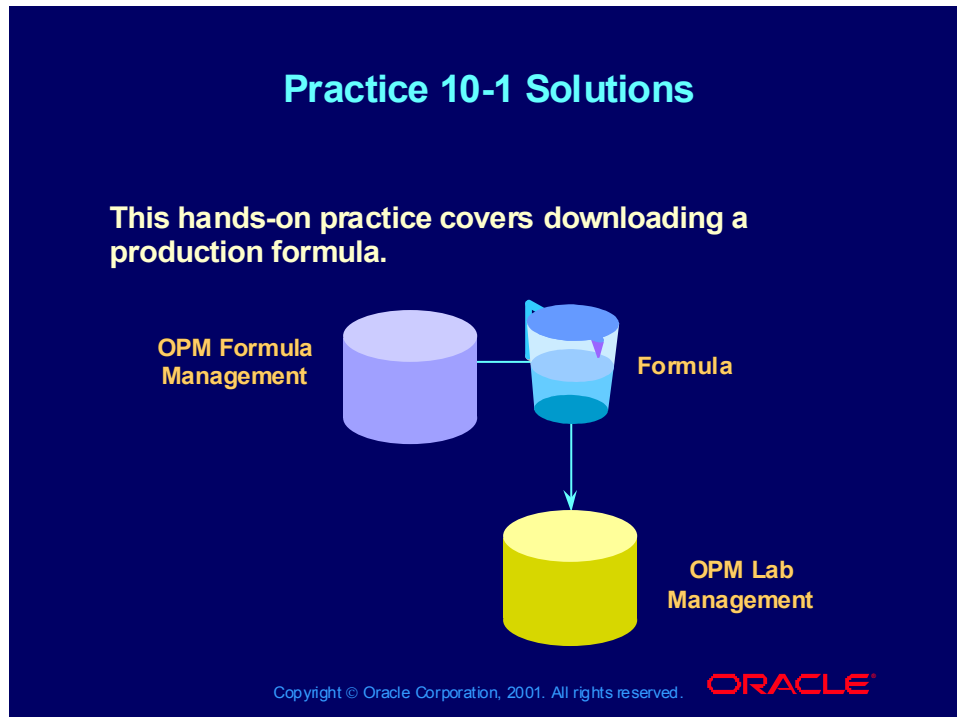
### Practice 10-1

#### **Downloading a Production Formula**

Download production formula 9250, and give it a name for laboratory management of *XX-9250*, where *XX* is your student number.

## Practice 10-1 Solutions

---



### Practice 10-1 Solutions

#### Downloading a Production Formula

Download production formula 9250, and give it a name for laboratory management of XX-9250, where XX is your student number.

1. Open the Download Production Formula to Laboratory window:  
(N) OPM Product Development > Laboratory Management > Laboratory Formulas (M) Actions > Download Formula
2. Select the formula 9250 from the production formula list of values.
3. Assign a formula name for the lab management formula of XX-9410 where XX is your student number.
4. Click OK to record your formula and to open the Laboratory Formulas window. Query your new formula.

## The Laboratory Spreadsheet

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Laboratory Management User's Guide > Laboratory Spreadsheet > Using the Laboratory Spreadsheet Window  
... > Using the Laboratory Spreadsheet Window Procedure  
... > Laboratory Spreadsheet Field Reference  
... > Laboratory Spreadsheet - Additional Setup in Laboratory Management

**Note:** You can manipulate ingredients and by-products. The fields in the Ingredients region that accept additions, deletions, and changes are:

- Item: The code for each ingredient in the formula
- Quantity: The quantity of each item in the formula
- UOM: The unit of measure in which the quantity is expressed in the formula
- Technical Parameter values: Columns labeled with the names of each technical parameter for the lab type (screenshot above shows density, weight, and volume). The values for the selected lab type and item combination can be edited.

You can see how this manipulation affects the technical parameter values of the products, for the following specific technical parameters: weight average, volume percentage, specific gravity, cost, equivalent weight, and quantity/unit.

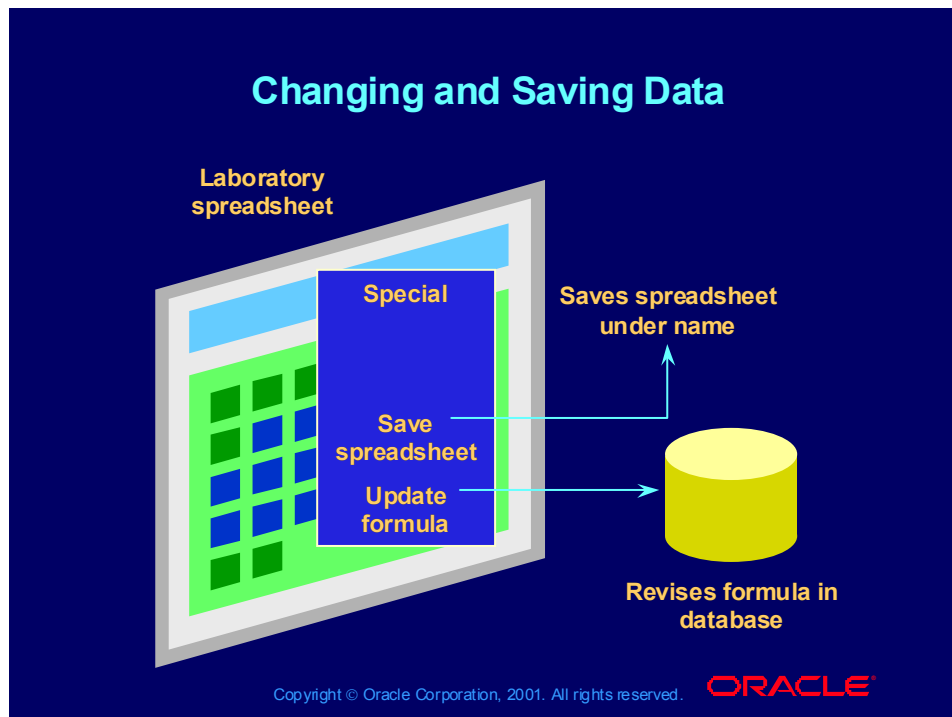
**Note:** Product technical parameter values are only calculated for one product in a formula.

You can display other information in the lower region of the window, by using the alternative region drop-down list. Items in the alternative region drop-down list are:

- Products region
- By-products region
- Extended Information region (This region displays the description of the ingredient on the line on which the cursor is positioned. If the cursor is positioned on a technical parameter that is calculated from an Expression data type, the expression displays below the ingredient description.)

## Changing and Saving Data

---



### Changing and Saving Data

To see effects of ingredient changes on the product, type in the new ingredient quantities or ingredient technical parameter values and click the Recalculate button. If you want to save the new version of the spreadsheet, select Save Spreadsheet from the Special menu of the Laboratory Spreadsheet window.

You can then enter the filename of your choice in the Save Spreadsheet dialog box and click the OK button. To retrieve the spreadsheet at a later time, select Retrieve Spreadsheet from the Special menu of the Laboratory Spreadsheet window.

Making changes to the formula on the spreadsheet does not automatically change the formula, because the formula is stored in the database. This is true even if you save the spreadsheet. The spreadsheet itself is saved to a file, but the lab formula table in the database is not updated.

This prevents you from accidentally making permanent changes to the lab formula when you are working with scenarios on the spreadsheet. If you want the formula changes to be saved to the formula in the database, you must select Update Formula from the Special menu. You must select Update Formula before you exit the spreadsheet for the update to affect the database.



## Viewing Calculation Errors

---

### Viewing Calculation Errors

**Go to the Display Calculation Errors window to display information about any errors which OPM encountered in performing calculations on the Laboratory Spreadsheet.**

**OPM Product Development Responsibility  
Laboratory Management (N) Spreadsheet > (M) Actions >  
Calculation Errors**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Spreadsheet > Displaying Calculation Errors  
... > Displaying Calculation Errors Procedure  
... > Display Calculation Errors Field Reference

### Viewing Calculation Errors

For technical parameters that are calculated from the Expressions data type, the Lab Spreadsheet displays a string of question marks or asterisks if the value could not be calculated.

A string of question marks indicates that the compilation error occurred, such as when the value of a variable used in the expression could not be found, or the syntax of the expression is incorrect.


A string of asterisks indicates that the expression could not be calculated for mathematical reasons. For example, if division by zero was requested, the calculation would fail.

## Practice 10-2

---

**Practice 10-2**

**This hands-on practice covers creating a new laboratory formula using the Lab Spreadsheet.**



OPM Lab Management      Lab Spreadsheet

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### Practice 10-2

#### **Experimenting with the Laboratory Spreadsheet Window**

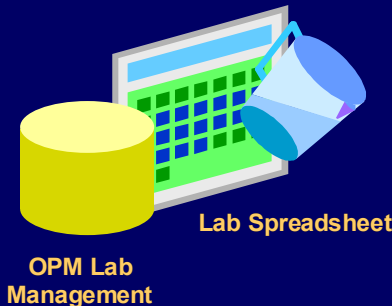
Now that you have created your own lab formula, you can experiment with different items, quantities, and so on. Open the Laboratory Spreadsheet window and experiment with ingredients for your XX-9250 formula.

## Practice 10-2 Solutions

---

**Practice 10-2 Solutions**

**This hands-on practice covers creating a new laboratory formula using the Lab Spreadsheet.**



OPM Lab Management      Lab Spreadsheet

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### Practice 10-2 Solutions

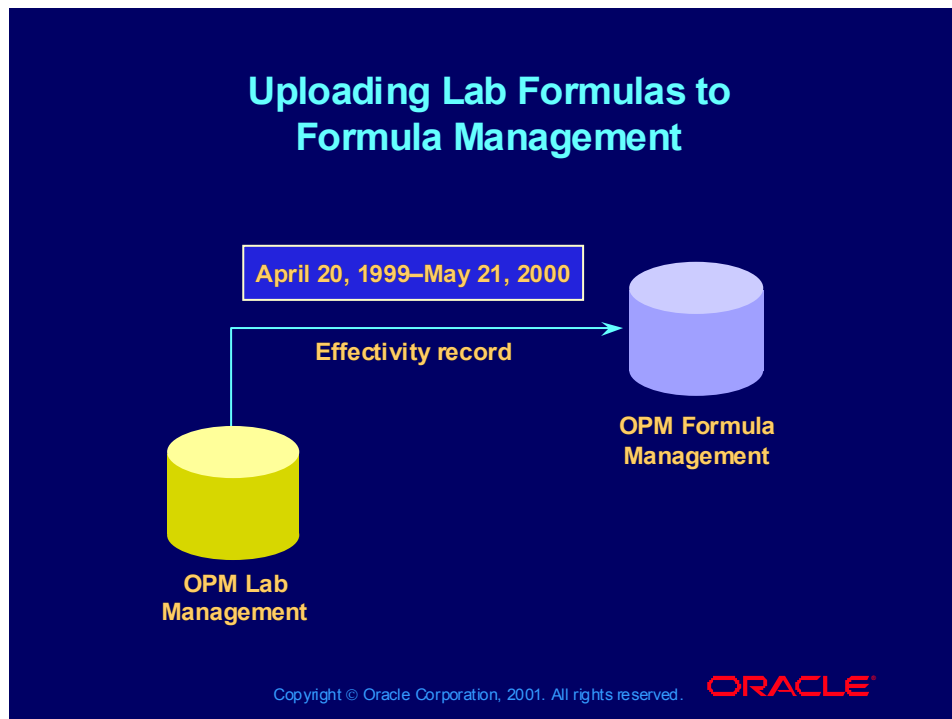
#### Experimenting with the Laboratory Spreadsheet Window

Now that you have created your own lab formula, you can experiment with different items, quantities, and so on. Open the Laboratory Spreadsheet window and experiment with ingredients for your *XX-9250* formula.

1. Open the Laboratory Spreadsheet window:  
(N) OPM Product Development > Lab Management > Spreadsheet
2. Query your lab formula, *XX-9250*.
3. Perform various changes and input to the items, quantities, and units.
4. Write notes to discuss during class time.
5. Save a new version.

## Uploading Lab Formulas to Formula Management

---



### Introducing Formula Effectivity

If you want to upload a lab formula to Formula Management, it needs an effectivity record as a driver. This can be done using one of two methods:

- You can access OPM Formula Management, and assign an effectivity
- You can set the personal profile values so that the Maintain Effectivities window opens whenever you execute an upload from OPM Laboratory Management. This is triggered by constants in the profiles.

## Uploading Formulas to Formula Management

---

### Uploading Formulas to Formula Management

**Go to the Upload Laboratory Formula to Production window to copy a formula from the Laboratory Management application to the Formula Management application.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas > (M) Actions >  
Upload Laboratory Formula**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Uploading a Laboratory Formula to Production  
... > Uploading a Laboratory Formula to Production Procedure  
... > Upload Laboratory Formula to Production Field Reference

## Maintaining Effectivities

---

### Maintaining Effectivities

**Go to the Maintain Effectivities window to enter and save the effectivity record so that the formula can be used in OPM Formula Management and OPM Production Management.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas > (M) Actions >  
Upload Laboratory Formula (B) OK**

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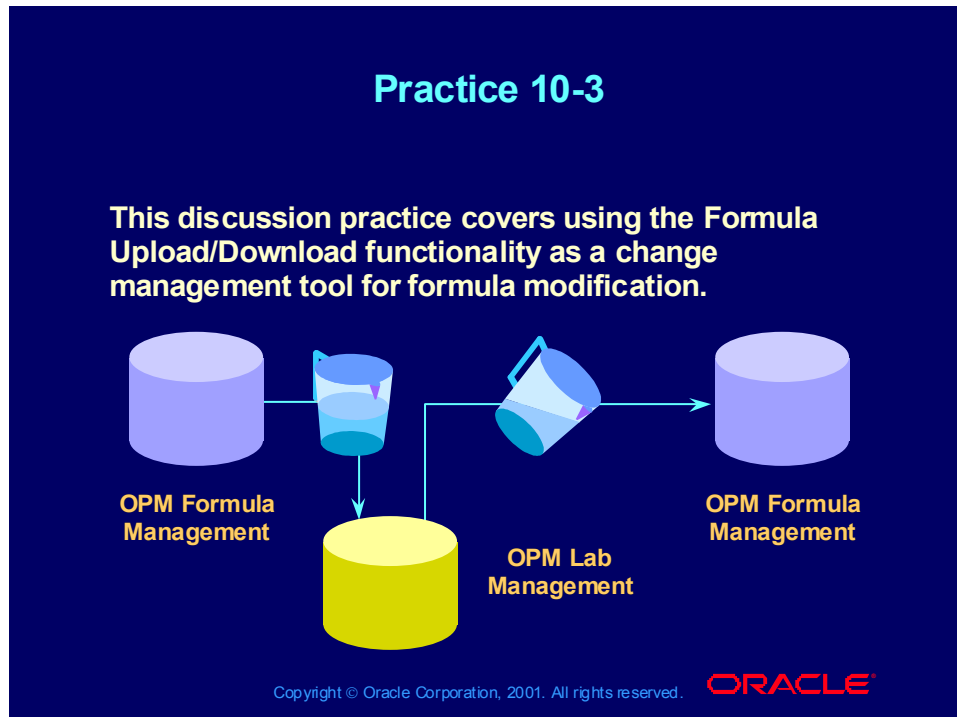
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Formula Management User's Guide >  
Effectivities > Adding To or Editing Effectivities  
... > Adding To or Editing Effectivities Procedure  
... > Maintain Effectivities Field Reference

### **Uploading a Laboratory Formula to Formula Management**

If the appropriate profile value setting is set to 1, the Maintain Effectivities window opens. You must enter and save the effectivity record so that the formula can be used in OPM Formula Management and OPM Production Management.

## Practice 10-3

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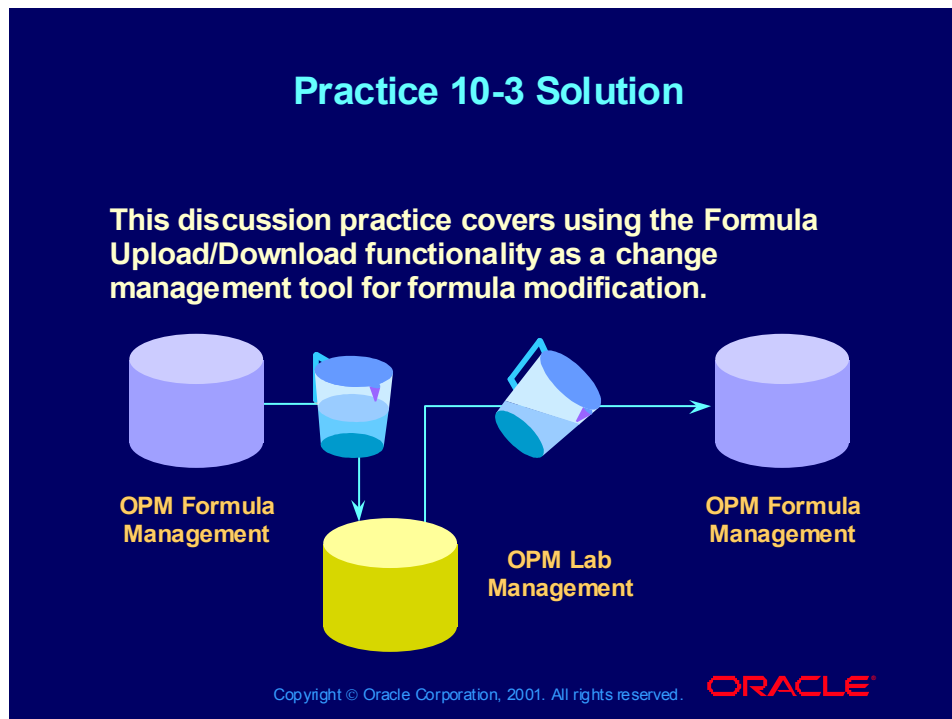
### Practice 10-3

#### **Discussion on Upload/Download Functionality**

Discuss briefly how the OPM Lab Management Upload/Download formula functionality can be used as a Change Management tool for formula modification.

## Practice 10-3 Solution

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### Practice 10-3 Solutions

#### Discussion on Upload/Download Functionality

1. In OPM Lab Management, use the download formula option to copy an OPM Production formula into the lab environment for modification. During the lab modification time, there is no effect on the production formula.

(N) OPM Product Development > Laboratory Management > Laboratory Formulas (M) Actions > Download Formula

Use the upload formula option to copy the modified formula into OPM Production and create a new version of the formula signifying a change.

(N) OPM Product Development > Laboratory Management > Laboratory Formulas (M) Actions > Upload Formula

2. In addition, the effectivity can be defined for a future start date to be used in production for the modified formula.



### Summary

In this lesson, you should have learned how to:

- Download production formulas to OPM Lab Management
- Display ingredient and product technical parameters
- Set the item technical data selection
- Change and save lab spreadsheet data
- View, calculate errors, and save lab spreadsheet data
- Upload formulas to OPM Production

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# **Creating Lab Formulas**

## **Chapter 11**

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# **11i Oracle Process Manufacturing Formula and Laboratory Management**

## **Creating Lab Formulas**

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### Objectives

**After completing this lesson, you should be able to do the following:**

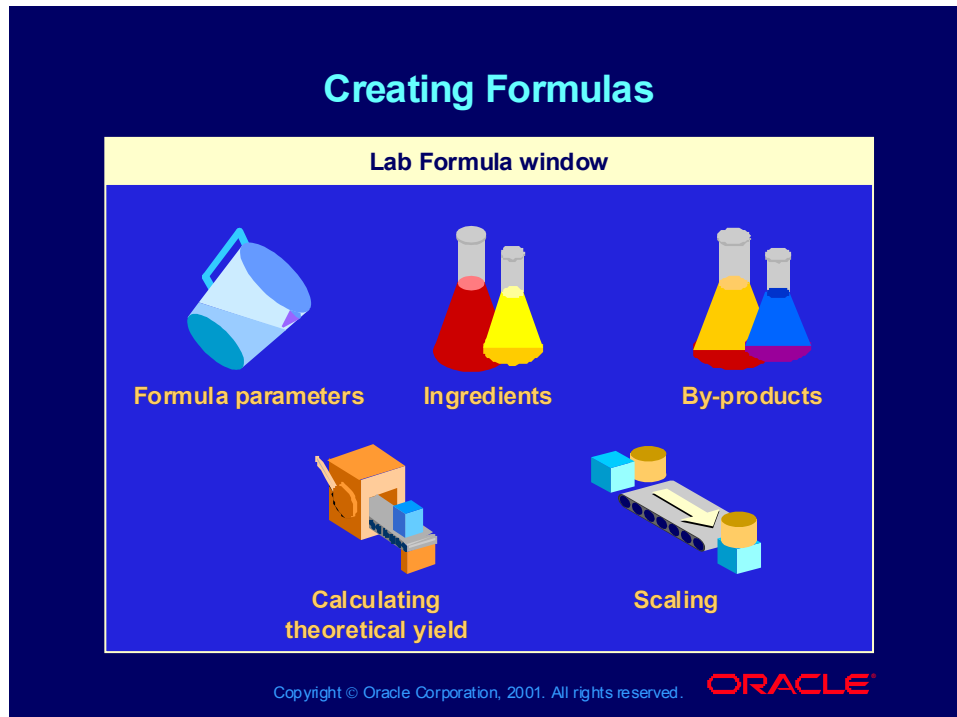
- Enter lab formula parameters
- Specify lab formula ingredients and by-products
- Enter additional information
- List experimental items
- Scale ingredients and products
- Calculate theoretical yield for formulas

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## Creating Formulas

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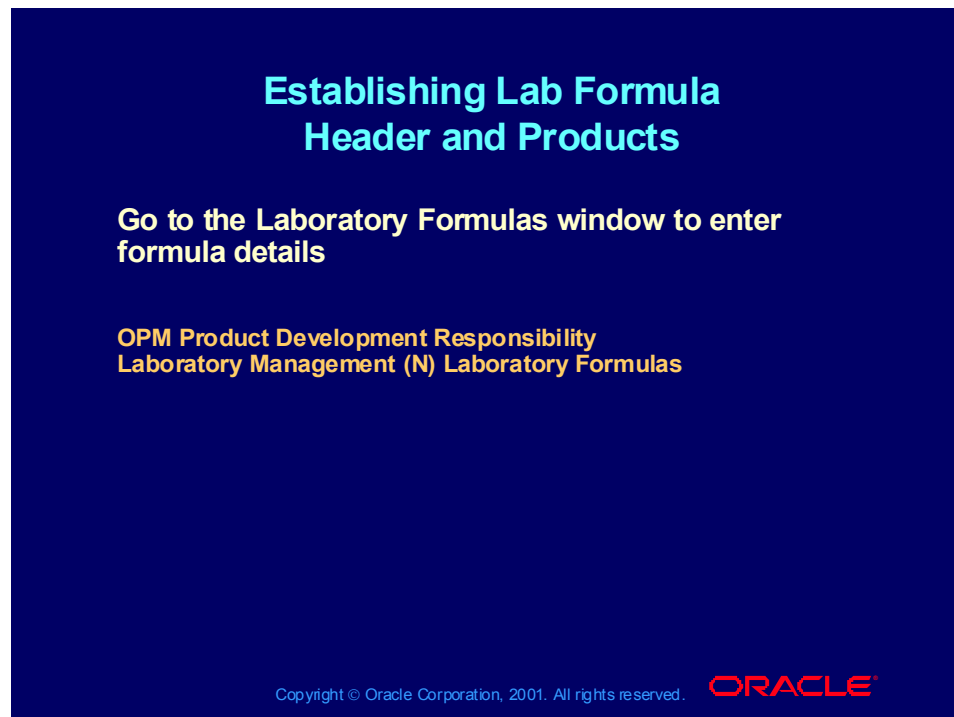


### Creating Laboratory Formulas

You can create a laboratory formula by entering the information in the Laboratory Formulas window of OPM Laboratory Management. You can upload these formulas to OPM Formula Management, as long as they do not contain experimental items.

## Establishing Lab Formula Header and Products

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Entering Laboratory Formula Information  
... > Entering Laboratory Formula Information Procedure  
... > Laboratory Formulas Field Reference  
... > Laboratory Formulas - Additional Setup in Laboratory Management

### Establishing Lab Formulas

Lab formulas and the windows in which they are set up are identical to formulas in OPM Formula Management. The differences are as follows:

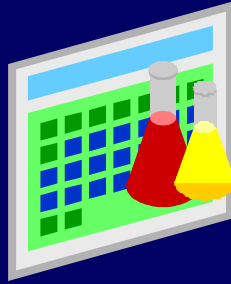
- Lab formulas cannot be used as the basis of a batch in the OPM Production Management application.
- Lab formulas do not have associated effectivity records.
- Lab formulas can contain experimental items.
- The fields that are required for establishing a lab formula are Formula, Version, Description, Scaling Allowed, Inactive, Sequence (system displays), Item, Quantity, and UOM.

## Practice 11-1

---

### Practice 11-1

This hands-on practice covers creating a lab formula.



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### Practice 11-1

#### Creating a Lab Formula

You want to test a new ice cream flavor, Fish and Chips, to be test-marketed in Melbourne, Australia. For the lab formula, you will need two test ingredient items, and one product items, as follows:

- XX-FISH: Chocolate gold fish crackers
- XX-RAIN CHIPS: Rainbow chips candy
- XX-FC ICECREAM: Fish & Chips Ice Cream

For your formula name use XX-F&C ICE CREAM, where XX is your student number.



## Practice 11-1 Solutions

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**Practice 11-1 Solutions**

**This hands-on practice covers creating a lab formula.**



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### Practice 11-1 Solutions

#### Creating a Lab Formula

You want to test a new ice cream flavor, Fish and Chips, to be test-marketed in Melbourne, Australia. For the lab formula, you will need two test ingredient items, and one product items, as follows:

- XX-FISH: Chocolate gold fish crackers
- XX-RAIN CHIPS: Rainbow chips candy
- XX-FC ICECREAM: Fish & Chips Ice Cream

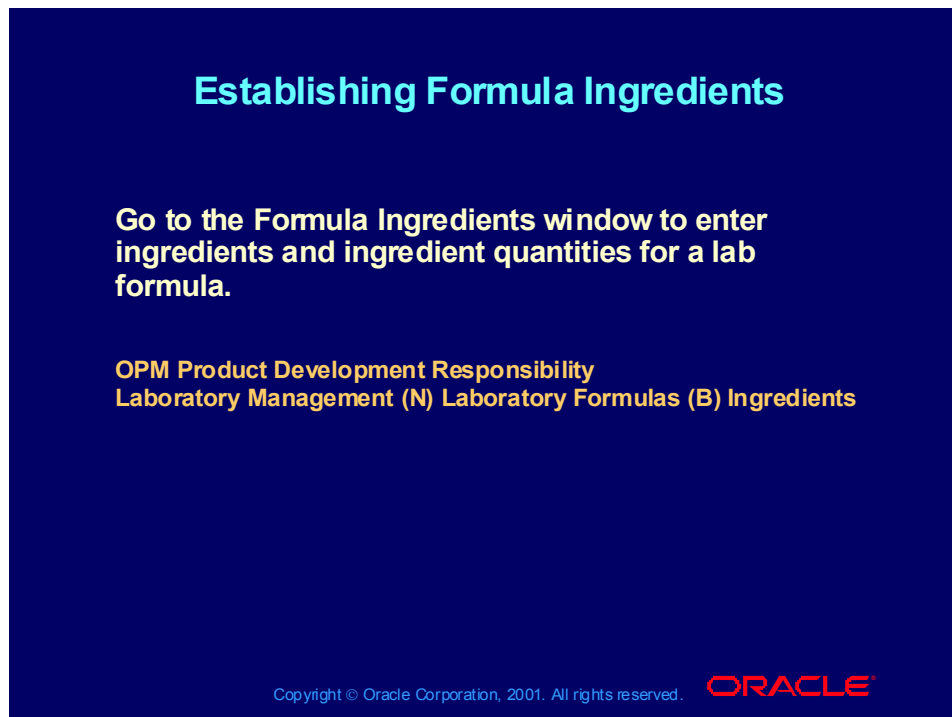
For your formula name use XX-F&C ICE CREAM, where XX is your student number.

1. Create three experimental items: two as ingredients, one as a product. Be sure to select the Experimental check box for all items.  
(N) OPM Inventory > Inventory Control > Setup > Item Master
2. Open the Laboratory Formulas window under your default organization: (N) OPM Product Development > Lab Management > Laboratory Formulas
3. Enter a formula name XX-F&C ICE CREAM, where XX is your student number.
4. Enter other descriptive fields.
5. In the Products region, enter your product experimental item in the Item field.

6. Click the Ingredients button to open the Formula Ingredients window.
7. Enter your experimental ingredients, and ingredient 9310 (Ice Cream) and ingredient quantities.
8. Click the Products button to navigate back the Laboratory Formulas window.
9. Save your work.

## Establishing Formula Ingredients

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Laboratory Management User's Guide > Laboratory Formulas > Entering Formula Ingredients  
... > Entering Formula Ingredients Procedure  
... > Formula Ingredients Field Reference  
... > Formula Ingredients - Additional Setup in Laboratory Management

### Establishing Formula Ingredients

You can use the Formula Ingredients window to enter ingredients and ingredient quantities for a lab formula. When establishing formula ingredients, use the following guidelines:

- The information in the Products region at the bottom of the window is displayed and cannot be edited.
- The Formula and Version fields at the top of the window is displayed and cannot be edited.
- In the Ingredients region, you must select the ingredient from the Item LOV. The Sequence and Description fields are automatically displayed. If you enter an item that is a product of more than one laboratory formula, the Item Technical Data Selection dialog box appears.

If you entered an ingredient, you must enter the quantity of each ingredient used in the laboratory formula in the Quantity field and the UOM in which the

quantity is expressed in the UOM field. The inventory UOM for the item is the default.

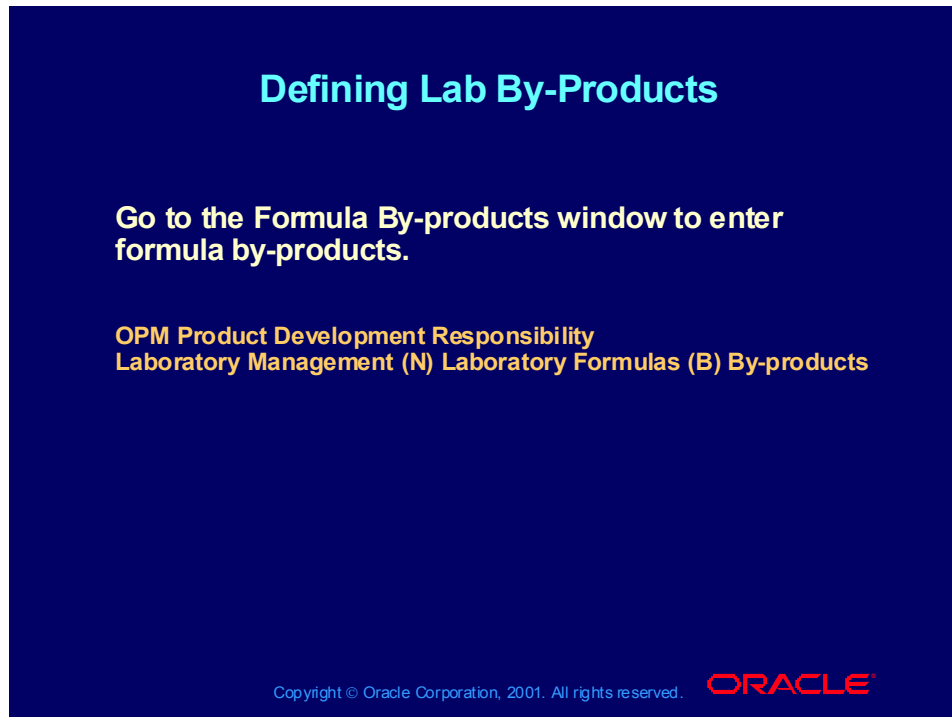
**Note:** In the Quantity field, you must type over the existing text to edit the field.

#### **Item Technical Data Selection**

If you are in the Formula Ingredients window and you enter an item that is a product of more than one laboratory formula, the Item Technical Data Selection dialog box opens. You must select the appropriate formula from the Laboratory Formula field LOV and click the OK button.

## Defining Lab By-Products

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Laboratory Management User's Guide > Laboratory Formulas > Entering Formula By-products  
... > Entering Formula By-products Procedure  
... > Formula By-products Field Reference  
... > Formula By-products - Additional Setup in Laboratory Management

### Defining Lab By-Products

By-products are items produced by the formula. They differ from products in that you do not plan your production to make by-products, and you cannot cost by-products.

The information in the Products region at the bottom of the window is displayed and cannot be edited.

The Formula and Version fields at the top of the window are displayed and cannot be edited.

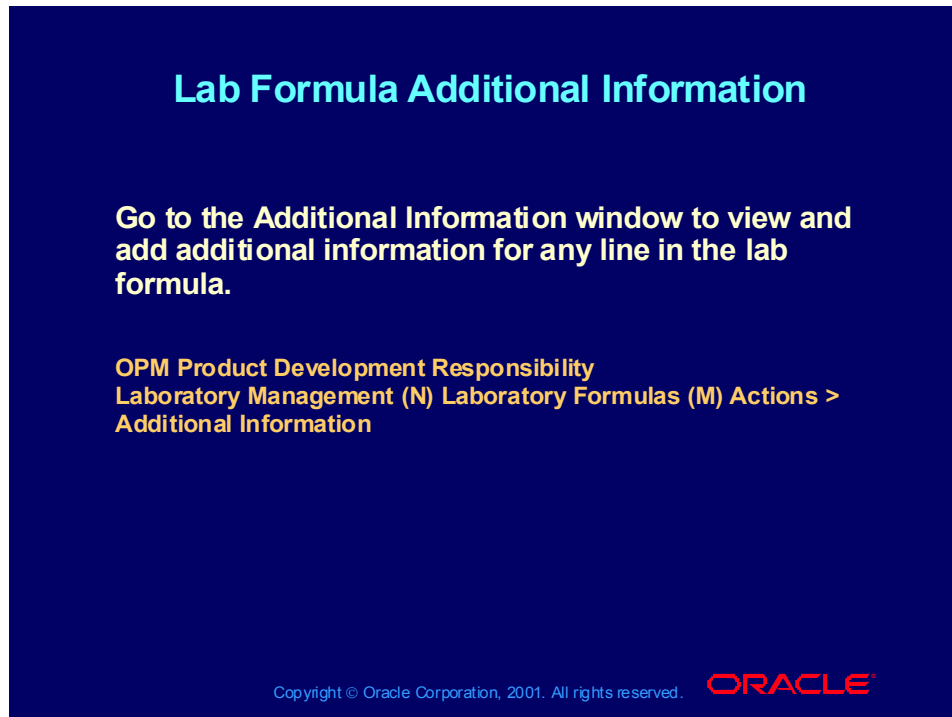
In the By-products region, you must select the by-product from the Item LOV. The Sequence and Description fields are automatically displayed.

If you entered a by-product, you must enter the quantity of each by-product used in the laboratory formula in the Quantity field, and the UOM in which the by-product is expressed in the UOM field. The inventory UOM for the item is the default.

**Note:** In the Quantity field, you must type over the existing text to edit the field. Click the Products button to navigate back to the Laboratory Formula window.

## Lab Formula Additional Information

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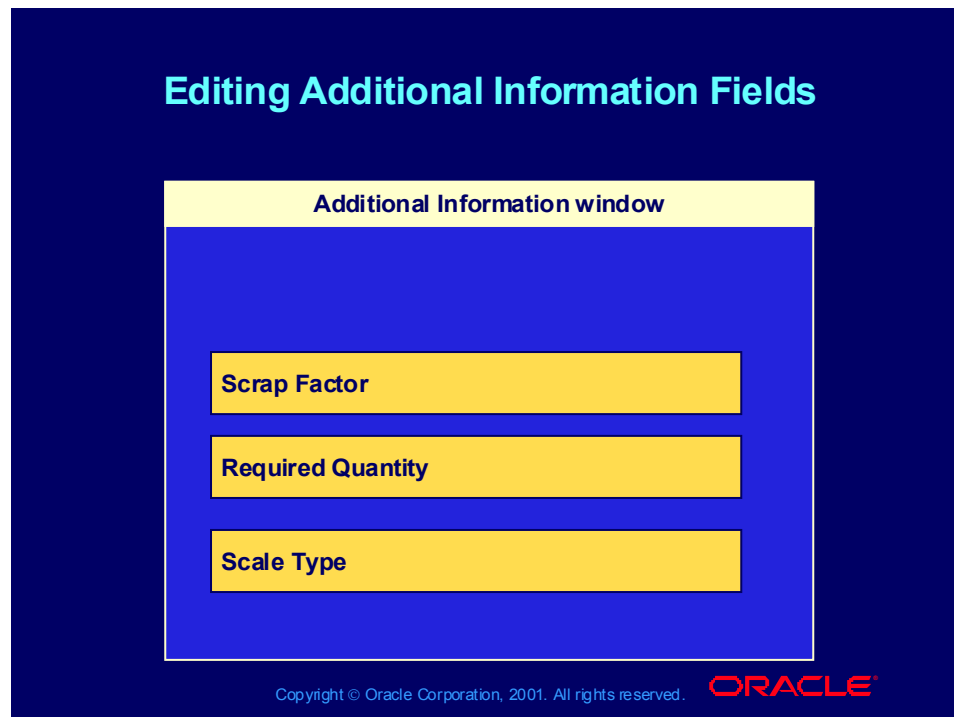
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Entering Additional Formula Information  
... > Entering Additional Formula Information Procedure  
... > Additional Information Field Reference

### Using the Additional Information Window

Most of the information in the Additional Information window is not directly relevant to the OPM Laboratory Management application. It is relevant if you copy a lab formula to the Formula Management application and use it as the basis for production batches.

## Editing Additional Information Fields

---



### Editing Additional Information Fields

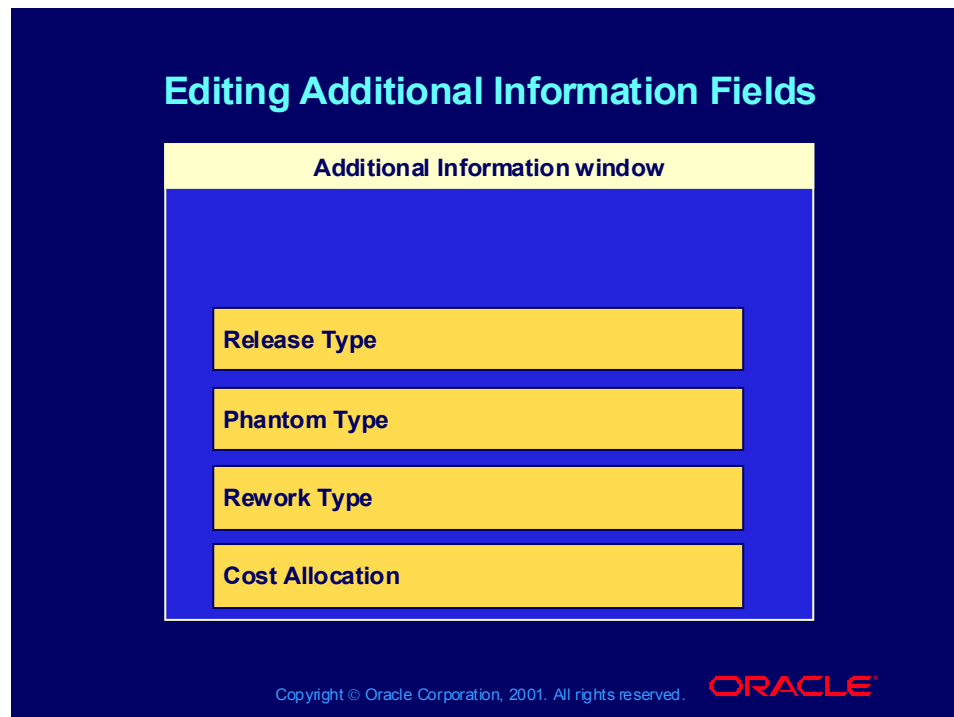
You can edit the following fields in the Additional Information window:

- **Scrap Factor:** The anticipated amount of ingredient loss due to manufacturing, expressed as a percentage. When the scrap factor percentage is entered, the required quantity automatically calculates by using the following algorithm:
  - $\text{required\_qty} = \text{formula\_qty} + (\text{formula\_qty} * (\text{scrap\_factor}\%/100))$
- **Required Quantity:** The amount of an ingredient needed to manufacture a given product, including scrap.
- **Scale Type:** If scaling is selected on the Lab Formula window, specify the scale type from one of the following:
  - Fixed quantity if the quantity of the item does not change when the formula is scaled
  - Linear scaling if the item is scaled when the formula is scaled



## Editing Additional Information Fields

---



### Editing Additional Information Fields (continued)

- Release Type: Select one of the following release types for each ingredient line:
  - Automatic release when the ingredient line is released for production when a batch that uses the formula is released
  - Manual release when the ingredient line must be released individually in a batch that uses the formula
  - Incremental release when the ingredient line is released in steps based on the entries made using partial certification (Refer to the “Partial Certification and Backflushing” section in the OPM Formula Management Release 11i User’s Guide for more information.)
- Phantom Type: Select one of the following options:
  - Not a Phantom
  - Automatic Generation, if you want the system to generate a dependent phantom batch and production ID number to associate the related batches
  - Manual Generation, if you want to explode each phantom ingredient by selecting the Create Phantom menu option
- Rework Type: Select one of the following for additional information purposes:
  - Not Rework Default Batch Quantity

- Cost Allocation: Displays the fraction of costs allocated to the selected product.

## Listing Experimental Items

---

### Listing Experimental Items

**Go to the List Experimental Items window to list all of the items in a lab formula that are marked as experimental in the Items window.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
List Experimental Items**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Listing Experimental Items  
... > Listing Experimental Items Procedure  
... > List Experimental Items Field Reference

### Viewing Experimental Items

The List Experimental Items window lists all of the items in a lab formula that are marked as experimental in the Items window. It also displays automatically if you try to upload a lab formula containing experimental items to the OPM Formula Management application. You cannot edit any fields in this window.

## Scaling Ingredients and Products

---

### Scaling Ingredients and Products

**Go to the Scale Formula window to proportionately increase or decrease the ingredient, product, and by-product quantities in a formula.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
Scale**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Scaling Ingredient and Product Quantities  
... > Scaling Ingredient and Product Quantities Procedure  
... > Scale Formula Field Reference

### Scaling Ingredient and Product Quantities

Scaling ingredient and product quantities is the proportional increase or decrease of ingredient, product, and by-product quantities in a formula. To establish scaling, do the following:

- When you enter the dialog box, you are in the percent-scaling mode. You must enter the percent value by which you want to scale the item. A negative factor indicates a scale-down.
- You can switch to item quantity mode by selecting the Item Quantity check box. This specifies a quantity for a specific item, and the rest of the formula is scaled accordingly. You need to enter a new quantity in the New Quantity field. The application calculates the percent difference between the old quantity and the new quantity and scales the rest of the lab formula accordingly.

## Calculating a Theoretical Laboratory Yield

---

### Calculating a Theoretical Laboratory Yield

Go to the Calculate Theoretical Yield window to enter the percent yield for the lab formula.

OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
Theoretical Yield

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Calculating Theoretical Yield  
... > Calculating Theoretical Yield Procedure  
... > Calculate Theoretical Yield Field Reference

### Calculating a Theoretical Laboratory Yield

You can use the Calculate Theoretical Yield dialog box to enter the percent yield for the lab formula. Refer to the OPM Formula Management Release 11i User's Guide for a thorough discussion of calculating yield. To perform calculation, do the following:

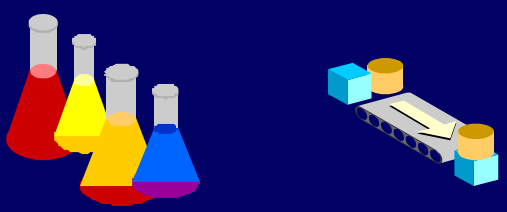
- Enter the percentage of ingredient quantities yielded in the product quantity. The program adds the ingredient quantities, taking UOM conversions into account, and multiplies the sum of the ingredient quantities by this percentage. **Note:** The yield percent used to calculate the product quantity is not stored. You may want to note it in an ingredient comment.
- If the lab formula yields 100 percent, you can still use this window to have the program calculate the product quantity, or to check to determine that you added correctly. Simply use 100 percent as the yield percent.

## Practice 11-2

---

**Practice 11-2**

**This hands-on practice covers creating experimental items and allowing for scaling.**



The diagram consists of two parts. On the left, under the label 'Experimental items', there are four Erlenmeyer flasks of different sizes and colors (red, yellow, orange, and blue) containing liquids. On the right, under the label 'Scaling', there is a 3D model of a mechanical component, possibly a piston or a valve, with a yellow arrow indicating a direction of movement or flow.

**Experimental items**

**Scaling**

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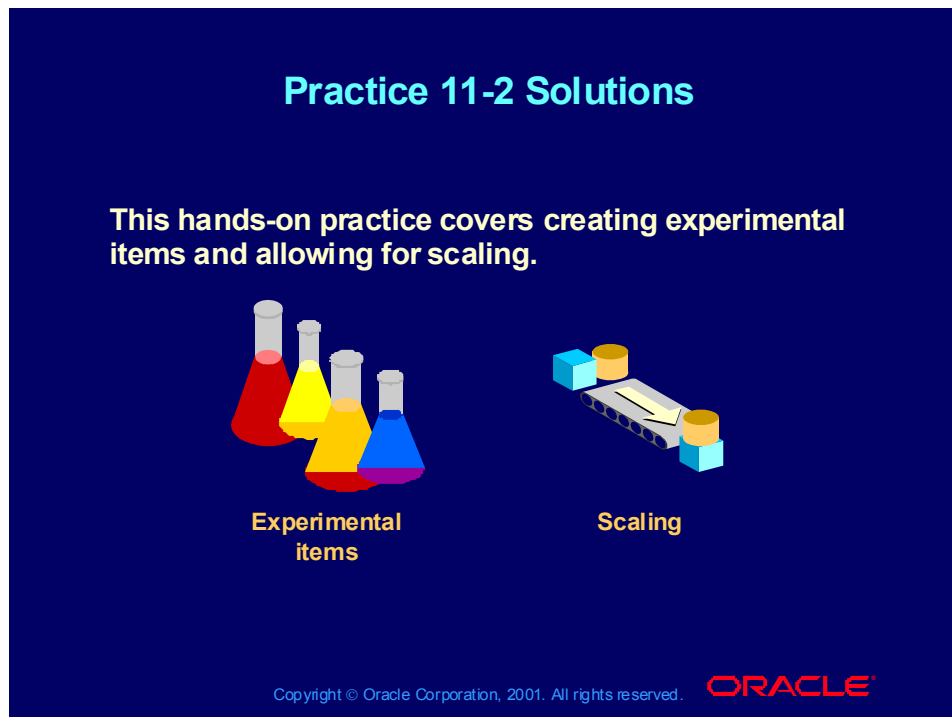
### Practice 11-2

#### Scaling Product

Scale your experiment product by 5%.

## Practice 11-2 Solutions

---



### Practice 11-2 Solutions

#### Scaling Product

Scale your experiment product by 5%.

1. Open the List Experimental Items window:

(N) OPM Product Development > Laboratory Management > Laboratory Formulas (M) Actions > List Experimental Items

2. Query your lab formula XX-F&C ICE CREAM.

3. Open the Scale Formula window.

(N) OPM Product Development>Lab Management>Laboratory Formulas (M) Actions>Scale

4. In the Factor% field, enter 5.

5. Click OK.

6. Verify that the scaling occurred by referencing the Quantity field in the Products region of the Laboratory Formulas window, and in the Ingredients region of the Formula Ingredients window.

### Summary

In this lesson, you should have learned how to:

- Enter lab formula parameters
- Specify lab formula ingredients and by-products
- Enter additional information
- List experimental items
- Scale ingredients and products
- Calculate theoretical yield for formulas

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## **11i Oracle Process Manufacturing Formula and Laboratory Management**

### **Creating Lab Formulas**

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### Objectives

**After completing this lesson, you should be able to do the following:**

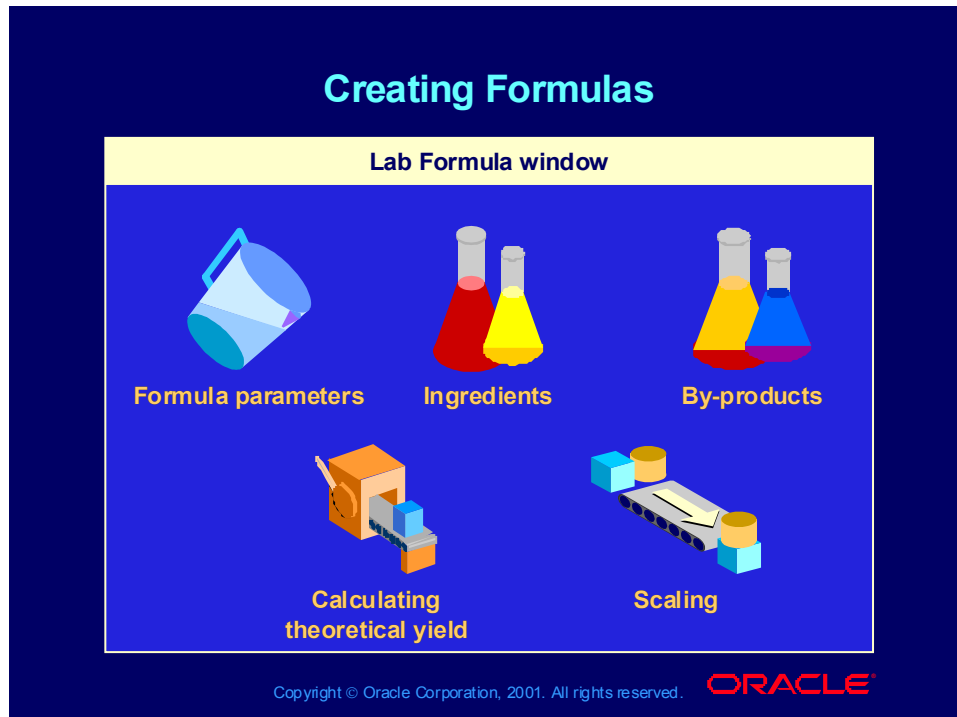
- **Enter lab formula parameters**
- **Specify lab formula ingredients and by-products**
- **Enter additional information**
- **List experimental items**
- **Scale ingredients and products**
- **Calculate theoretical yield for formulas**

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## Creating Formulas

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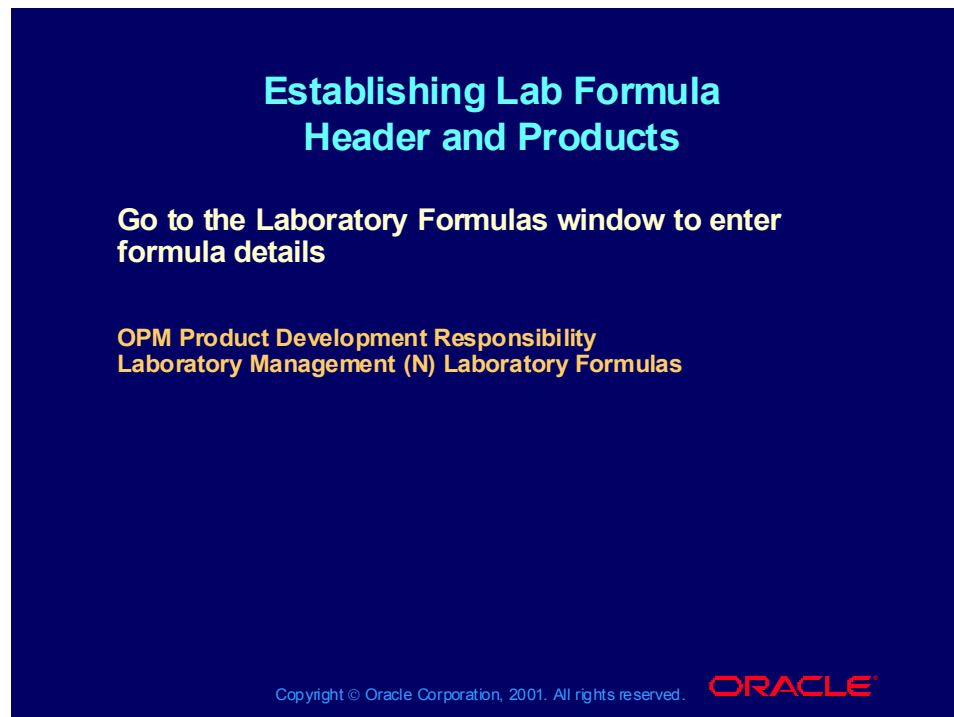


### Creating Laboratory Formulas

You can create a laboratory formula by entering the information in the Laboratory Formulas window of OPM Laboratory Management. You can upload these formulas to OPM Formula Management, as long as they do not contain experimental items.

## Establishing Lab Formula Header and Products

---



(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Entering Laboratory Formula Information  
... > Entering Laboratory Formula Information Procedure  
... > Laboratory Formulas Field Reference  
... > Laboratory Formulas - Additional Setup in Laboratory Management

### Establishing Lab Formulas

Lab formulas and the windows in which they are set up are identical to formulas in OPM Formula Management. The differences are as follows:

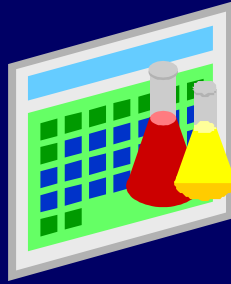
- Lab formulas cannot be used as the basis of a batch in the OPM Production Management application.
- Lab formulas do not have associated effectivity records.
- Lab formulas can contain experimental items.
- The fields that are required for establishing a lab formula are Formula, Version, Description, Scaling Allowed, Inactive, Sequence (system displays), Item, Quantity, and UOM.

## Practice 11-1

---

### Practice 11-1

This hands-on practice covers creating a lab formula.



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### Practice 11-1

#### Creating a Lab Formula

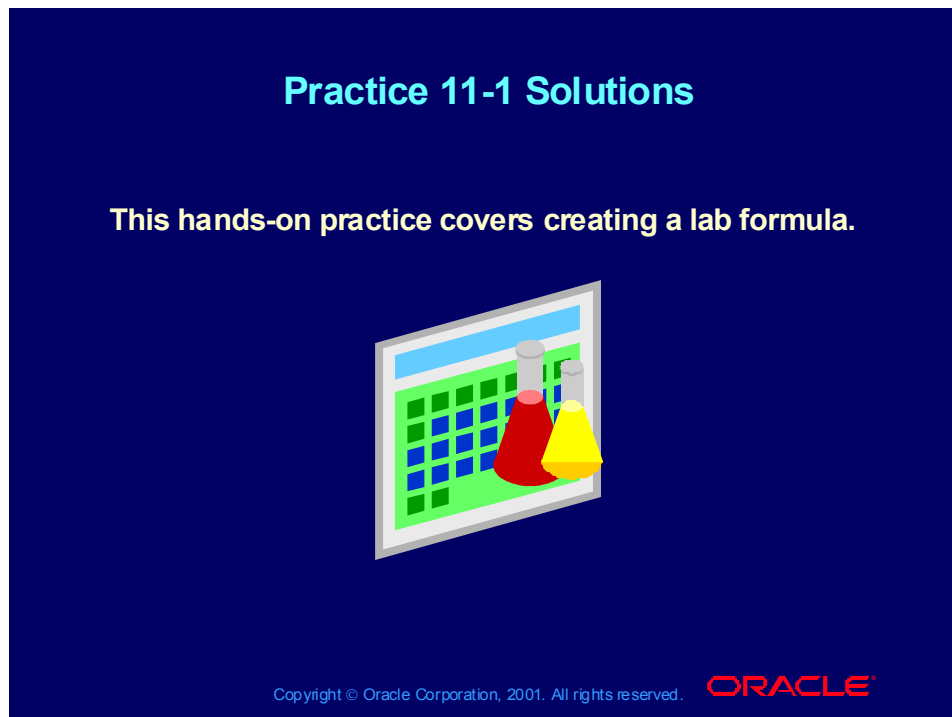
You want to test a new ice cream flavor, Fish and Chips, to be test-marketed in Melbourne, Australia. For the lab formula, you will need two test ingredient items, and one product items, as follows:

- XX-FISH: Chocolate gold fish crackers
- XX-RAIN CHIPS: Rainbow chips candy
- XX-FC ICECREAM: Fish & Chips Ice Cream

For your formula name use XX-F&C ICE CREAM, where XX is your student number.

## Practice 11-1 Solutions

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### Practice 11-1 Solutions

#### Creating a Lab Formula

You want to test a new ice cream flavor, Fish and Chips, to be test-marketed in Melbourne, Australia. For the lab formula, you will need two test ingredient items, and one product items, as follows:

- XX-FISH: Chocolate gold fish crackers
- XX-RAIN CHIPS: Rainbow chips candy
- XX-FC ICECREAM: Fish & Chips Ice Cream

For your formula name use XX-F&C ICE CREAM, where XX is your student number.

1. Create three experimental items: two as ingredients, one as a product. Be sure to select the Experimental check box for all items.

(N) OPM Inventory > Inventory Control > Setup > Item Master

2. Open the Laboratory Formulas window under your default organization: (N) OPM Product Development > Lab Management > Laboratory Formulas

3. Enter a formula name XX-F&C ICE CREAM, where XX is your student number.

4. Enter other descriptive fields.

5. In the Products region, enter your product experimental item in the Item field.

6. Click the Ingredients button to open the Formula Ingredients window.
7. Enter your experimental ingredients, and ingredient 9310 (Ice Cream) and ingredient quantities.
8. Click the Products button to navigate back the Laboratory Formulas window.
9. Save your work.

## Establishing Formula Ingredients

---

### Establishing Formula Ingredients

**Go to the Formula Ingredients window to enter ingredients and ingredient quantities for a lab formula.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (B) Ingredients**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Entering Formula Ingredients  
... > Entering Formula Ingredients Procedure  
... > Formula Ingredients Field Reference  
... > Formula Ingredients - Additional Setup in Laboratory Management

### Establishing Formula Ingredients

You can use the Formula Ingredients window to enter ingredients and ingredient quantities for a lab formula. When establishing formula ingredients, use the following guidelines:

- The information in the Products region at the bottom of the window is displayed and cannot be edited.
- The Formula and Version fields at the top of the window is displayed and cannot be edited.
- In the Ingredients region, you must select the ingredient from the Item LOV. The Sequence and Description fields are automatically displayed. If you enter an item that is a product of more than one laboratory formula, the Item Technical Data Selection dialog box appears.

If you entered an ingredient, you must enter the quantity of each ingredient used in the laboratory formula in the Quantity field and the UOM in which the



quantity is expressed in the UOM field. The inventory UOM for the item is the default.

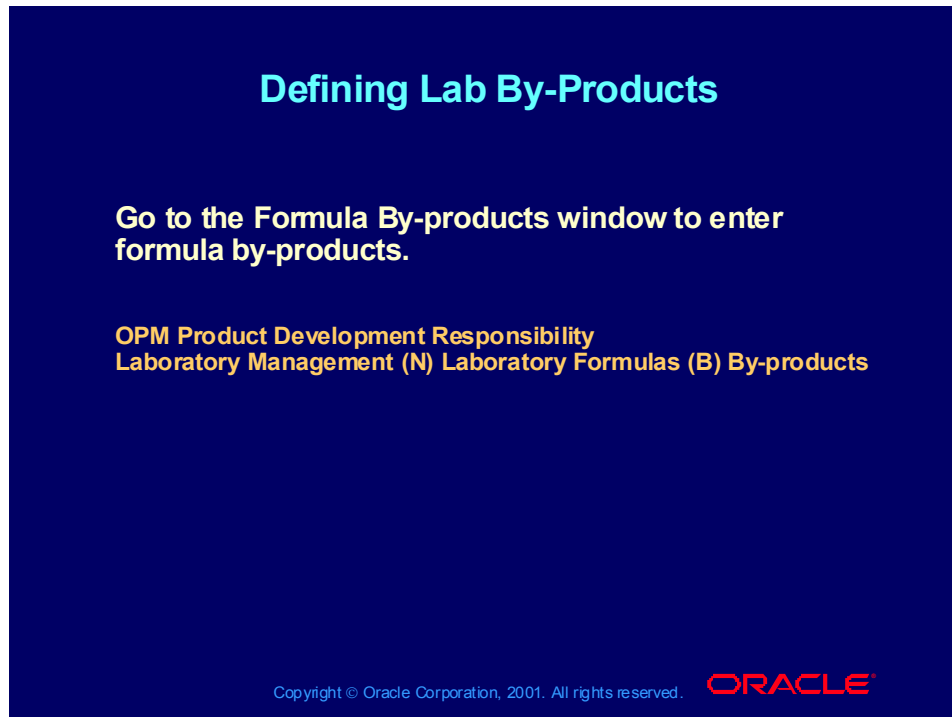
**Note:** In the Quantity field, you must type over the existing text to edit the field.

#### **Item Technical Data Selection**

If you are in the Formula Ingredients window and you enter an item that is a product of more than one laboratory formula, the Item Technical Data Selection dialog box opens. You must select the appropriate formula from the Laboratory Formula field LOV and click the OK button.

## Defining Lab By-Products

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(Help) Oracle Manufacturing Applications > Oracle Process Applications > OPM Product Development > OPM Laboratory Management User's Guide > Laboratory Formulas > Entering Formula By-products  
... > Entering Formula By-products Procedure  
... > Formula By-products Field Reference  
... > Formula By-products - Additional Setup in Laboratory Management

### Defining Lab By-Products

By-products are items produced by the formula. They differ from products in that you do not plan your production to make by-products, and you cannot cost by-products.

The information in the Products region at the bottom of the window is displayed and cannot be edited.

The Formula and Version fields at the top of the window are displayed and cannot be edited.

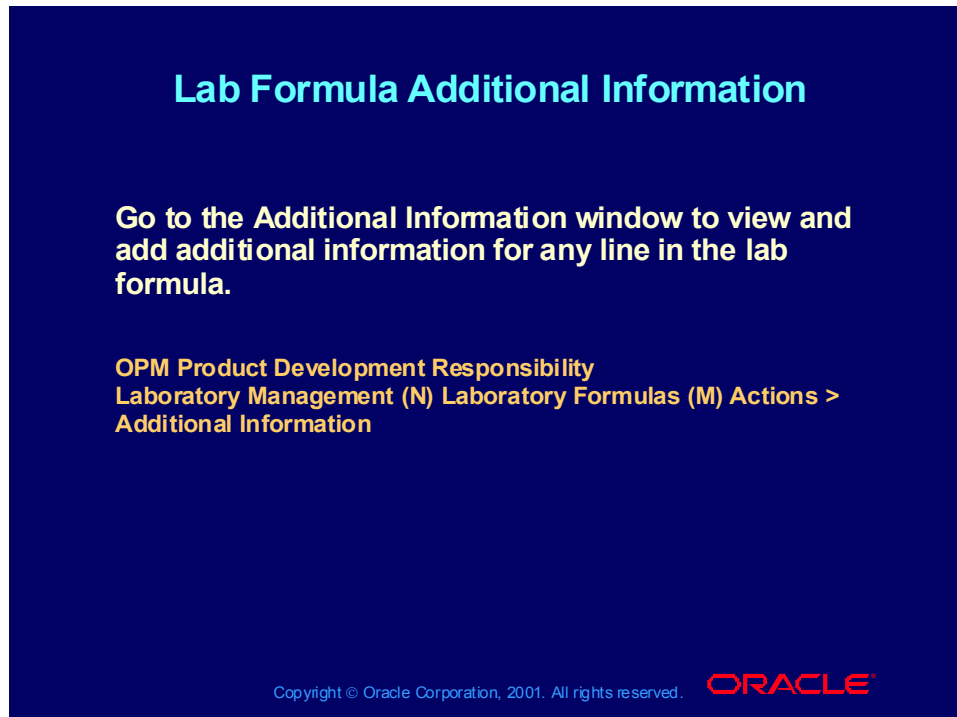
In the By-products region, you must select the by-product from the Item LOV. The Sequence and Description fields are automatically displayed.

If you entered a by-product, you must enter the quantity of each by-product used in the laboratory formula in the Quantity field, and the UOM in which the by-product is expressed in the UOM field. The inventory UOM for the item is the default.

**Note:** In the Quantity field, you must type over the existing text to edit the field. Click the Products button to navigate back to the Laboratory Formula window.

## Lab Formula Additional Information

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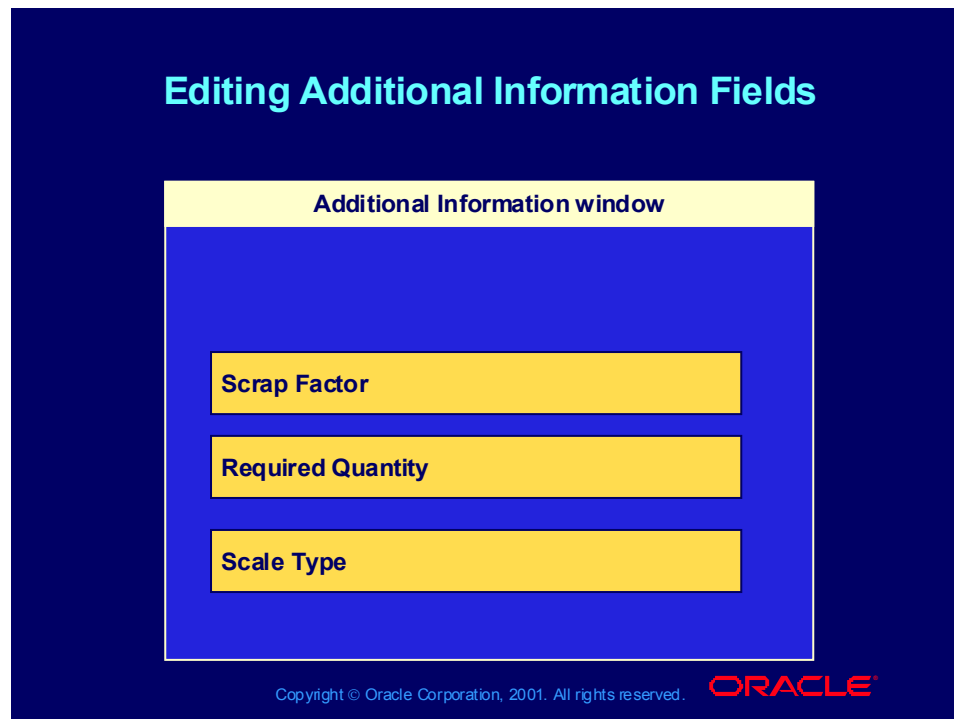
(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Entering Additional Formula Information  
... > Entering Additional Formula Information Procedure  
... > Additional Information Field Reference

### Using the Additional Information Window

Most of the information in the Additional Information window is not directly relevant to the OPM Laboratory Management application. It is relevant if you copy a lab formula to the Formula Management application and use it as the basis for production batches.

## Editing Additional Information Fields

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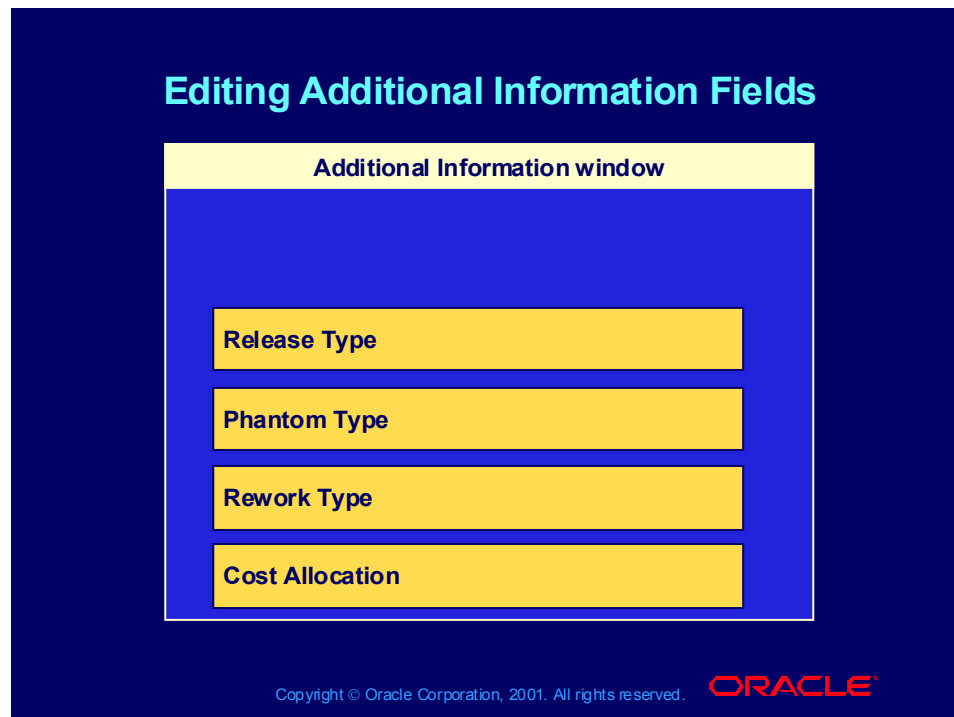
### Editing Additional Information Fields

You can edit the following fields in the Additional Information window:

- **Scrap Factor:** The anticipated amount of ingredient loss due to manufacturing, expressed as a percentage. When the scrap factor percentage is entered, the required quantity automatically calculates by using the following algorithm:
  - $\text{required\_qty} = \text{formula\_qty} + (\text{formula\_qty} * (\text{scrap\_factor}\%/100))$
- **Required Quantity:** The amount of an ingredient needed to manufacture a given product, including scrap.
- **Scale Type:** If scaling is selected on the Lab Formula window, specify the scale type from one of the following:
  - Fixed quantity if the quantity of the item does not change when the formula is scaled
  - Linear scaling if the item is scaled when the formula is scaled

## Editing Additional Information Fields

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### Editing Additional Information Fields (continued)

- Release Type: Select one of the following release types for each ingredient line:
  - Automatic release when the ingredient line is released for production when a batch that uses the formula is released
  - Manual release when the ingredient line must be released individually in a batch that uses the formula
  - Incremental release when the ingredient line is released in steps based on the entries made using partial certification (Refer to the “Partial Certification and Backflushing” section in the OPM Formula Management Release 11i User’s Guide for more information.)
- Phantom Type: Select one of the following options:
  - Not a Phantom
  - Automatic Generation, if you want the system to generate a dependent phantom batch and production ID number to associate the related batches
  - Manual Generation, if you want to explode each phantom ingredient by selecting the Create Phantom menu option
- Rework Type: Select one of the following for additional information purposes:
  - Not Rework Default Batch Quantity

- Cost Allocation: Displays the fraction of costs allocated to the selected product.

## Listing Experimental Items

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### Listing Experimental Items

**Go to the List Experimental Items window to list all of the items in a lab formula that are marked as experimental in the Items window.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
List Experimental Items**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Listing Experimental Items  
... > Listing Experimental Items Procedure  
... > List Experimental Items Field Reference

### Viewing Experimental Items

The List Experimental Items window lists all of the items in a lab formula that are marked as experimental in the Items window. It also displays automatically if you try to upload a lab formula containing experimental items to the OPM Formula Management application. You cannot edit any fields in this window.



## Scaling Ingredients and Products

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### Scaling Ingredients and Products

**Go to the Scale Formula window to proportionately increase or decrease the ingredient, product, and by-product quantities in a formula.**

**OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
Scale**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Scaling Ingredient and Product Quantities  
... > Scaling Ingredient and Product Quantities Procedure  
... > Scale Formula Field Reference

### Scaling Ingredient and Product Quantities

Scaling ingredient and product quantities is the proportional increase or decrease of ingredient, product, and by-product quantities in a formula. To establish scaling, do the following:

- When you enter the dialog box, you are in the percent-scaling mode. You must enter the percent value by which you want to scale the item. A negative factor indicates a scale-down.
- You can switch to item quantity mode by selecting the Item Quantity check box. This specifies a quantity for a specific item, and the rest of the formula is scaled accordingly. You need to enter a new quantity in the New Quantity field. The application calculates the percent difference between the old quantity and the new quantity and scales the rest of the lab formula accordingly.

## Calculating a Theoretical Laboratory Yield

---

### Calculating a Theoretical Laboratory Yield

Go to the Calculate Theoretical Yield window to enter the percent yield for the lab formula.

OPM Product Development Responsibility  
Laboratory Management (N) Laboratory Formulas (M) Actions >  
Theoretical Yield

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Laboratory Formulas > Calculating Theoretical Yield  
... > Calculating Theoretical Yield Procedure  
... > Calculate Theoretical Yield Field Reference

### Calculating a Theoretical Laboratory Yield

You can use the Calculate Theoretical Yield dialog box to enter the percent yield for the lab formula. Refer to the OPM Formula Management Release 11i User's Guide for a thorough discussion of calculating yield. To perform calculation, do the following:

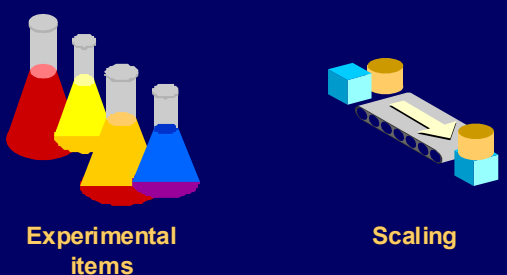
- Enter the percentage of ingredient quantities yielded in the product quantity. The program adds the ingredient quantities, taking UOM conversions into account, and multiplies the sum of the ingredient quantities by this percentage. **Note:** The yield percent used to calculate the product quantity is not stored. You may want to note it in an ingredient comment.
- If the lab formula yields 100 percent, you can still use this window to have the program calculate the product quantity, or to check to determine that you added correctly. Simply use 100 percent as the yield percent.

## Practice 11-2

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**Practice 11-2**

**This hands-on practice covers creating experimental items and allowing for scaling.**



The diagram consists of two parts. On the left, under the label 'Experimental items', there are four Erlenmeyer flasks of different sizes and colors (red, yellow, orange, and blue) containing liquids. On the right, under the label 'Scaling', there is a 3D perspective view of a long, narrow rectangular block with a yellow arrow pointing along its length, flanked by small blue and yellow cubes.

**Experimental items**

**Scaling**

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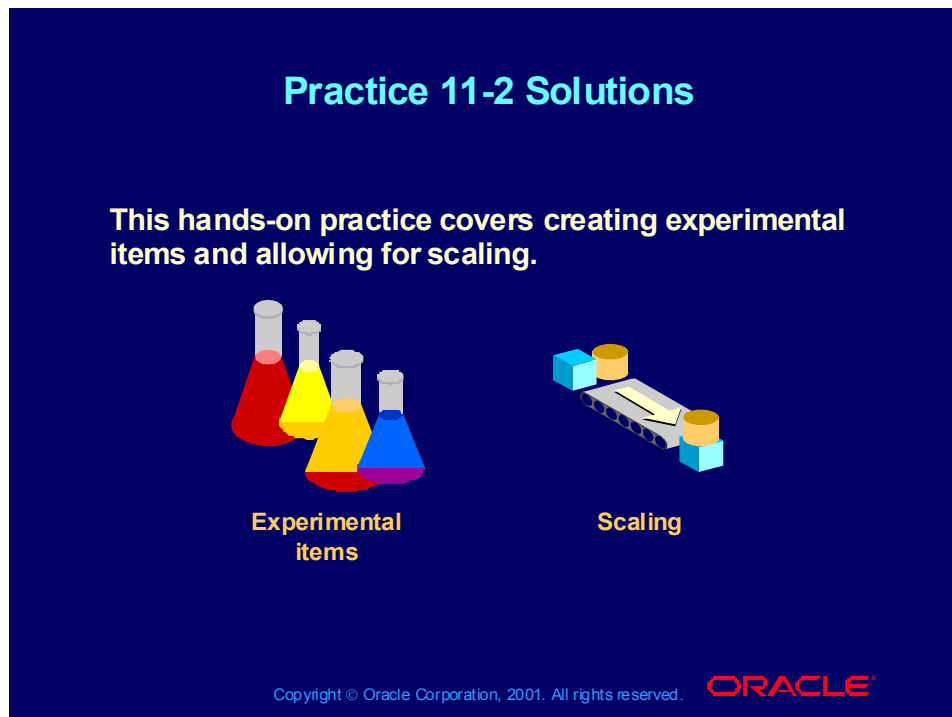
### Practice 11-2

#### Scaling Product

Scale your experiment product by 5%.

## Practice 11-2 Solutions

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### Practice 11-2 Solutions

#### Scaling Product

Scale your experiment product by 5%.

1. Open the List Experimental Items window:

(N) OPM Product Development > Laboratory Management > Laboratory Formulas (M) Actions > List Experimental Items

2. Query your lab formula XX-F&C ICE CREAM.

3. Open the Scale Formula window.

(N) OPM Product Development>Lab Management>Laboratory Formulas (M) Actions>Scale

4. In the Factor% field, enter 5.

5. Click OK.

6. Verify that the scaling occurred by referencing the Quantity field in the Products region of the Laboratory Formulas window, and in the Ingredients region of the Formula Ingredients window.

### Summary

In this lesson, you should have learned how to:

- Enter lab formula parameters
- Specify lab formula ingredients and by-products
- Enter additional information
- List experimental items
- Scale ingredients and products
- Calculate theoretical yield for formulas

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# **Using Lab Ingredient Search and Replace**

## **Chapter 12**

## 11i Oracle Process Manufacturing Formula and Laboratory Management

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### **11i Oracle Process Manufacturing Formula and Laboratory Management**

#### **Using Lab Ingredient Search and Replace**

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## Objectives

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### Objectives

**After completing this lesson, you should be able to do the following:**

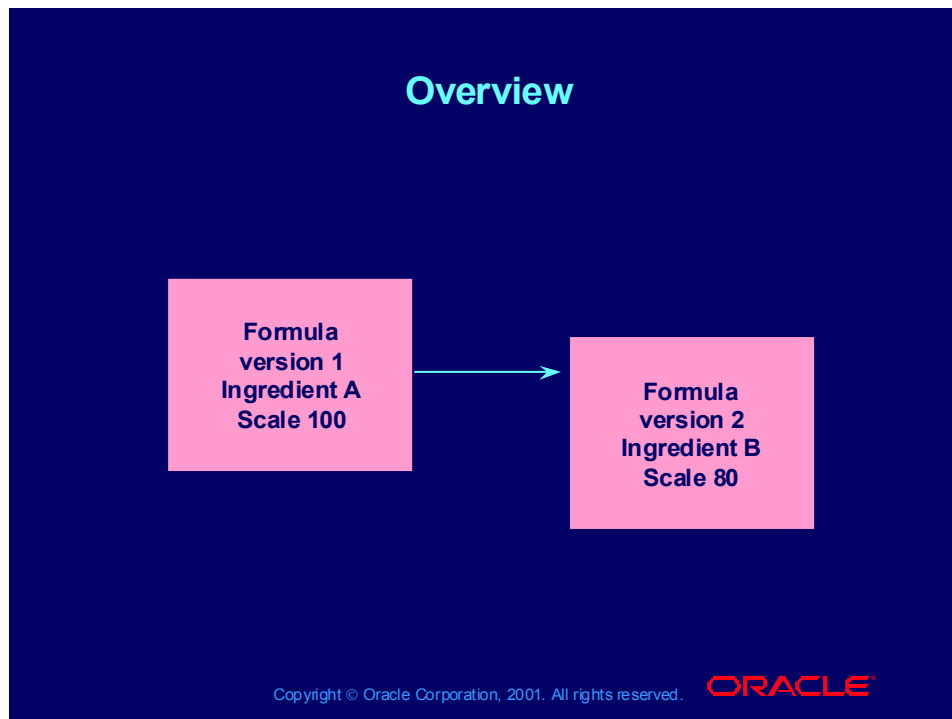
- **Establish ingredient search and replace parameters**
- **Select ingredient replacement**

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## Overview

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### Introducing the Ingredient Search and Replace Functionality

The Laboratory Ingredient Search and Replace functionality enables you to search for each lab formula version that contains a specified ingredient, and to create a new formula version in which the specified ingredient is replaced by another ingredient. You may want to change an ingredient if the original ingredient is unavailable, or if environmental factors prescribe that you use a different ingredient.

In addition to replacing the ingredient, you can also specify a factor by which the new ingredient quantity is to be scaled.

Ingredient Search and Replace consists of two stages:

- In the dialog box, you enter the search and replace criteria and the formula selection criteria.
- In the Ingredient Search and Replace window, you can enter the quantity for the new ingredient and create a new formula version.

**Note:** The ingredient search and replace process does not actually replace the old ingredient with the new one in existing formulas. It creates a new formula version containing the new ingredient instead of the old ingredient.

## Ingredient Search and Replace Parameters

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### Ingredient Search and Replace Parameters

**Go to the Ingredient Search and Replace window to specify the old ingredient that is to be replaced, the new ingredient, and a scale factor.**

**OPM Product Development Responsibility  
Laboratory Management (N) Item Search/Replace**

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(Help) Oracle Manufacturing Applications > Oracle Process Applications >  
OPM Product Development > OPM Laboratory Management User's Guide >  
Ingredient Management > Replacing Ingredients in a Formula  
... > Replacing Ingredients in a Formula Procedure  
... > Ingredient Search and Replace Field Reference  
... > Ingredient Search and Replace - Additional Setup in Laboratory  
Management

## Summary

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### Summary

**In this lesson, you should have learned how to:**

- **Establish ingredient search and replace parameters**
- **Select ingredient replacement**

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# **Course Summary**

## **Chapter 13**

# 11i Oracle Process Manufacturing Formula and Laboratory Management

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## **11i Oracle Process Manufacturing Formula and Laboratory Management**

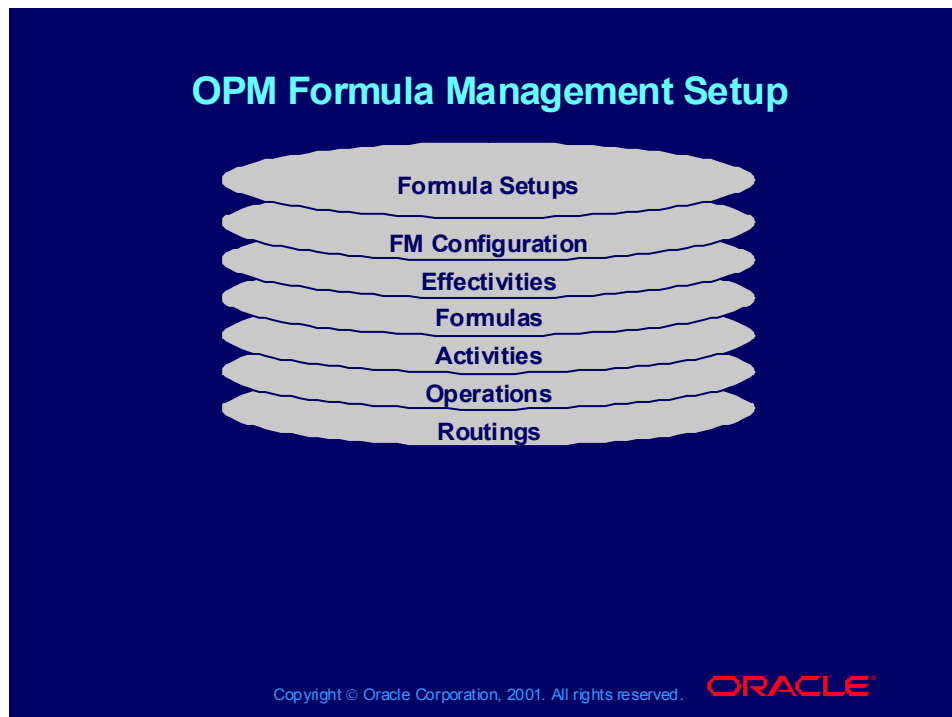
### **Course Summary**

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# OPM Formula Management Setup

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## Course Implementation Considerations

### Systems Setup

You must set up the required data in the OPM Systems responsibility before performing setup in any other module. The diagram in the Required Systems Setup unit gives the order in which the setups should be performed. For more information about each of these functions, see the Oracle Process Manufacturing Implementation Guide and the online help for each form.

### Quality Setup

Following the OPM Systems setup, there is additional setup that needs to be performed in the Quality Control responsibility. Although this setup can be considered optional, if you are going to use OPM Quality Control, you must enter grades and hold reasons before you begin entering your setup data in OPM Inventory. The diagram in the Required System Setup unit shows the minimum required setup for Quality Control. For more information about OPM Quality Control, see the Oracle Process Manufacturing Quality Management User's Guide and the online help for each form.

### Inventory Setup

After completing the required setup in OPM Systems and OPM Quality Control, you must complete the required setup in the OPM Inventory responsibility. The diagram in the Required System Setup unit shows the sequence of the setup, although Inventory Classes represent setup that can be optional. For more information about the Inventory responsibility, see the Oracle Process

Manufacturing Inventory Management User's Guide and the online help for each form.

### **FM Configuration Setup**

Prior to setting up formulas, set up configurations for the effectivity records. Use the Configurations window to enter parameters that control the creation of effectivity records in Formula Management.

### **Formulas Setup**

Formula Management distributes precise formula information to every area of your enterprise, including inventory, production, cost, and process/materials requirements planning. This not only ensures that a formula is used consistently across the enterprise, but also increases your production efficiency.

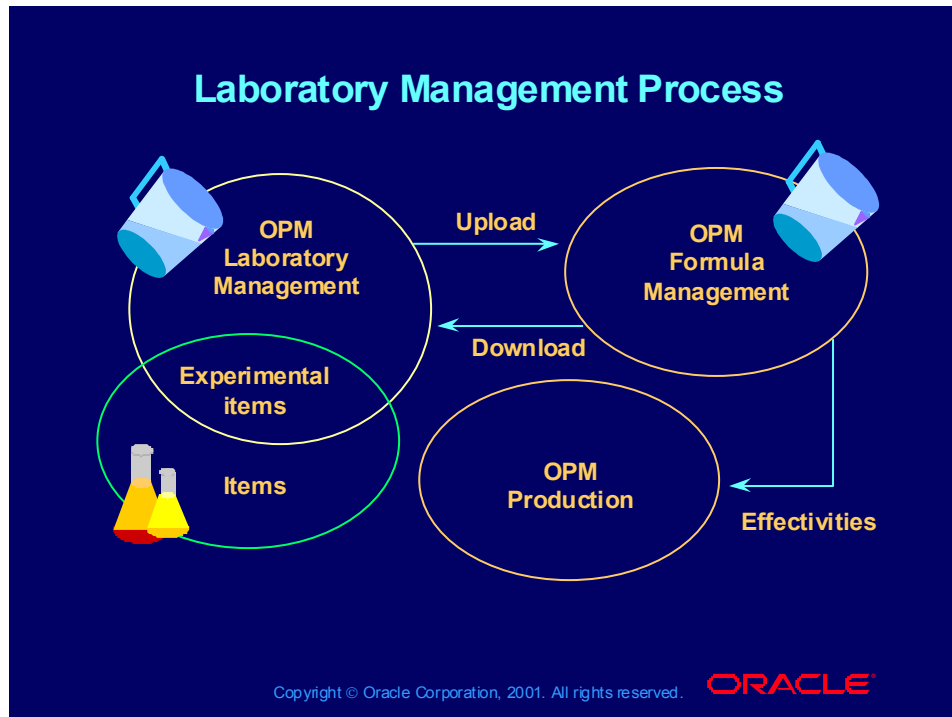
### **Effectivities Setup**

You define effectivities to specify the exact conditions—date, plant, customer, or quantities—under which a formula is applied. These factors enable you to anticipate seasonal variations in product formulations, accommodate the production constraints of different facilities, guarantee appropriate product to each customer, and ensure the use of the correct formula in production, planning, and costing. These unique features eliminate the possibility of using a formula inappropriately.



## Laboratory Management Process

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### The Laboratory Management Process

Using the OPM Laboratory Management, you can reduce the costs associated with creating and modifying formulas. By integrating with OPM Formula Management, you can characterize and simulate the properties of formula ingredients and their effects on formulas.

By using multiple laboratory types across the organizations, the laboratory types provides a collection of grouped technical parameters.

## Course Summary

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### Course Summary

In this course, you should have learned how to:

- Describe the concepts and flows that drive Oracle Process Manufacturing (OPM) Lab and Formula Management
- Navigate through the Lab and Formula Management responsibilities
- Perform required setups.
- Create formulas, routings, and effectivities
- Define formula modifications
- Use Formula Management online inquiries and reports

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### Course Summary

Oracle Process Manufacturing (OPM) Formula and Laboratory Management supports the complex formula and processing information across an enterprise. OPM Formula and Laboratory Management applies user-defined rules to define and control formulas. Rule-based formula selection logic simplifies the management of multiple formula versions. In addition, users can specify the exact conditions under which a formula is used through effectivities, and the combination of formula and process routings. The online reports and inquiries increase efficiency and productivity.