

Version 2.0

Program Tutorial

About the Tutorial

The Tutorial is not designed to teach you everything about SESAME. The Tutorial is designed to expose you to some of the more practical uses of SESAME and to introduce some of the new features of SESAME 2.x. As you progress through the Tutorial, you will find that the tasks become progressively more difficult and provide fewer instructions. The first two sections of the Tutorial will focus on activities useful in setting up SESAME to better meet your needs, including feed and price lists. The final section of the Tutorial will introduce a situation and five problems that you can solve. Your answers to these problems should match those provided in the Answers to Tutorial Questions Section.

Tutorial Situation

You are a feed purchaser for a feed mill that services a six county area in Washington. The area you service is almost exclusively dairy operations. You decide to set up SESAME specifically for this area. The list of feedstuffs to which you have access is presented below.

ID	Group	Name	Price/T	ID	Group	Name	Price/T
-11	1	Beet Sugar Pulp, dried	\$130.00	-118	4	Wheat Middlings	\$101.00
-79	1	Leg Hay, mid, 40-46%	N/A	-14	5	Blood Meal, ring dried	\$400.00
*	1	Local Hay	\$110.00	-39	5	Cotton Seed Meal, 41% CP	\$195.00
-113	2	Tomato Pomace	\$ 25.00	-37	5	Cotton Seed, Whole w lint	\$176.00
-35	3	Corn Silage, 32-38% DM	\$ 35.00	-23	5	Distillers Dried Grains w Sol	\$132.00
-8	4	Barley Grain, rolled	\$110.00	-47	5	Fish Anchovey Meal, mech.	\$500.00
-27	4	Corn Grain, ground, dry	N/A	-24	5	Gluten Feed, dry	\$ 99.00
-28	4	Corn Grain, steam flaked	\$110.00	-25	5	Gluten Meal, dry	\$287.00
-33	4	Hominy	\$104.00	-86	5	Meat Meal, rendered	\$210.00
-89	4	Molasses, Sugarcane	\$ 96.00	-106	5	Soybean Meal, solvent 44%	\$188.00
-103	4	Soybean Hulls	\$ 90.00	-107	5	Soybean Meal, solvent 48%	\$197.00
-43	4	Tallow	\$280.00				

* ID numbers are automatically assigned by SESAME for newly created feedstuffs.

Creating a Customized Feedstuffs Library

Customized libraries are useful as they break the main Feedstuffs library, which consists of 121 feedstuffs from NRC (2001), commercial feedstuffs, and other commodities (plus any new feedstuffs you add), into smaller manageable groups of feeds that can be customized to meet your needs.

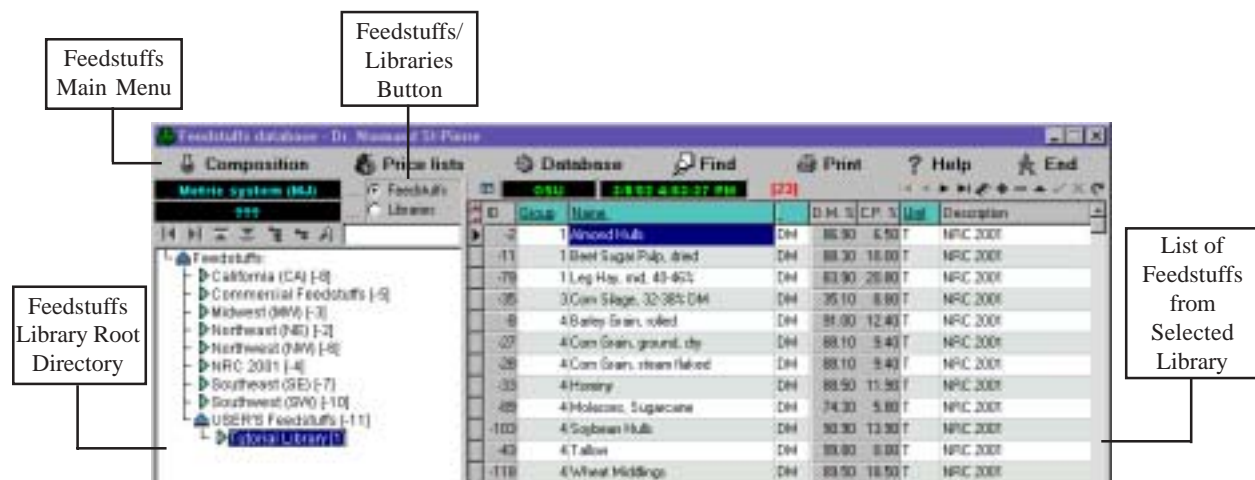
Step 1. Select **Feedstuffs** from the SESAME Main Menu.

Step 2. View each of the Libraries by clicking on the name of each in the feedstuffs library root directory (located in the left window). The list of feedstuffs included in each library will appear in the right window. Select the library that is most similar in terms of feedstuffs included to the Library you wish to create. For this specific example, the Northwest (NW) is the most appropriate. Click the **Libraries** radio button (located below Price Lists in the main menu). The list of libraries will appear in the right window.

Step 3. Select **Northwest (NW)** in the root directory of libraries by clicking on its name. This will highlight the Northwest (NW) library in the feedstuffs library root directory and also select the Northwest (NW) library in the right window.

Step 4. Select **Database > Copy feedstuffs library** from the main menu. The Library Name window will appear. Enter the name of the new Library: **Tutorial Library**. The newly created library will appear in the feedstuffs library root directory under USERS Feedstuffs.

Step 5. Click the **Feedstuffs** radio button (located below Price Lists in the main menu). The list of feedstuffs belonging to the Tutorial Library will appear in the right window. You may now customize the new library by deleting unnecessary feedstuffs and adding feedstuffs (both those existing in other libraries and newly created).



Deleting Feedstuffs from a Library

Two feedstuffs will be removed from the Tutorial Library: **Almond Hulls** and **Canola Meal, mech. extracted**.

- a. Select the **Tutorial Library** in the root directory (located in the left window under USERS feedstuffs) by clicking its name. The Tutorial Library name will appear highlighted and the list of feedstuffs included in the Library will appear in the right window.
- b. Select **Almond Hulls (ID -2)** by clicking on its name in the list of feedstuffs (right window).
- c. Select **Database > Delete feedstuffs** from the main menu. A confirmation window will appear. Click **Yes**. The Delete Feedstuffs dialogue box will appear. Click the **Remove feedstuffs from library** option. This option will delete the selected feedstuff from the Tutorial Library only. The selected feedstuff will still be available in the Feedstuffs Database and all other libraries.
- d. Follow the same procedure for **Canola Meal, mech. extracted (ID -19)**.

Note: To globally delete a feedstuff, click the **Delete feedstuffs** option in the Delete Feedstuffs dialogue box.

Adding Existing Feedstuffs to a Library

One existing feedstuff will be added to the Tutorial Library: **Tomato Pomace**.

- a. Be sure the **Tutorial Library** is visible in the feedstuffs root directory (under USERS feedstuffs). Select the **Feedstuffs: Library** in the root directory by clicking on its name. The Feedstuffs: Library name will appear highlighted and the master list of feedstuffs found in this library will be displayed in the right window.
- b. Select **Tomato Pomace (Group 2; ID -113)** by clicking on its name in the list of feedstuffs (right window) and, while holding the left mouse button, dragging it to the feedstuffs root directory (left window), and dropping it on the **Tutorial Library** name.
- c. Return to the feedstuffs list of the Tutorial Library by clicking on the name **Tutorial Library** in the feedstuffs root directory (left window).

Note: Existing feedstuffs may be dragged from any Feedstuff library and dropped (added) in any other library. For example, -304 Megalac could be dragged from the Commercial Feedstuffs library and -113 Tomato Pomace could be dragged from the NRC 2001 library.

Adding New Feedstuffs to a Library (Method 1)

New feedstuffs can be created by copying and editing an existing feedstuff. This method is generally the easiest and quickest to use. For this exercise, one new feedstuff will be added to the Tutorial Library: **Local Hay**.

- a. Select a feedstuff from a library that is similar in terms of feed group and chemical composition to the new feedstuff you want to create. For this exercise, that feedstuff will be **Grass-Leg Hay-mix, mat >53% (ID -66)**, which is located in the **Feedstuffs: Library**.
- b. Select the **Feedstuffs: Library** in the root directory (left window) by clicking its name. The list of feedstuffs in the Feedstuffs: Library will be displayed in the right window.
- c. Select **Grass-Leg Hay-mix, mat >53% (ID -66)** from the list of feedstuffs displayed in the right window by clicking on its name. Select **Database > Copy feedstuffs** option from the main menu. The Copying Feedstuffs dialogue box will appear. Enter the new feedstuff name: **Local Hay** and then click **<OK>**. The newly created feedstuff will automatically be placed in both the **USERS Feedstuffs** and **Feedstuffs: Libraries**.
- d. Select the **USERS Feedstuffs** Library in the root directory (left window). The list of feedstuffs in this library, including Local Hay, will be displayed in the right window. Select the **Local Hay** feedstuff by clicking on its name in the right window. The Local Hay feedstuff record will appear highlighted. Select the **Composition** option from the main menu. The list of nutrients available will appear in the left window and the nutrient composition of the selected feedstuff will appear in the right window. In the left window, select **Basic Nutrients (Across Species)** by double-clicking its name. The known nutrient composition (based on lab analysis) of Local Hay is as follows:

Dry Matter	87.6%
Crude Protein	13.7%
NDF	54.3%

- e. Activate the dry matter field by clicking on the **Value** field corresponding to Dry Matter in the right window. The field will appear highlighted. Enter the value for dry matter: **87.6%**. Press **<Enter>**. Move to the Value field of Crude Protein by using the **<Down Arrow>** or clicking on the desired nutrient name in the left window. Enter the value for crude protein: **13.7%** and press **<Enter>**. Follow this procedure for NDF.
- f. Click the Post changes button (✓ button located below End on the main menu) on the task bar to save the changes.
- g. Exit the Composition window by selecting **End** on the main menu.
- h. Move the Local Hay feedstuff from the **USERS Feedstuffs** Library to the **Tutorial Library** using the drag-and-drop method described under Adding Existing Feedstuffs to a Library.
- i. Exit from the Feedstuffs Window to the SESAME Main Menu by selecting **End**.

Adding New Feedstuffs to a Library (Method 2)

New feedstuffs can also be added by creating a new feedstuff.

- a. Select the **Tutorial Library** in the root directory by clicking its name. The Tutorial Library name will appear highlighted and the list of feedstuffs included in the Library will be displayed in the right window.
- b. Select the **Database > Create new feedstuffs** option on the main menu. The Create New Feedstuffs window will appear. Complete each field (only the first four fields are required input). Use <Tab> to move to the next field. Enter the following and then click <OK>.

Group	Dry roughage
Name	Local Hay
Unit	T Ton
Price	58.45
Quantity	1
Description	Analysis

- c. Local Hay will automatically appear highlighted on the feedstuffs list. Select **Composition** on the main menu. In the left window, select **Basic Nutrients (Across Species)** by double clicking on the name. The list of basic nutrients will be displayed in the right window. The known nutrient composition of Local Hay (based on lab analysis) is as follows:

Dry Matter	87.6%
Crude Protein	13.7%
NDF	54.3%

- d. Place the cursor in the **Value** field corresponding to Dry Matter in the right window. Enter the value for dry matter: **87.6%**. Press <Enter>. Move to the Value field of Crude Protein by using the <Down Arrow> or clicking on the desired nutrient name in the left window. Enter the value for crude protein: **13.7%** and press <Enter>. Follow this procedure for NDF.
- e. Click the Post changes button (✓ button located below End on the main menu) on the task bar to save the changes.
- f. Exit the Composition window by selecting **End** on the main menu.
- g. Exit from the Feedstuffs Window to the SESAME Main Menu by selecting **End**.

Creating a New Price List

Similar to customized Feedstuffs Library, Price Lists can also be customized to meet your needs.

Step 1. Select **Price Lists** from the SESAME Main Menu.

Step 2. Select the **Northwest Generic Prices (NW)** in the Price Lists root directory (located in the upper left window) by clicking on its name.

Step 3. Select **Database > Copy price lists library** option from the main menu. The Price Lists Library Name dialogue box will appear. Enter the name of the new Library: **Tutorial Price List**. Click **<OK>**. The newly created price list will appear in the price lists root directory. Select the **Tutorial Price List** in the price lists root directory by clicking on its name. The list of feedstuffs included in this price list will appear in the upper right window.

Step 4. Select the **Tutorial Library** under USERS Feedstuffs in the feedstuffs library root directory (located in the lower left window) by clicking on its name. The list of feedstuffs included in the Tutorial Library will appear in the Available Feedstuffs window (lower right window).



Step 5. Update the Tutorial Price List by mimicking the changes made to create the Tutorial Library in the Feedstuffs window.

- a. Remove **Canola Meal, mech. extracted** from the Tutorial Price List. In the list of feedstuffs included in the Tutorial Price List (upper right window), highlight **Canola Meal, mech. extracted** by clicking in its name. Select the **Database > Delete Feedstuff** option on the main menu. A delete confirmation window will appear. Click **<OK>**.
- b. Add **Tomato Pomace** and **Local Hay** to the Tutorial Price list. From the list of feedstuffs in the Tutorial Library (lower right window), select **Tomato Pomace** by clicking on its name and, holding the left mouse button, drag the feedstuff to the Tutorial Price List (upper right window) and drop it. The Price field for Tomato Pomace will automatically be highlighted. Enter market price for Tomato Pomace: **\$25.00**. Press **<Enter>**. Repeat the procedure for Local Hay. Updated prices are shown below. Post the change by clicking the Post changes button (✓ button located directly below End on the main menu) on the task bar.

Tomato Pomace	\$ 25.00 / T
Local Hay	\$110.00 / T

Step 6. Exit the Price Lists window to the SESAME Main Menu by selecting **End**.

Solving Problems

Problem 1. Estimating nutrient values.

One of your clients wants to know what is the better buy: 48% or 44% soybean meal? You decide to use SESAME to estimate the break-even price of the two feedstuffs based on energy (NE_L), rumen degradable protein (RDP), digestible rumen undegradable protein (dRUP), and non-effective fiber (ne-NDF).

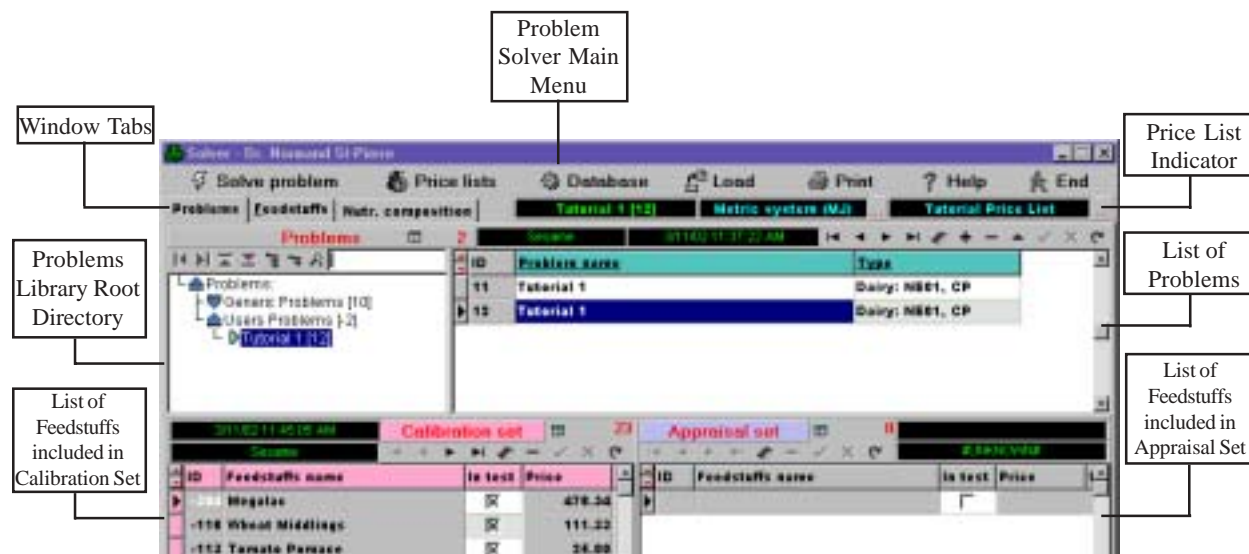
Step 1. Select **Solver** from the SESAME Main Menu.

Step 2. Select the **USERS Problems** directory by clicking on its name in the problems root directory (left window).

Step 3. Select **Database > Create new problem** from the main menu. The Create New Problem window will appear. Enter the name of the new Problem: **Tutorial 1**. Use <Tab> to move to the next field labeled Type. From the preset list of problem Types, select the appropriate one for the problem: **-9 Dairy: NE01, RDP, D-RUP, e-NDF, ne-NDF**. The newly created problem will appear in the Problem root directory under USERS Problems (it may be necessary to double click USERS Problems). Select **Tutorial 1** in the problems library root directory by clicking its name before proceeding.

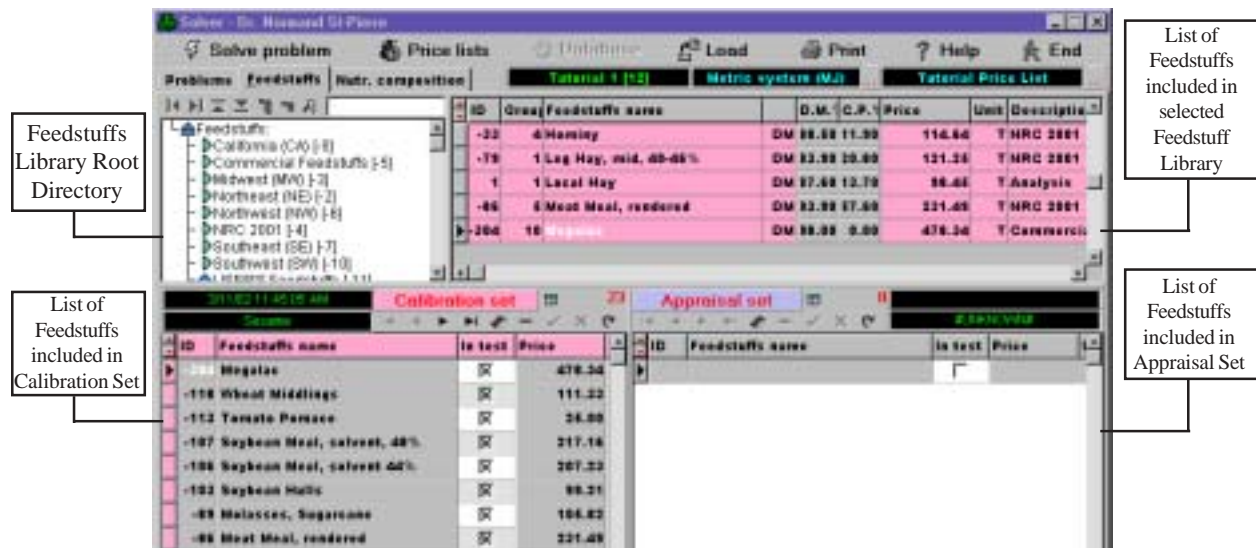
Step 4. Select the appropriate price list.

- To select the price list to be used in the problem, locate the price list indicator (a narrow black box with bright blue writing in the upper right corner, just below the Help and End menu options). Access the Price Lists by clicking on the button to the right of the price list indicator (... red dots). The **Active Price List** dialogue box will appear.
- Select **Tutorial Price List** and click <OK>. The prices found in the Calibration Set will automatically be updated.



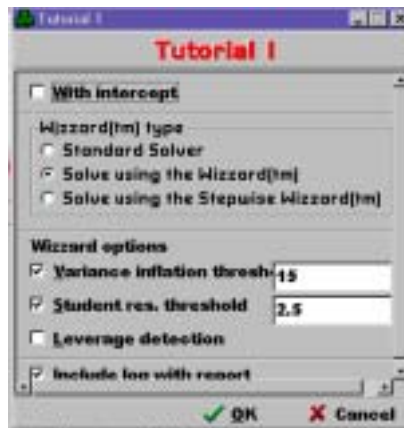
Step 5. Select the appropriate feedstuffs.

- a. To select the feedstuffs to be evaluated in the problem, click the **Feedstuffs** window tab (located directly below Solve Problem on the main menu). The Feedstuffs Library root directory will appear in the upper left window.
- b. Select the **Tutorial Library** (under USERS Feedstuffs) by clicking on its name. All feedstuffs belonging to that library will appear in the upper right window.
- c. Move feedstuffs that are also in the Tutorial Price List from the feedstuffs window to the Calibration Set (lower left window). *Only those feedstuffs with a value in the cost column will be moved to the Calibration Set.* To move feedstuffs, click the appropriate feedstuff and while holding the left mouse button, drag and drop the feedstuff into the Calibration Set window. Each feed must be moved one-by-one. Note that when a feedstuff is added to the Calibration Set, the background color of the feedstuff in the Tutorial Library changes from gray to pink.



Step 5. Click the **Problems** window tab (located directly below Solve Problem on the main menu) to return to the main window. Post the changes to Tutorial 1 by clicking the Post changes button (✓ button located directly below End on the main menu) on the task bar.

Step 6. Select the **Solve Problem** option on the main menu. A dialogue entitled Tutorial 1 will appear. Do not select the **With Intercept** option. The Wizzard™ Type should be set at the **Solve Using the Wizzard™**. The **Variance Threshold Option** should be activated (do this by clicking the box) and set at 15. The **Student Res. Threshold Option** should be activated and set at 2.5. The **Leverage Detection** option should not be activated. Click <OK>.



Experienced Users may desire to alter the Wizzard™ Options as appropriate. SESAME will perform a series of iterations. The following Short Report will be automatically displayed.

Continuity of Domestic Link Loans

Model	Adjusted R ²	F-Statistic (F)	Adjusted R ²	F-Statistic (F)
Model 1 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 2 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 3 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 4 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 5 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 6 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 7 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 8 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 9 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 10 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 11 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 12 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 13 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 14 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 15 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 16 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 17 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 18 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 19 (No. of calls)	0.21288	146.893	0.18476	146.768
Model 20 (No. of calls)	0.21288	146.893	0.18476	146.768

Adjusted R²

Model	Adjusted R ²	F-Statistic (F)
Model 1 (No. of calls)	0.21288	146.893
Model 2 (No. of calls)	0.21288	146.893
Model 3 (No. of calls)	0.21288	146.893
Model 4 (No. of calls)	0.21288	146.893
Model 5 (No. of calls)	0.21288	146.893
Model 6 (No. of calls)	0.21288	146.893
Model 7 (No. of calls)	0.21288	146.893
Model 8 (No. of calls)	0.21288	146.893
Model 9 (No. of calls)	0.21288	146.893
Model 10 (No. of calls)	0.21288	146.893
Model 11 (No. of calls)	0.21288	146.893
Model 12 (No. of calls)	0.21288	146.893
Model 13 (No. of calls)	0.21288	146.893
Model 14 (No. of calls)	0.21288	146.893
Model 15 (No. of calls)	0.21288	146.893
Model 16 (No. of calls)	0.21288	146.893
Model 17 (No. of calls)	0.21288	146.893
Model 18 (No. of calls)	0.21288	146.893
Model 19 (No. of calls)	0.21288	146.893
Model 20 (No. of calls)	0.21288	146.893

Calculative Key

Model	Adjusted R ²	F-Statistic (F)
Model 1 (No. of calls)	0.21288	146.893
Model 2 (No. of calls)	0.21288	146.893
Model 3 (No. of calls)	0.21288	146.893
Model 4 (No. of calls)	0.21288	146.893
Model 5 (No. of calls)	0.21288	146.893
Model 6 (No. of calls)	0.21288	146.893
Model 7 (No. of calls)	0.21288	146.893
Model 8 (No. of calls)	0.21288	146.893
Model 9 (No. of calls)	0.21288	146.893
Model 10 (No. of calls)	0.21288	146.893
Model 11 (No. of calls)	0.21288	146.893
Model 12 (No. of calls)	0.21288	146.893
Model 13 (No. of calls)	0.21288	146.893
Model 14 (No. of calls)	0.21288	146.893
Model 15 (No. of calls)	0.21288	146.893
Model 16 (No. of calls)	0.21288	146.893
Model 17 (No. of calls)	0.21288	146.893
Model 18 (No. of calls)	0.21288	146.893
Model 19 (No. of calls)	0.21288	146.893
Model 20 (No. of calls)	0.21288	146.893

Problem 2. Changing nutrients evaluated.

After estimating the break-even prices in Problem 1, you decide you want to evaluate the break-even prices for replacement heifers using energy (ME), rumen degradable protein (RDP), and rumen undegradable protein (RUP).

Step 1. Because the change to the problem is small, it will be quicker to copy **Tutorial 1** and make the necessary alterations. Select Tutorial 1 in the USERS problems of the problems library root directory by clicking its name. Select **Database > Copy problem** in the main menu. The new Problem Name window will appear. Enter the name of the new problem: **Tutorial 2**. Click **<OK>**. The newly created library will appear under USERS Problems in the Problem Library root directory (located in the upper left window). Select Tutorial 2 by clicking on its name in the root directory.

Step 2. Because the only change to the problem is the nutrients being used, it is necessary to change the problem Type. To change Type, double click on the **Type** field corresponding to Tutorial 2 in the upper right window. Select the new problem type: **-16 Heifers: ME01, RDP, RUP**. Press the **<Enter>** button. Post the change by clicking the Post changes button (✓ button located directly below End on the main menu) on the task bar.

Step 3. Solve the problem by selecting the **Solve Problem** option in the main menu and using the Wizzard™ Options as described for Problem 1. SESAME will automatically display a Short Report. Generate a graphic representation of the results by selecting the Graph option on the short report menu.

Questions

- 2.1. What are the estimated values of ME, RUP and RDP?
- 2.2. What is the estimated break-even prices of soybean meal 44% and soybean meal 48%?
- 2.3. What feedstuffs were determined to be outliers?
- 2.4. What feedstuffs were overvalued?

Problem 3. Changing prices of feedstuffs.

Six months after you estimated nutrient costs in Problem 1, you are curious as to whether the break-even prices have changed, as market prices of several feedstuffs have changed:

Soybean Meal (48%)	\$205.00
Soybean Meal (44%)	\$189.00
Cottonseed Whole w Lint	\$168.00
Beet Sugar Pulp	\$140.00

Step 1. Copy Tutorial 1. Name the new problem: **Tutorial 3.**

Step 2. Change the price for **Soybean Meal 48%** by locating Soybean Meal 48% in the Calibration Set. Place the cursor over the Price field of Soybean Meal 48% and right mouse button clicking. The New Price: Soybean Meal 48% dialogue box will appear. Enter the new price/T: **\$205.00** and click <OK>. The new price will be updated globally throughout the program.

Follow the same procedure for the Soybean Meal 44% Cottonseed Whole w Lint, and Beet Sugar Pulp.

Step 3. Solve the problem by selecting **Solve Problem** in the main menu and using the Wizzard™ Options as previously described (no graphic option).

Questions

- 3.1.** Are the break-even prices of soybean meal 44% and 48% greater or less than values obtained six months ago?
- 3.2.** What are the estimated nutrient values of NE_L , RDP, dRUP, eNDF, and ne-NDF?

Problem 4. Appraising feedstuffs values.

One of your clients is interested in incorporating some alternative sources of roughage in their ration: wet citrus pulp and poultry litter. Your feed mill currently does not contract these feedstuffs, but you have a friend in California who can supply both. Before you call your friend to negotiate prices, you want to get a better idea of the value of these feedstuffs for your area. You use SESAME to estimate the break-even prices of wet citrus pulp and poultry litter for your area.

Step 1. Make a copy of Tutorial 3. Name the new problem: **Tutorial 4.**

Step 2. Add **Citrus Pulp, wet 30% (ID -203)** and **Poultry Litter, dried (DPL) (ID -207)** to the problem by clicking the **Feedstuffs** window tab (located directly below Solve Problem on the main menu). The Feedstuffs Library root directory will appear in the upper left window. Select the **California Library**. All feedstuffs belonging to that library will appear in the upper right window.

Step 3. Use the drag and drop method described in Problem 1 for adding feedstuffs to the Calibration Set to move citrus pulp and poultry litter from the list of feedstuffs (California Library) to the Appraisal Set (lower right window). Note that when a feedstuff is added to the Appraisal Set, the background color of the feedstuff in the California Library changes from gray to blue. *Only those feedstuffs for which you wish to estimate a value should be included in the Appraisal Set.*

Step 4. Solve the problem by selecting **Solve Problem** in the main menu and using the Wizzard™ Options as previously described.

Questions

4.1. What are the appraised values of Wet Citrus Pulp and Poultry Litter?

Problem 5. Appraising feedstuffs values in new areas.

You have decided to relocate and now work for a feed mill in the Midwest. With your nutritional expertise, the feed mill has decided to sell whole TMR; however, the mill must now purchase hay. You have two options for hay: local hay (Grass Legume Hay Mix, mid 47-53%) and western hay (Legume Hay, mid, 40-60%). You want to determine how much these hays are worth.

Hints: Copy the **Midwest Generic Problem** found in the Generic Problems directory and rename as **Tutorial 5** or create a new problem called Tutorial 5. Use the **Midwest (MW)** feedstuffs library and **Midwest Generic Prices (MW)**.
Grass Legume Hay Mix and Legume Hay can be pulled into the Appraisal Set from either the **Feedstuffs: Library** or the **NRC 2001 Library**.

Questions

- 5.1.** What are the appraised values of the local hay (Grass Legume Hay Mix, mid 47-53%) and western hay (Legume Hay, mid, 40-60%)?

Answers to the Questions

2.1. $NE_L = 0.016905$
 $RUP = 0.421172$
 $RDP = -0.04256$

2.2.

2.3. Fish Anchovy Meal
Local Hay

2.4. Beet, Sugar Pulp
Cottonseed Whole w Lint
Cottonseed Meal, 41% CP
Leg Hay, mid, 40-46%
Local Hay
Molasses, Sugarcane
Soybean Meal, solvent 44%

3.1. $NE_L = 0.16923$ (Higher)
 $RUP = 0.423561$ (Higher)
 $RDP = -0.04762$ (Lower)

3.2.

4.1. Citrus Pulp = \$40.116 / T
Poultry Litter = \$36.979 / T

5.1. Local hay (Grass Legume Hay Mix, mid 47-53%) = \$108.762 / T
Western hay (Legume Hay, mid, 40-60%) = \$99.763