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## Introduction

Microsoft Access 2013 is a database creation and management program. To understand Access, you must first understand databases.

### What is a database?

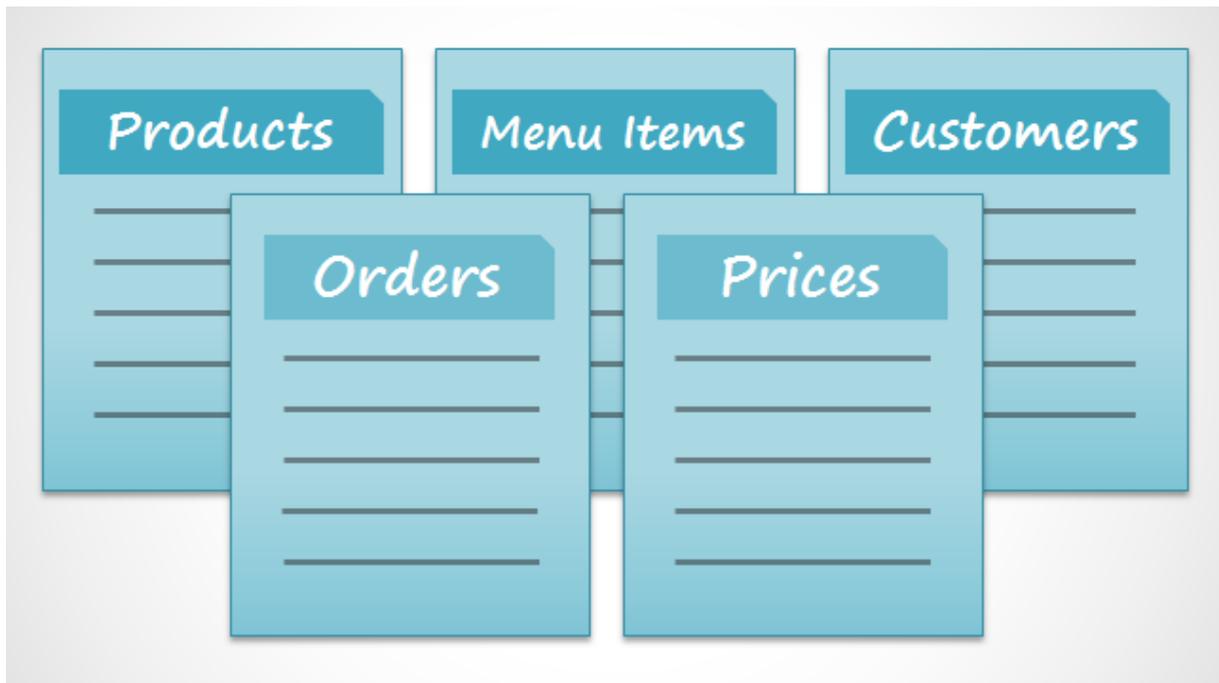
A database is a collection of data that is stored in a computer system. Databases allow their users to enter, access, and analyze their data quickly and easily. They're such a useful tool that you see them all the time. Ever waited while a doctor's receptionist entered your personal information into a computer, or watched a store employee use a computer to see whether an item was in stock? Then you've seen a database in action.

The easiest way to understand a database is to think of it as a collection of lists. Think about one of the databases we mentioned above: the database of patient information at a doctor's office. What lists are contained in a database like this? Well, to start with, there's a list of patients' names. Then there's a list of past appointments, a list with medical history for each patient, a list of contact information, and so on.

This is true of all databases, from the simplest to the most complex. For instance, if you like to bake you might decide to keep a database containing the types of cookies you know how to make and the friends you give these cookies to. This is one of the simplest databases imaginable. It contains two lists: a list of your friends, and a list of cookies.



However, if you were a professional baker, you would have many more lists to keep track of: a list of customers, a list of products sold, a list of prices, a list of orders, and so on. The more lists you add, the more complex the database will be.



In Access, lists are a little more complex than the ones you write on paper. Access stores its lists of data in tables, which allow you to store even more detailed information. In the table below, the People list in the amateur baker’s database has been expanded to include other relevant information on the baker’s friends.

ID	Name	Cell Phone	Birthday	Nut Allergy?
1	Dad	555-0404	June 3	Yes
2	Aunt Aida	555-9890	July 8	No
3	Joakim	555-0462	September 19	No
4	Dwane	555-9975	January 5	No
5	Allegra	555-0099	January 14	Yes

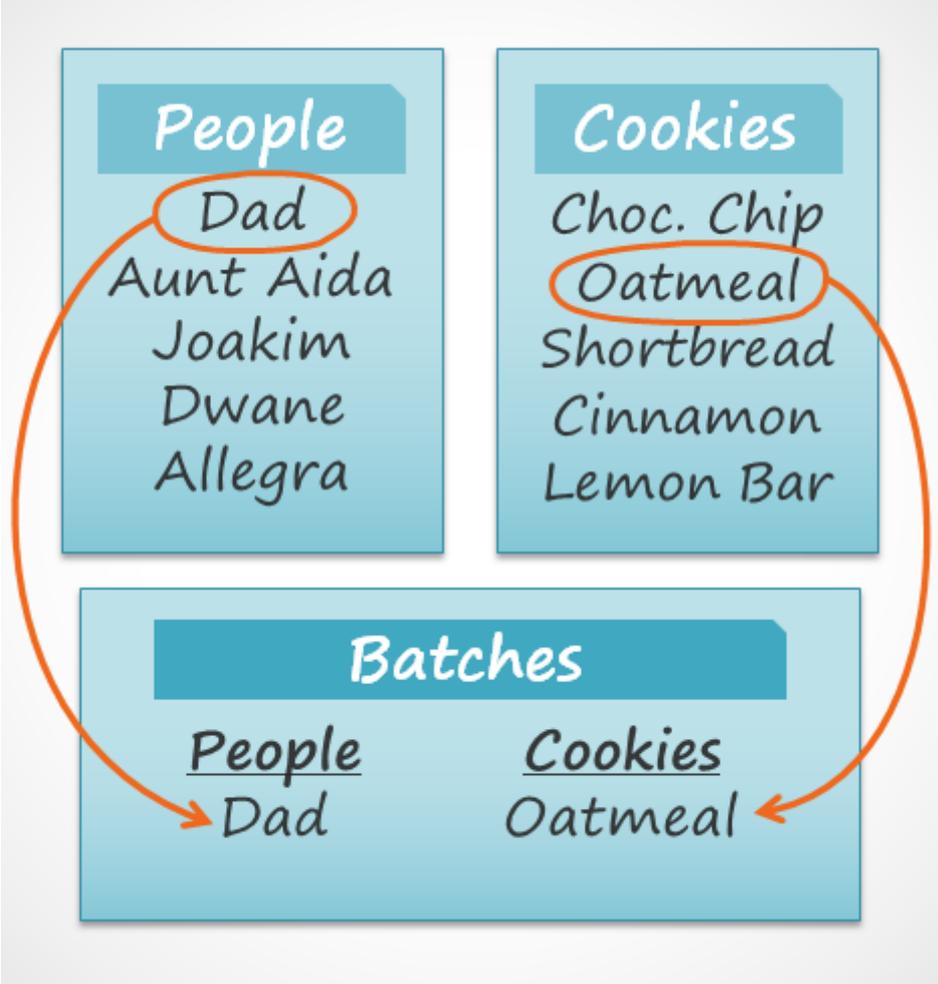
If you are familiar with other programs in the Microsoft Office suite, this might remind you of Excel, which allows you to organize data in a similar way. In fact, you could build a similar table in Excel.

### Why use a database?

If a database is essentially a collection of lists stored in tables and you can build tables in Excel, why do you need a real database in the first place? While Excel is great at storing and organizing numbers, Access is far stronger at handling non-numerical data, like names and descriptions. Non-numerical data plays a significant role in almost any database, and it's important to be able to sort and analyze it.

However, the thing that really sets databases apart from any other way of storing data is connectivity. We call a database like the ones you’ll work with in Access a relational database. A relational database is able to understand how lists and the objects within them relate to one another. To explore this idea, let's go back to the simple database with two lists: names of your friends, and the types of cookies you know how to make. You decide to create a third list to

keep track of the batches of cookies you make and who they're for. Because you're only making cookies you know the recipe for and you're only going to give them to your friends, this new list will get all of its information from the lists you made earlier.



See how the third list uses words that appeared in the first two lists? A database is capable of understanding that the Dad and Oatmeal cookies in the Batches list are the same things as the Dad and Oatmeal in the first two lists. This relationship seems obvious, and a person would understand it right away. However, an Excel workbook wouldn't.

Excel would treat all of these things as distinct and unrelated pieces of information. In Excel, you'd have to enter every single piece of information about a person or type of cookie each time you mentioned it because that database wouldn't be relational like an Access database. Simply put, relational databases can recognize what a human can: If the same words appear in multiple lists, they refer to the same thing.

The fact that relational databases can handle information this way allows you to enter, search for, and analyze data in more than one table at a time. All of these things would be difficult to accomplish in Excel, but in Access even complicated tasks can be simplified and made fairly user friendly.

Databases in Access are composed of four objects: tables, queries, forms, and reports. Together, these objects allow you to enter, store, analyze, and compile your data however you want.

In this lesson, you will learn about each of the four objects and come to understand how they interact with each other to create a fully functional relational database.

**Tables**

By this point, you should already understand that a database is a collection of data organized into many connected lists. In Access, all data is stored in tables, which puts tables at the heart of any database.

You might already know that tables are organized into vertical columns and horizontal rows.

ID	First Name	Last Name	Street Address	City	State
1	Tracey	am	7 East Walker Dr.	Raleigh	NC
2	Lucinda	George	789 Brewer St.	Cary	NC
3	Jerrod	Smith	211 St. George Ave.	Raleigh	NC
4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
8	Nisha	Hall	123 Huntington St.	Raleigh	NC
9	Hillary	Clayton	2516 Newman	Raleigh	NC
10	Kiara	Williams	9014 Miller Ln.	Durham	NC
11	Katy	Jones	456 Denver Rd.	Cary	NC
12	Beatrix	Joslin	85 North West St.	Raleigh	NC
13	Mariah	Allen	12 Jupe	Raleigh	NC
14	Jennifer	Hill	2100 Field Ave.	Raleigh	NC
15	Jaleel	Smith	123 Hill Top Drive	Garner	NC

In Access, rows and columns are referred to as records and fields. A field is more than just a column; it's a way of organizing information by the type of data it is. Every piece of information within a field is of the same type. For example, every entry in a field called First Name would be a name, and every entry in field called Street Address would be an address.

ID	First Name	Last Name	Street Address
1	Tracey	Beckha	7 East Walker Dr.
2	Lucinda	George	789 Brewer St.
3	Jerrod	Smith	211 St. George Ave.
4	Brett	Newkirk	47 Hillsborough St.
5	Chloe		23 Solo Ln.
6	Quinton		4 Cypress Cr.
7	Alex		1011 Hodge Ln.
8	Nisha	Hall	123 Huntington St.
9	Hillary	Clayton	2516 Newman
10	Kiara	Williams	9014 Miller Ln.
11	Katy	Jones	456 Denver Rd.
12	Beatrix	Joslin	85 North West St.

Likewise, a record is more than just a row; it's a unit of information. Every cell in a given row is part of that row's record.

ID	First Name	Last Name	Street Address	City	State
1	Tracey	Beckham	7 East Walker Dr.	Raleigh	NC
2	Lucinda	George	789 Brewer St.	Cary	NC
3	Jerrold	Smith	211 St. George Ave.	Raleigh	NC
4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
8	Nisha	Hall	123 Huntington St.	Raleigh	NC
9	Hillary	Clayton	2516 Newman	Raleigh	NC
10	Kiara	Williams	9014 Miller Ln.	Durham	NC
11	Katy	Jones	456 Denver Rd.	Cary	NC

Notice how each record spans several fields. Even though the information in each record is organized into fields, it belongs with the other information in that record. See the number at the left of each row? It's the ID number that identifies each record. The ID number for a record refers to every piece of information contained on that row.

ID	First Name	Last Name
40	Vig	Aurelio
41	Jeffery	Bergman
42	William	Bittiman
43	Megan	
44	Mark	
45	Marjan	
46	Colin	Hopkins
47	Hakim	Auden
48	Pilar	Semana
49	Eliza	Harris
50	Chloe	Ford
51	Juanita	Harris

**Record ID Numbers**

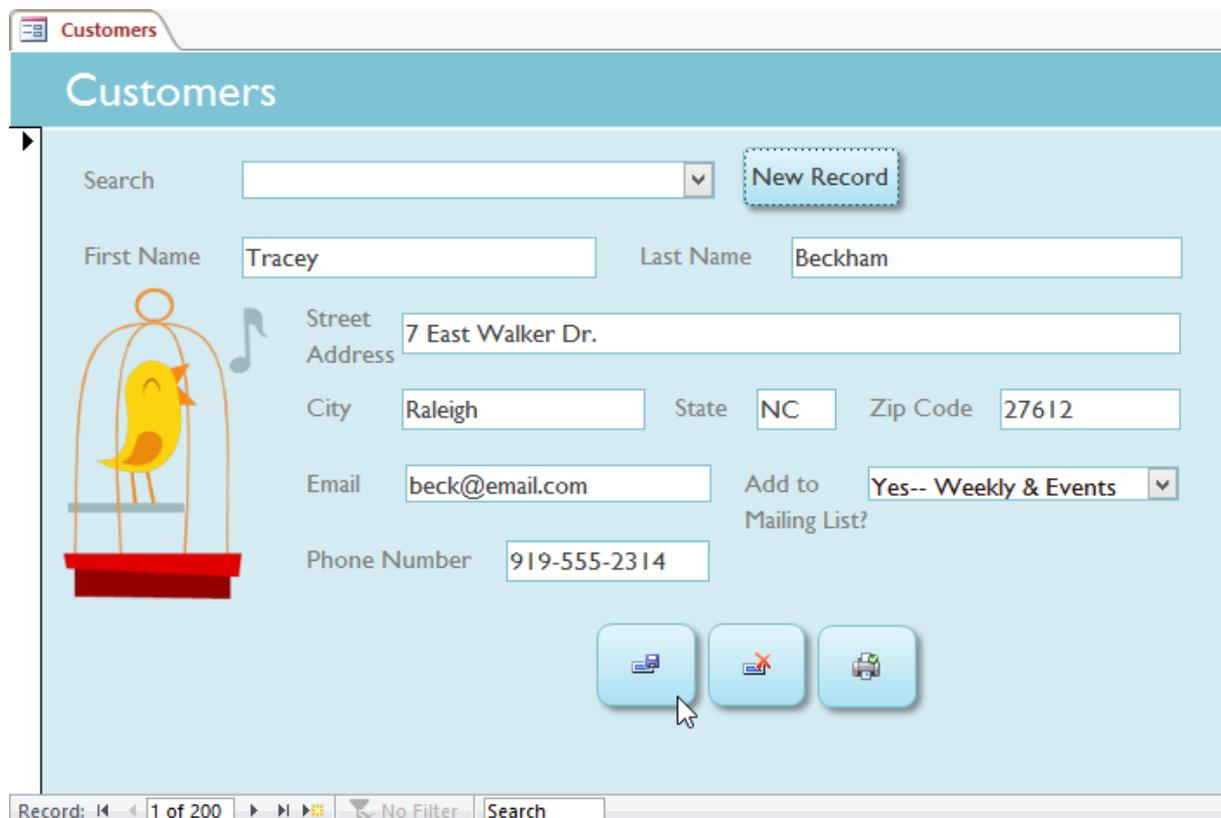
Tables are good for storing closely related information. Let's say you own a bakery and have a database that includes a table with your customers' names and information, like their phone numbers, home addresses, and email addresses. Because these pieces of information are all details on your customers, you'd include them all in the same table. Each customer would be represented by a unique record, and each type of information about these customers would be stored in its own field. If you decided to add any more information—say, a customer's birthday—you would simply create a new field within the same table.

## Forms, queries, and reports

Although tables store all of your data, the other three objects—forms, queries, and reports—offer you ways to work with it. Each of these objects interacts with the records stored in your database's tables.

### Forms

Forms are used for entering, modifying, and viewing records. You likely have had to fill out forms on many occasions, like when visiting a doctor's office, applying for a job, or registering for school. The reason forms are used so often is that they're an easy way to guide people toward entering data correctly. When you enter information into a form in Access, the data goes exactly where the database designer wants it to go: in one or more related tables.



The screenshot shows an Access form titled "Customers" with a light blue header. The form contains several input fields and controls:

- A "Search" dropdown menu.
- A "New Record" button with a dashed border.
- Text boxes for "First Name" (Tracey) and "Last Name" (Beckham).
- A "Street Address" text box containing "7 East Walker Dr." with a musical note icon to its left.
- Text boxes for "City" (Raleigh), "State" (NC), and "Zip Code" (27612).
- An "Email" text box containing "beck@email.com" and a dropdown menu for "Add to Mailing List?" set to "Yes-- Weekly & Events".
- A "Phone Number" text box containing "919-555-2314".
- Three action buttons at the bottom: a save button, a delete button, and a print button.
- A status bar at the bottom left showing "Record: 1 of 200" and "No Filter".

Forms make entering data easier. Working with extensive tables can be confusing, and when you have connected tables you might need to work with more than one at a time to enter a set of data. However, with forms it's possible to enter data into multiple tables at once, all in one place. Database designers can even set restrictions on individual form components to ensure all of the needed data is entered in the correct format. All in all, forms help keep data consistent and organized, which is essential for an accurate and powerful database.

### Queries

Queries are a way of searching for and compiling data from one or more tables. Running a query is like asking a detailed question of your database. When you build a query in Access, you are defining specific search conditions to find exactly the data you want.

Queries are far more powerful than the simple searches you might carry out within a table. While a search would be able to help you find the name of one customer at your business, you could run a query to find the name and phone number of every customer who's made a purchase within the past week. A well-designed query can give information you might not be able to find just by looking through the data in your tables.

**Customers that Ordered**

Field:	First Name	Last Name	Pickup Date	
Table:	Customers	Customers	Orders Table	
Total:	Group By	Group By	Count	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:				
or:				

## Reports

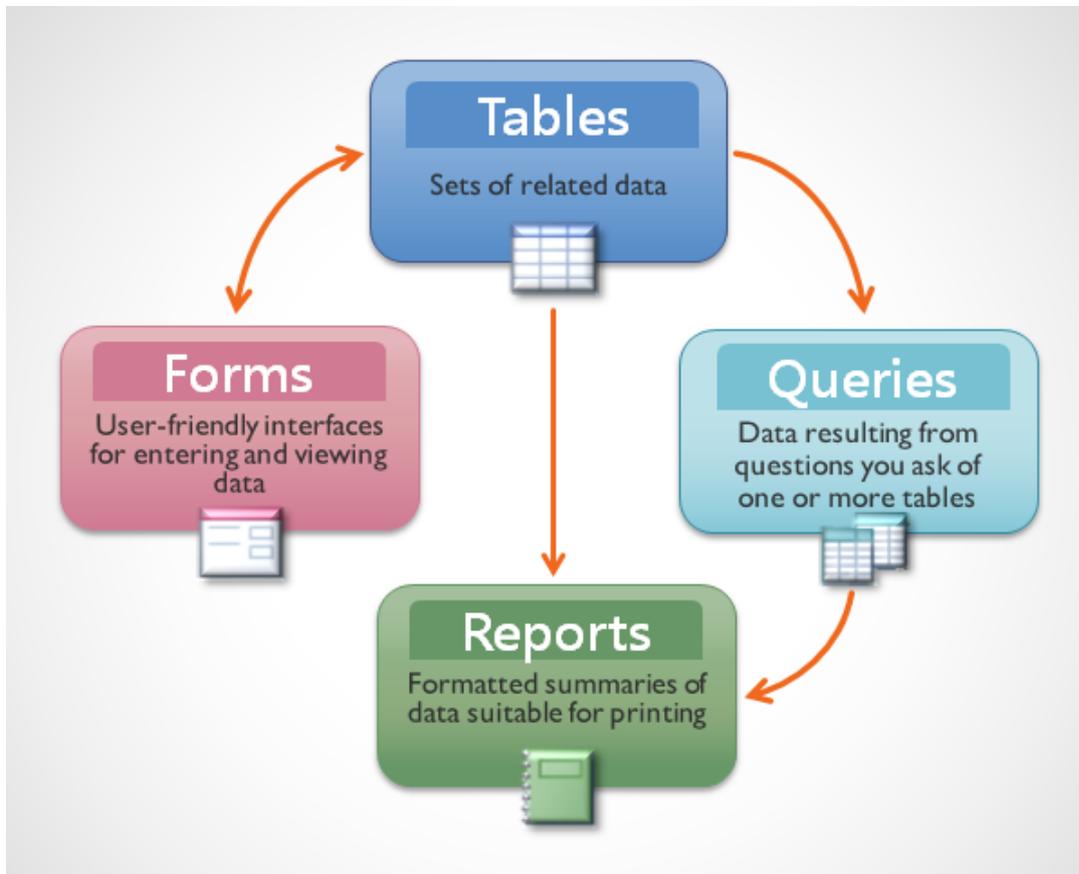
Reports offer you the ability to present your data in print. If you've ever received a computer printout of a class schedule or a printed invoice of a purchase, you've seen a database report. Reports are useful because they allow you to present components of your database in an easy-to-read format. You can even customize a report's appearance to make it visually appealing. Access offers you the ability to create a report from any table or query.

**December Orders**

First Name	Last Name	Phone Number	Pickup Date
Andrzej	Wujek	919-555-0450	12/4/2010
Dick	Whitman	919-555-5042	12/4/2010
Xy'nya	Bell	919-555-0758	12/9/2010
Xiaoxi	Zheng	919-555-2786	12/10/2010
Hakim	Auden	919-555-0045	12/14/2010
Zoey	Altman	919-555-6688	12/15/2010
Raphaele	Duvalier	919-555-1547	12/15/2010
Zoey	Altman	919-555-6688	12/16/2010

## Putting it all together

Even if you have a good idea of how each object can be used, it can initially be difficult to understand how they all work together. It helps to remember that they all work with the same data. Every piece of data a query, form, or report uses is stored in one of your database tables.



Forms allow you to both add data to tables and view data that already exists. Reports present data from tables and also from queries, which then search for and analyze data within these same tables.

These relationships sound complicated, but in fact they work together so well and naturally that we often don't even notice when we're using connected database objects. Have you ever used an electronic card catalog to search for a book at the library? Chances are, you entered your search in something that looks like this:

Search the library catalog. Fill in at least one field. The more words you search for, the smaller and more refined your results list will be.

**Search by:**

Title Keyword	<input type="text"/>	AND
Author Keyword	<input type="text"/>	AND
General Keyword	<input type="text"/>	AND
Subject Keyword	<input type="text"/>	

**Refine your search (optional):**

You can refine your search by selecting a limit or sort option.

**Limits**

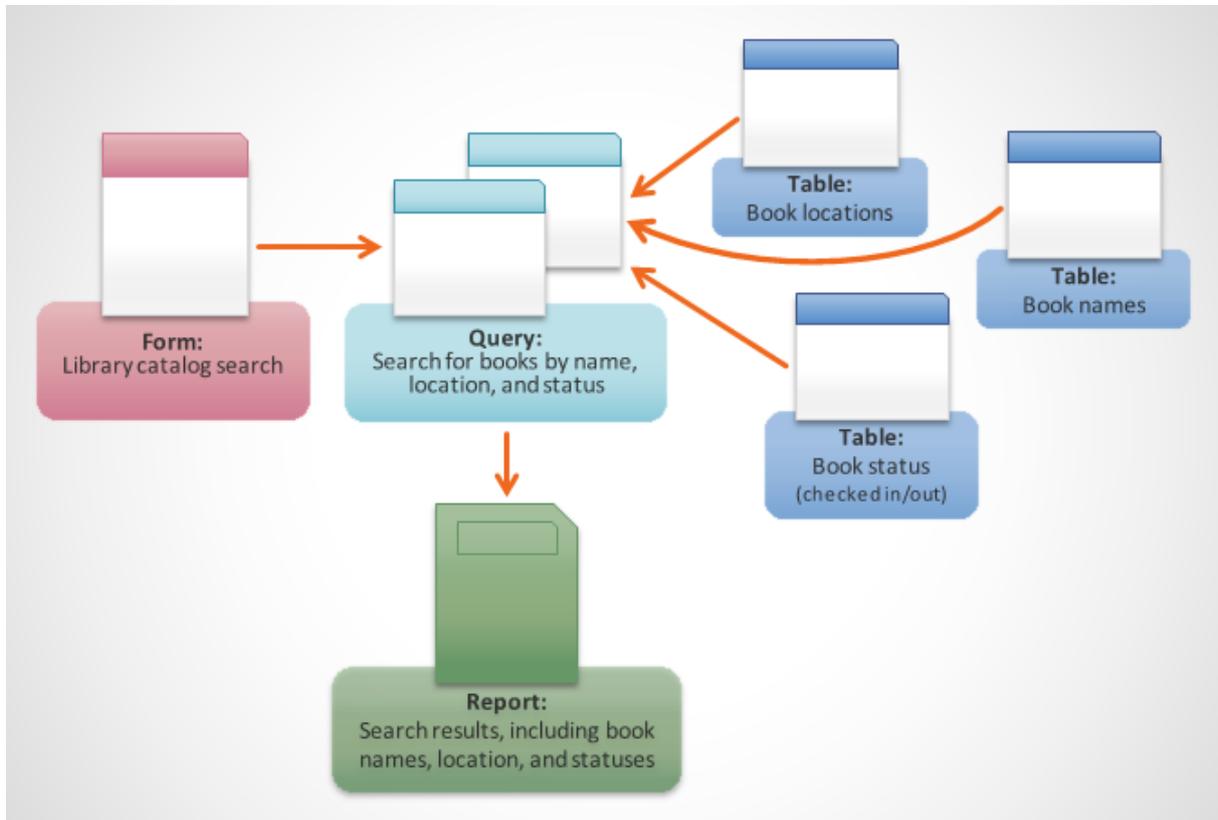
<b>Library Branch</b>	<b>Type of Book</b>
Athens Drive Community Library	All Audio Books
Cameron Village Regional Library	Downloadable Audio Books
Cary Public Library	Adult Audio Fiction
Duraleigh Road Library	Adult Audio Non Fiction
East Regional Library	Children's Audio

**Sorting**

Sort your results by selecting a sort option.

Select...

When you performed your search, you were entering your search terms into a form that then created and ran a query based on your request. When the query finished searching the database's tables for records that matched your search, you were shown a report that drew information from the query and the related tables—in this case, a list of books matching your search terms. You could represent the connections between the objects like this:

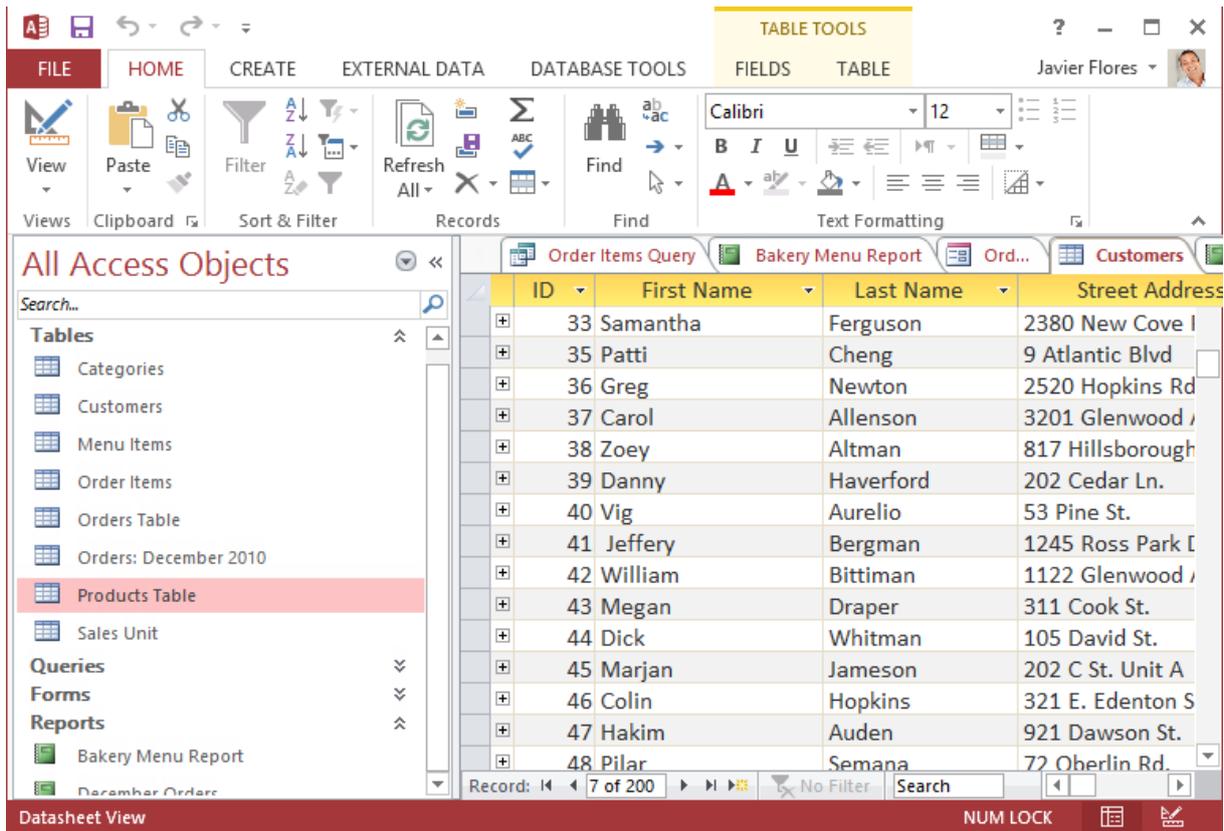


Let's say instead of using these tools you had to search within a giant table containing every book in the library system. The relevant records would likely be spread out across many tables: a table for book titles and descriptions, a table containing information on which books are checked in or out, and a table with each branch of the library, just to name a few.

You'd have to search at least three tables just to find a book, learn its location, and see whether it's checked in! It's easy to imagine how difficult it could become to find the right book. If you weren't careful, you might even mess something up by accidentally deleting or editing a record. It's easy to see how the database objects make this search much more manageable.

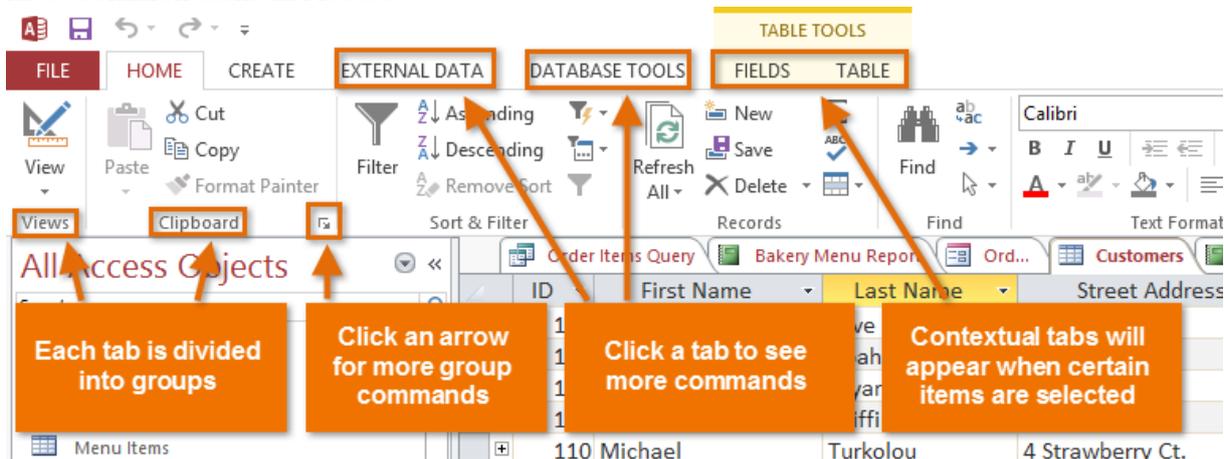
### Getting to know Access 2013

Access 2013 uses the Ribbon to organize commands, just like in Access 2010 and 2007. If you've used these versions before, Access 2013 will feel familiar. But if you are new to Access or have more experience with older versions, you should first take some time to become familiar with the Access 2013 interface.



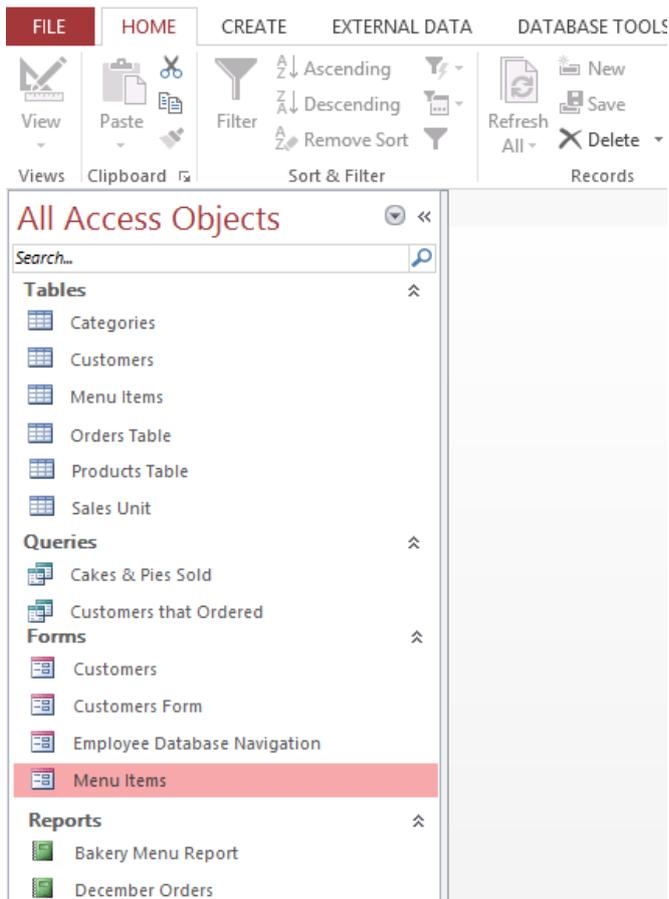
### The Ribbon

Access 2013 uses a tabbed Ribbon system instead of traditional menus. The Ribbon contains multiple tabs, each with several groups of commands. You will use these tabs to perform the most common tasks in Access.



### The Navigation pane

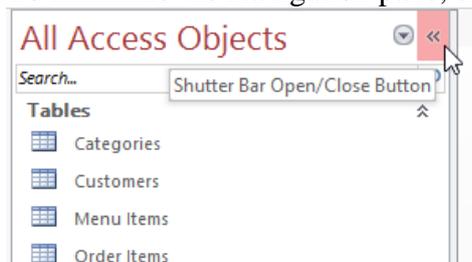
The Navigation pane is a list containing every object in your database. For easier viewing, the objects are organized into groups by type. You can open, rename, and delete objects using the Navigation pane.



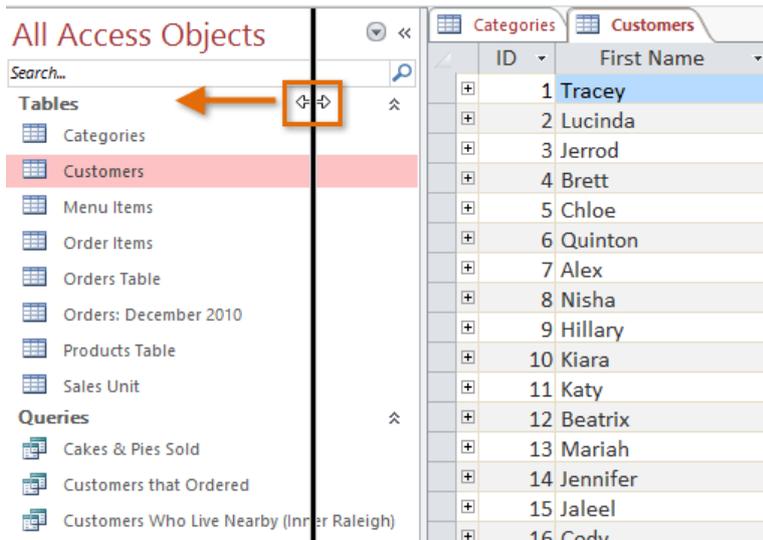
To minimize and maximize the Navigation pane:

The Navigation pane is designed to help you manage all of your objects; however, if you feel that it takes up too much of your screen space you can minimize it.

To minimize the Navigation pane, click the double arrow in the upper-right corner.



The Navigation pane will be minimized. Click the double arrow again to maximize it.



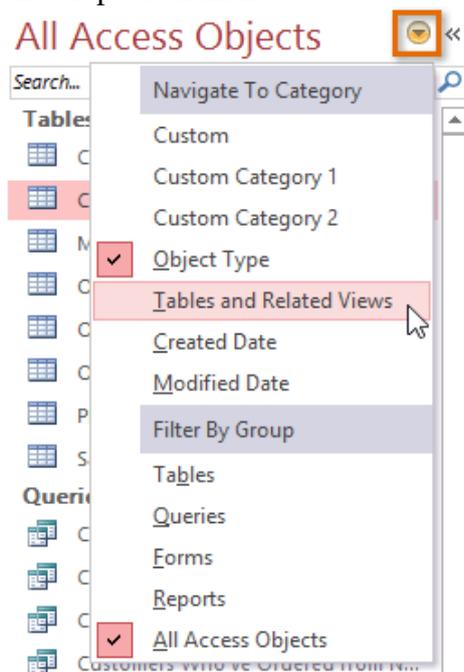
## Object sorting in the Navigation pane

By default, objects are sorted by type, with tables in one group, forms in another, and so on. However, if you want you can sort the objects in the Navigation pane into groups of your choosing. There are four sort options:

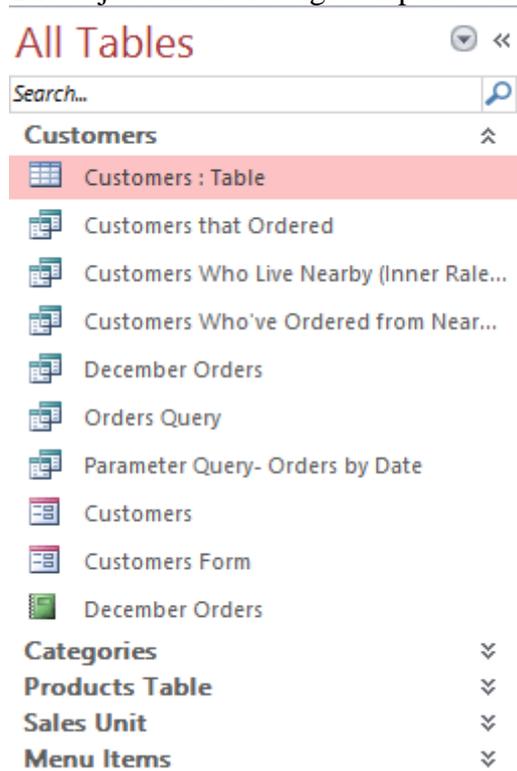
- Custom allows you to create a custom group for sorting objects. After applying the sort, simply drag the desired objects to the new group.
- Object Type groups objects by type. This is the default setting.
- Tables and Related Views groups forms, queries, and reports with the tables they refer to.
- Created Date or Modified Date sorts objects based on when they were created or last edited.

To sort objects in the Navigation pane:

Click the drop-down arrow to the right of All Access Objects, then select the desired sort from the drop-down menu.



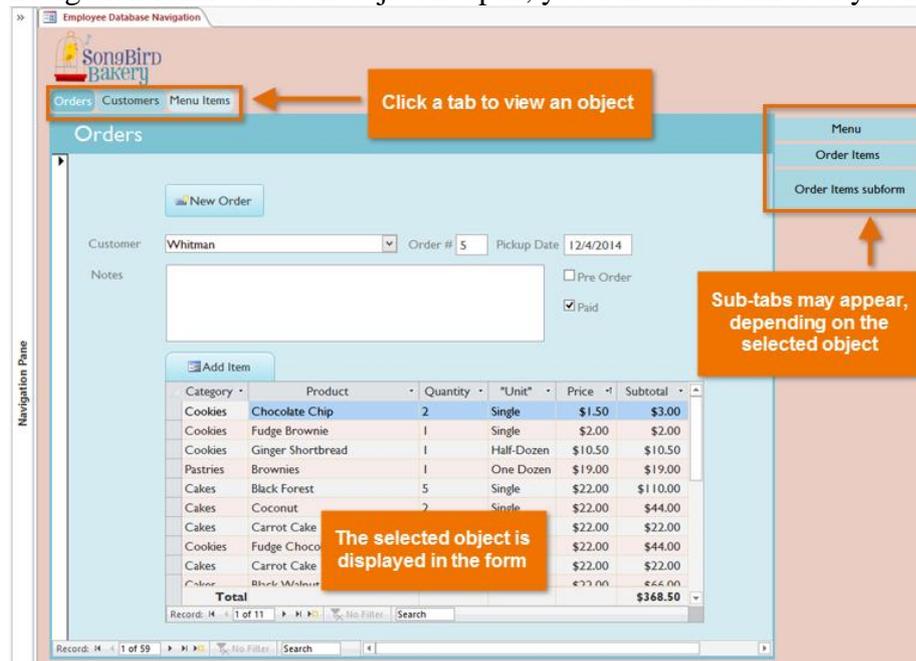
The objects in the Navigation pane will now be sorted to reflect your choice.



## Databases with navigation forms

Some databases include a navigation form that opens automatically when the database is opened. Navigation forms are designed to be a user-friendly replacement for the Navigation pane. They contain tabs that allow you to view and work with common forms, queries, and reports. Having your frequently used objects available to you in one place lets you access them quickly and easily.

To open an object from a navigation form, click its tab. The object will be displayed within the navigation form. Once an object is open, you can work with it as you normally would.



Generally, navigation forms include only the objects a typical user will need to work with fairly regularly, which is why your navigation form may not include every single form, query, or report. This makes it easier to navigate the database. By hiding tables and rarely used forms, queries, and reports, it also reduces the chance of the database being damaged by users accidentally editing or deleting necessary data.

For this reason, it's important to ask your database designer or administrator before working with objects that are not available in your navigation form. Once you have the go-ahead, you can simply maximize the Navigation pane and open the objects from there.

### Challenge!

1. Open an existing Access sample database.
2. Click through all of the tabs and notice how the options on the Ribbon change.
3. Try minimizing and maximizing the Ribbon.
4. Resize the Navigation pane to make it take up less room.
5. Re-sort the objects in the Navigation pane.

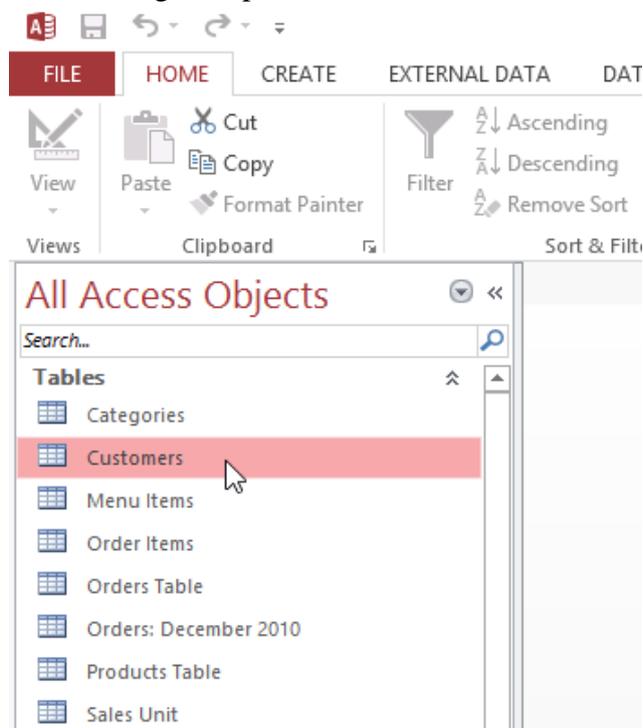
### Working with objects

It's helpful to think of your database as a large binder or folder in which you store your data. The data itself is contained in database objects. Access treats each of these objects as separate documents, which means you will have to open and save them individually in order to work with them.

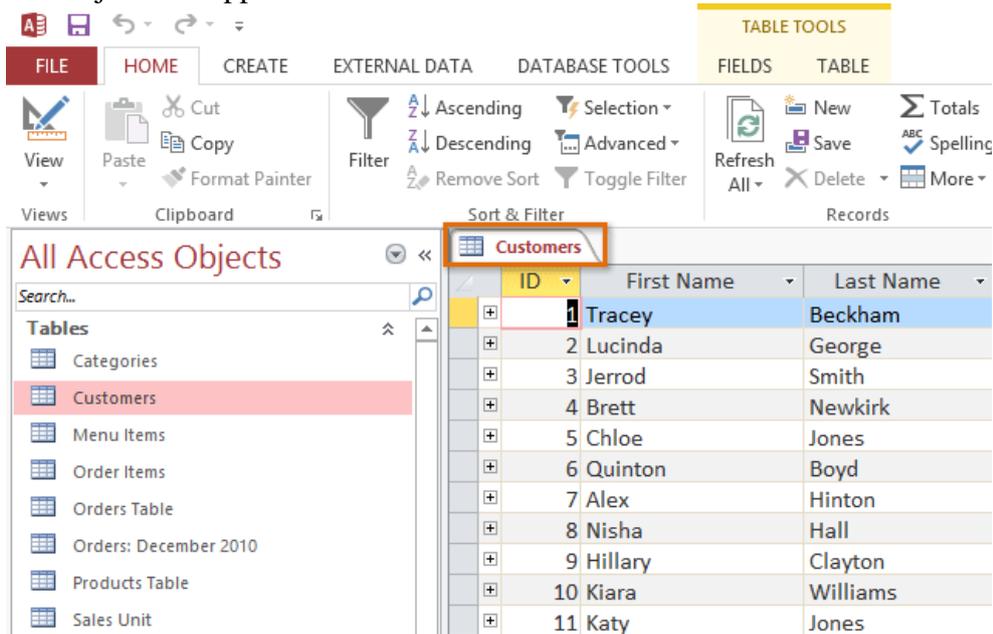
You may have noticed that this lesson contains no instructions for saving a database. This is because you cannot save an entire database at once. Rather, you must individually save the objects contained within the database.

To open an object:

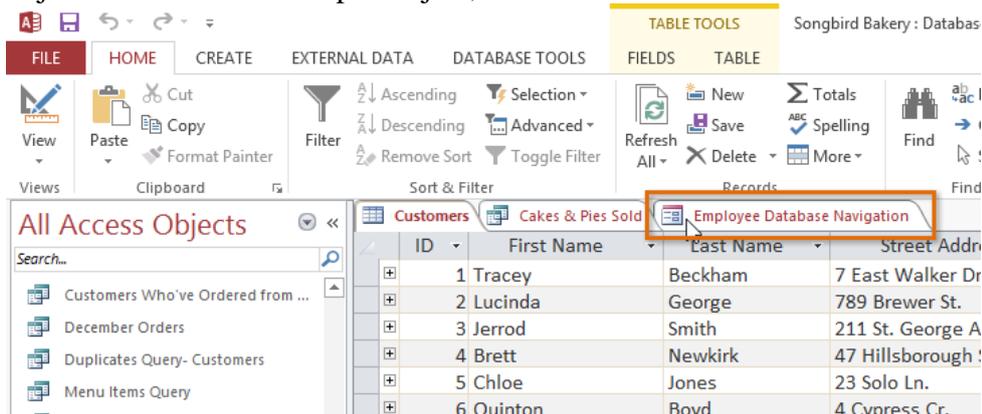
In the Navigation pane, locate and double-click the desired object.



The object will appear as a tab in the Document Tabs bar.



By default, the most recently opened object will appear in the main window as the current object. To view another open object, click its tab in the Document Tabs bar.



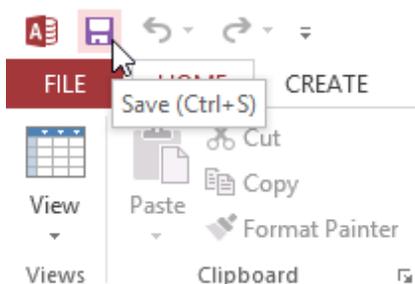
## Saving objects

You'll need to save any changes you make to each object before closing your database. Remember, saving early and often can prevent your work from being lost. However, you will also be prompted to save any unsaved work when you attempt to close your database.

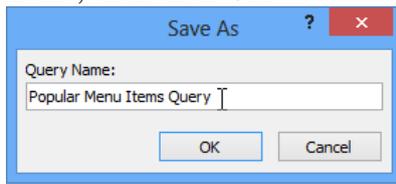
To save a new object:

Select the object you want to save by clicking its tab in the Document Tabs bar.

Click the Save command on the Quick Access toolbar, or press Ctrl+S on your keyboard.



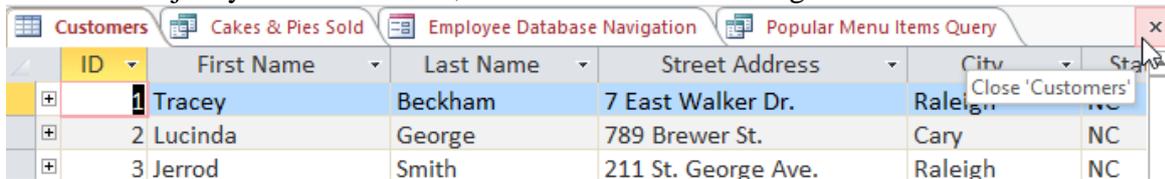
The first time you save an object, you will be prompted to name it. Enter the desired object name, then click OK.



The object will be saved. Click the Save command again to save any changes to the object.

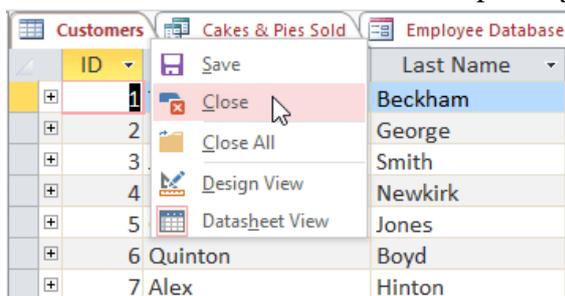
To close an object:

Select the object you want to close, then click the X on the right of the Document Tabs bar.



If there are any unsaved changes to the object, you will be prompted to save it. Select Yes to save, No to close it without saving your changes, and Cancel to leave the object open.

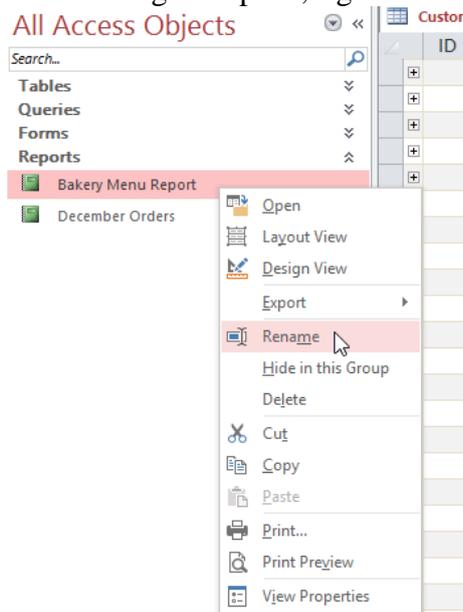
You can also close an object by right-clicking its tab on the Document Tabs bar and selecting Close. Select Close All to close all open objects.



To rename an object:

If the object you want to rename is open, close it.

In the Navigation pane, right-click the desired object, then select Rename.



Type the new object name, then press Enter on your keyboard.



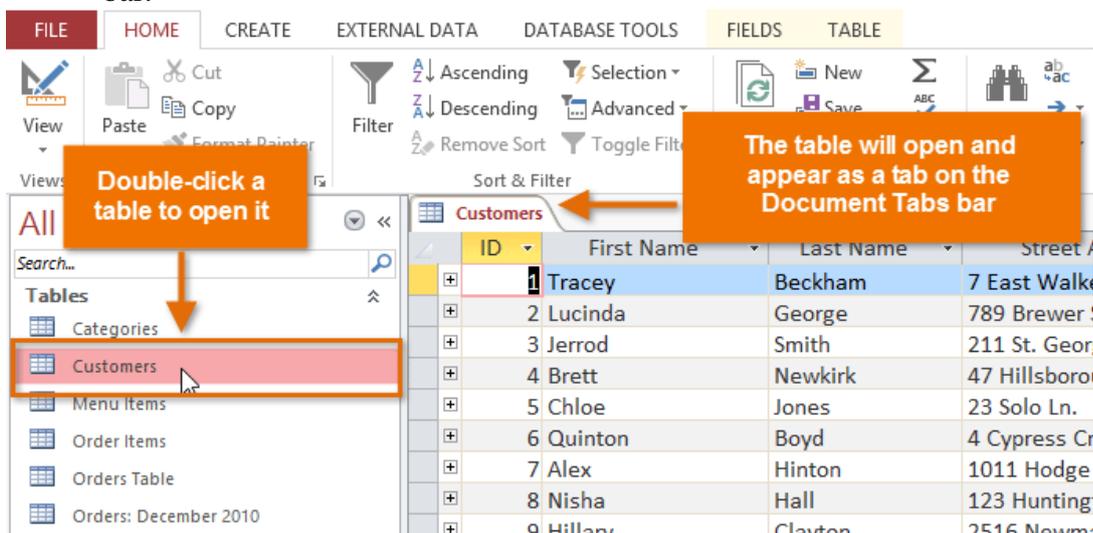
## Challenge!

1. Open an existing Access sample database.
2. Open an object.
3. Close the object.
4. Rename the object.
5. Close the database without saving your changes.

## Table basics

To open an existing table:

- Open your database, and locate the Navigation pane.
- In the Navigation pane, locate the table you want to open. Tables are marked with the icon.
- Double-click the desired table. It will open and appear as a tab in the Document Tabs bar.



## Understanding tables

All tables are composed of horizontal rows and vertical columns, with small rectangles called cells in the places where rows and columns intersect. In Access, rows and columns are referred to as records and fields.

ID	First Name	Last Name	Street Address	City	State
52	Denver	Emerson	856 Cook St.	Raleigh	NC
53	John	Emory	99 Hillsborough St.	Garner	NC
54	Ebony	Farmer	872 W. Morgan St.	Raleigh	NC
55	Kim	Doe	553 Wayne St.	Raleigh	NC
56	Coretta	Diaz	781 Bloodsworth St.	Raleigh	NC
57	Victor	Denver	31 St. Mary's St.	Raleigh	NC
58	Hamish	David	21 Cameron Ct.	Raleigh	NC
59	Erin	Counts	763 E. West St.	Raleigh	NC
60	Harris	Collman	455 E. Edenton St.	Raleigh	NC
61	Melissa	Chantay	3201 Glenwood Ave.	Raleigh	NC
62	Emmanual	Colin	11 Sassafras Way	Raleigh	NC
63	Illa	Carlson	563 Oberlin Rd.	Raleigh	NC
64	Tyrone	Rodgers	453 Pine St.	Raleigh	NC

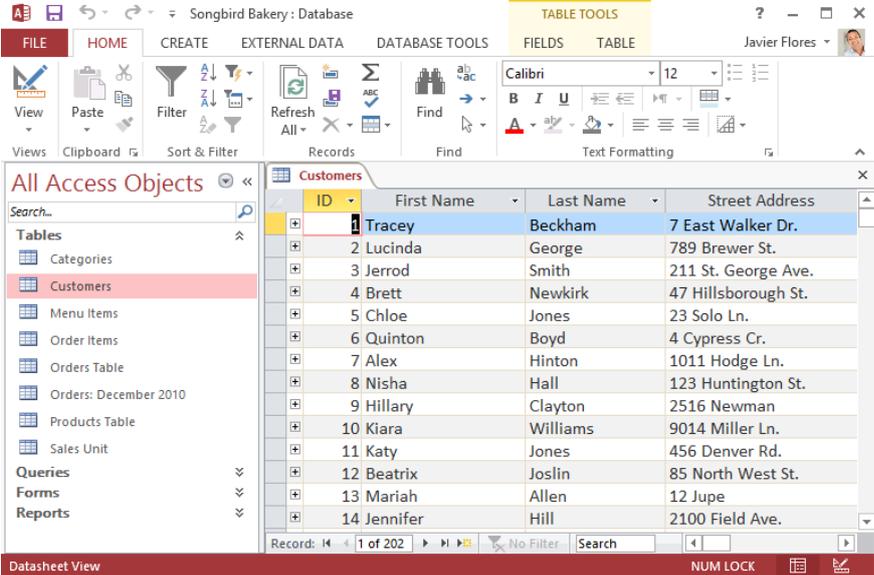
A field is a way of organizing information by type. Think of the field name as a question and every cell within that field as a response to that question.

ID	First Name	Last Name	Street Address
1	Tracey	Beckha	7 East Walker Dr.
2	Lucinda	George	780 Brewer St.
3	Jerrold	Smith	211 St. George Ave.
4	Brett	Newkirk	47 Hillsborough St.
5	Chloe		23 Solo Ln.
6	Quinton		4 Cypress Cr.
7	Alex		1011 Hodge Ln.
8	Nisha	Hall	123 Huntington St.
9	Hillary	Clayton	2516 Newman
10	Kiara	Williams	9014 Miller Ln.
11	Katy	Jones	456 Denver Rd.
12	Beatrix	Joslin	85 North West St.

A record is one unit of information. Every cell on a given row is part of that row's record. Each record has its own ID number. Within a table, each ID number is unique to its record and refers to all of the information within that record. The ID number for a record cannot be changed.

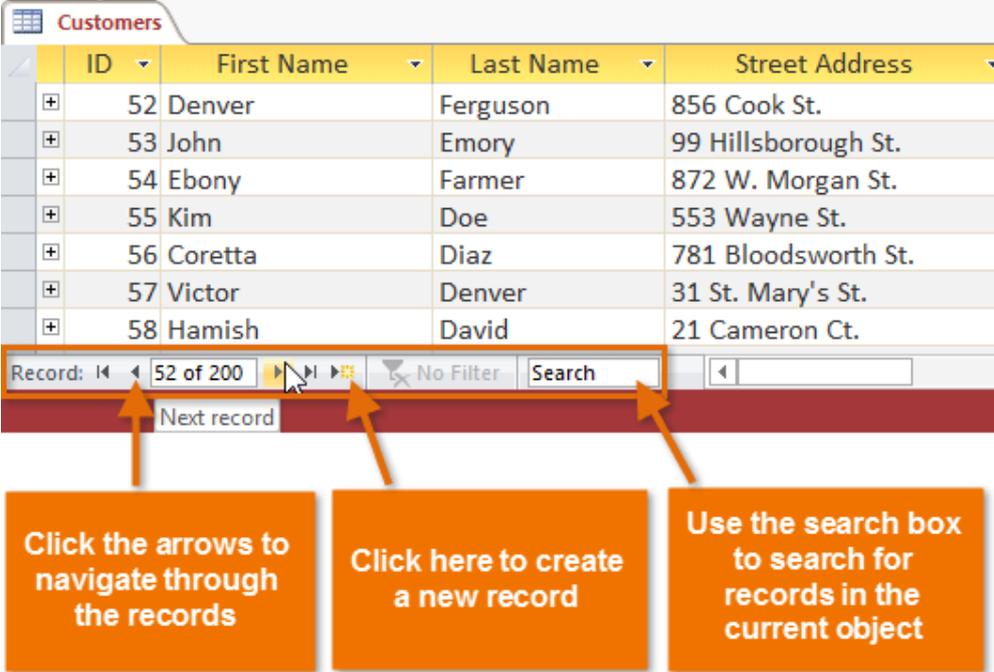
ID	First Name	Last Name
40	Vig	Aurelio
41	Jeffery	Bergman
42	William	Bittiman
43	Megan	
44	Elk	
45	Marjan	
46	Colin	Hopkins
47	Hakim	Auden
48	Pilar	Semana
49	Eliza	Harris
50	Chloe	Ford
51	Juanita	Harris

Each cell of data in your table is part of both a field and a record. For instance, if you had a table of names and contact information, each person would be represented by a record, and each piece of information about each person—name, phone number, address, and so on—would be contained within a distinct field on that record's row.



### Navigating within tables

To navigate through records in a table, you can use the up and down arrow keys, scroll up and down, or use the arrows in the Record Navigation bar located at the bottom of your table. You can also find any record in the currently open table by searching for it using the record search box. Simply place your cursor in the search box, type any word that appears in the record you want to find, and press the Enter key. To view additional records that match your search, press Enter again.



To navigate between fields, you can use the left and right arrow keys or scroll left and right.

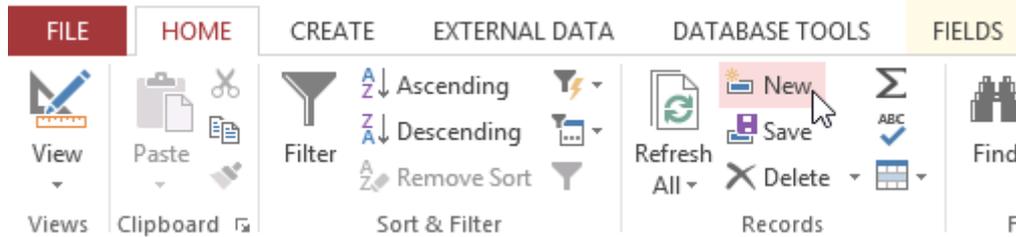
### Adding records and entering data

Entering data into tables in Access is similar to entering data in Excel. To work with records, you'll have to enter data into cells.

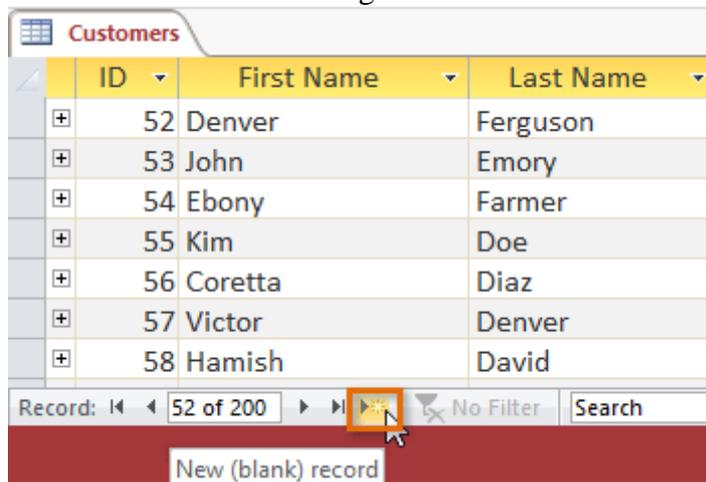
To add a new record:

There are three ways to add a new record to a table:

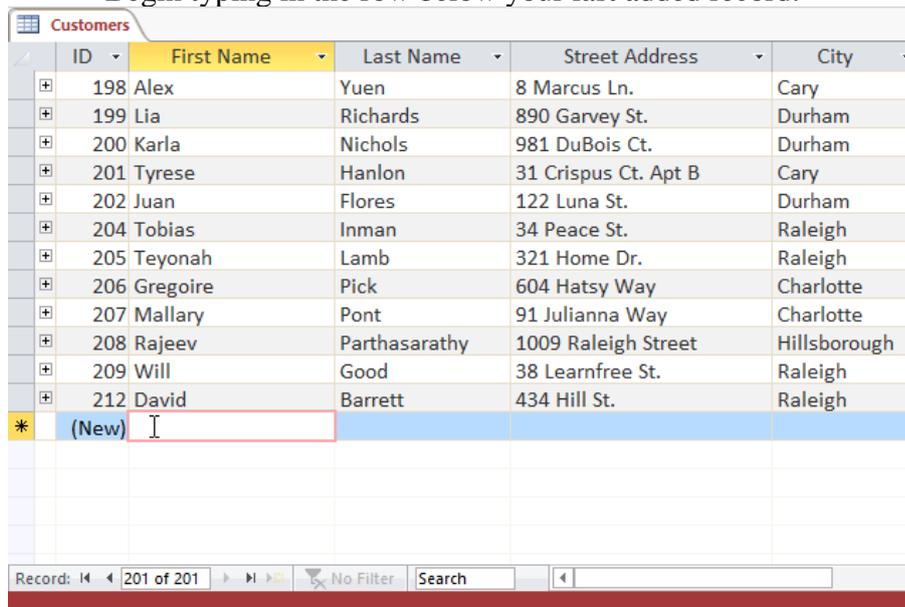
- In the Records group on the Home tab, click the New command.



- On the Record Navigation bar at the bottom of the window, click the New record button.



- Begin typing in the row below your last added record.



Sometimes when you enter information into a record, a window will pop up to tell you that the information you've entered is invalid. This means the field you're working with has a validation

rule, which is a rule about the type of data that can appear in that field. Click OK, then follow the instructions in the pop-up window to re-enter your data.

+ 31 Crispus Ct. Apt B	Cary	NC	27513
+ 38 Learnfree St.	Raleigh	NC	27701
+ 434 Hill St.	Raleigh	NC	27609
+ 1874 Thistledown Ave	Raleigh	North Carolina	

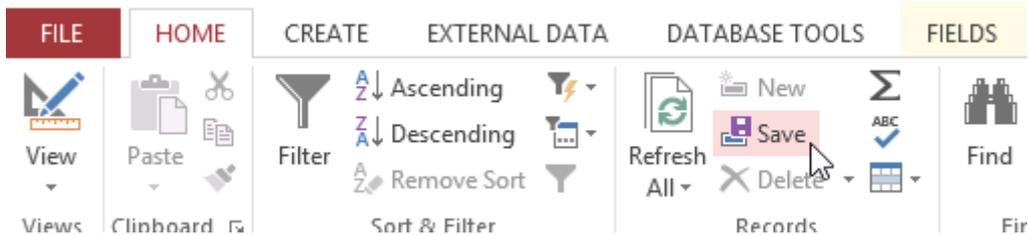
**Microsoft Access**

⚠ Must be a US State. Enter the 2-letter postal code only.

To save a record:

Access is designed to save records automatically. After you enter a record, you can either select a different record or close the object, and Access will save the record. However, in certain situations you may want to save a record manually. For example, if you needed to edit an existing record, you could save the record to ensure your changes are saved.

- Select the Home tab, and locate the Records group.
- Click the Save command. The record will be saved.



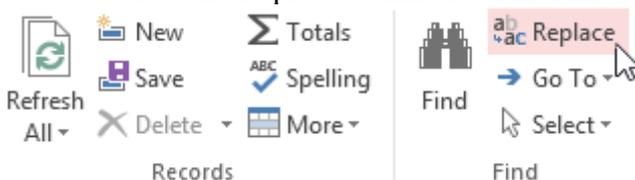
### Editing records

To quickly edit any record within a table, you can click it and type your changes. However, Access offers you the ability to find and replace a word within multiple records and delete records entirely.

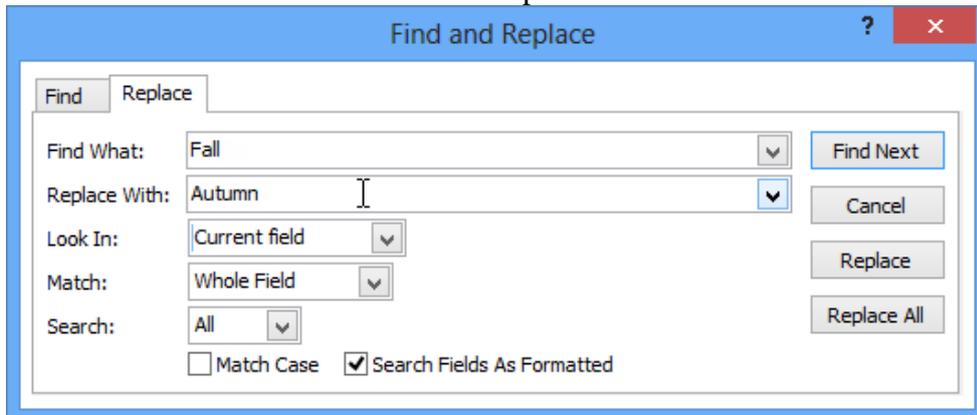
To replace a word within a record:

You can edit multiple occurrences of the same word by using Find and Replace, which searches for a term and replaces it with another term.

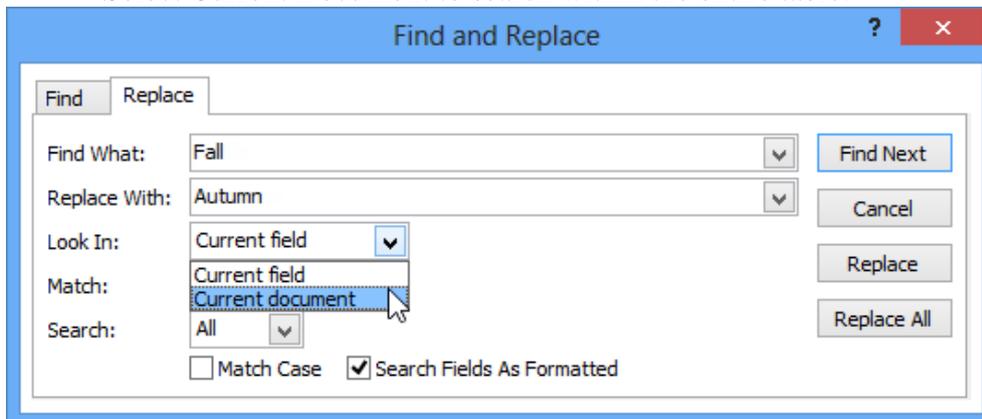
- Select the Home tab, and locate the Find group.
- Select the Replace command. The Find and Replace dialog box will appear.



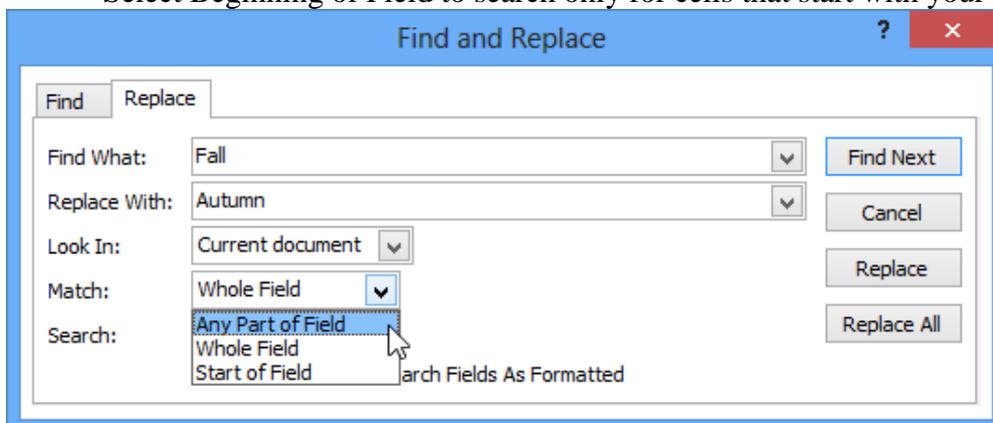
- In the Find What: field, type the word you want to find, then in the Replace With: field type the word you would like to replace the original word. In our example, we'll find instances of the word Fall and replace it with Autumn.



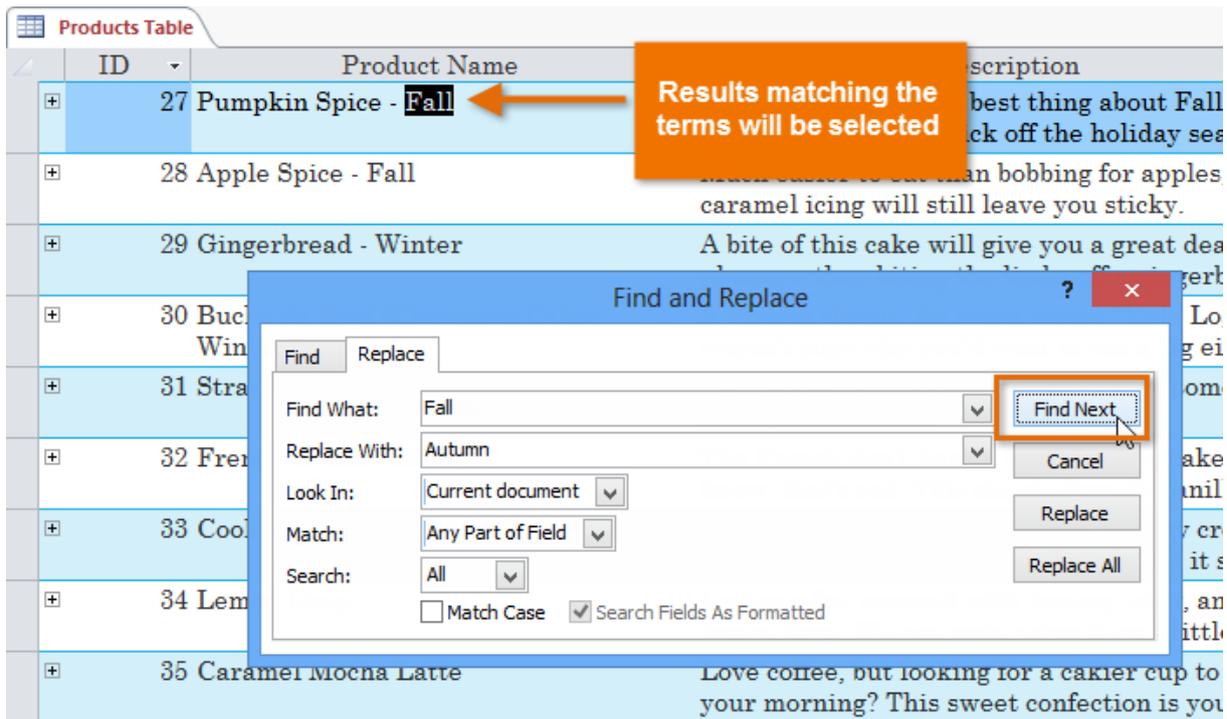
- Click the Look In: drop-down arrow to select the area you want to search.
- Select Current Field to limit your search to the currently selected field.
- Select Current Document to search within the entire table.



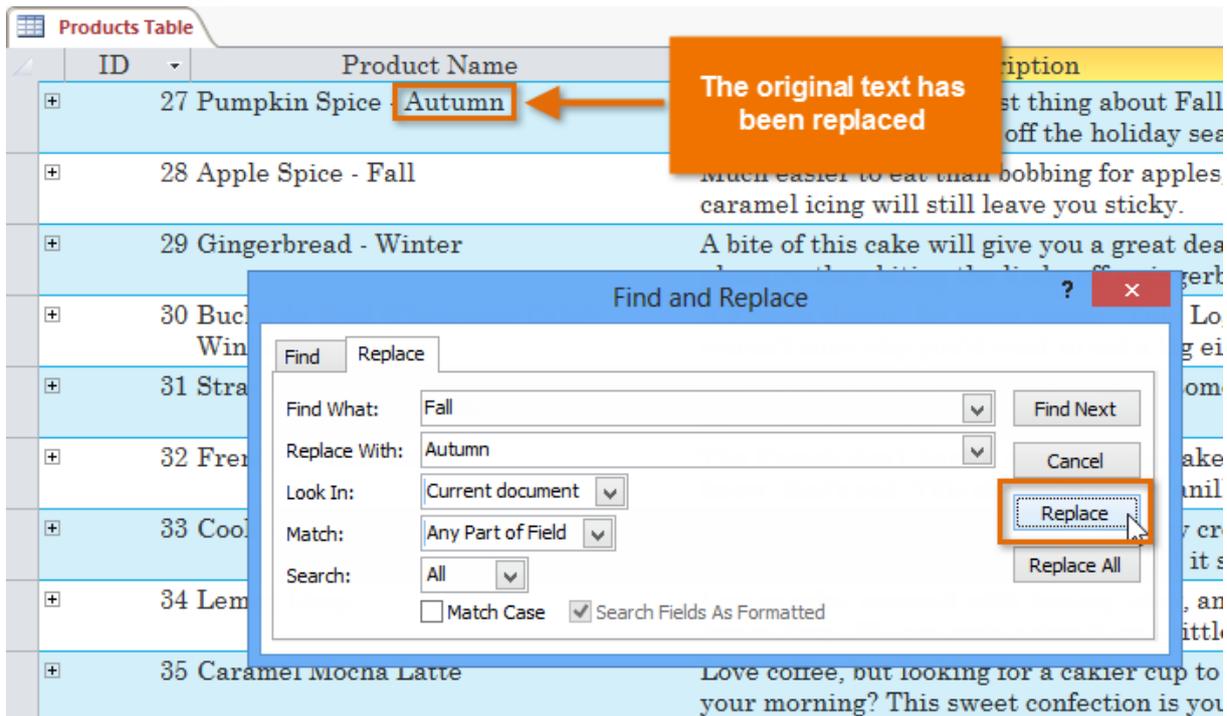
- Click the Match: drop-down arrow to select how closely you'd like results to match your search.
- Select Any Part of Field to search for your search term in any part of a cell.
- Select Whole Field to search only for cells that match your search term exactly.
- Select Beginning of Field to search only for cells that start with your search term.



- Click Find Next. If the text is found, it will be selected.



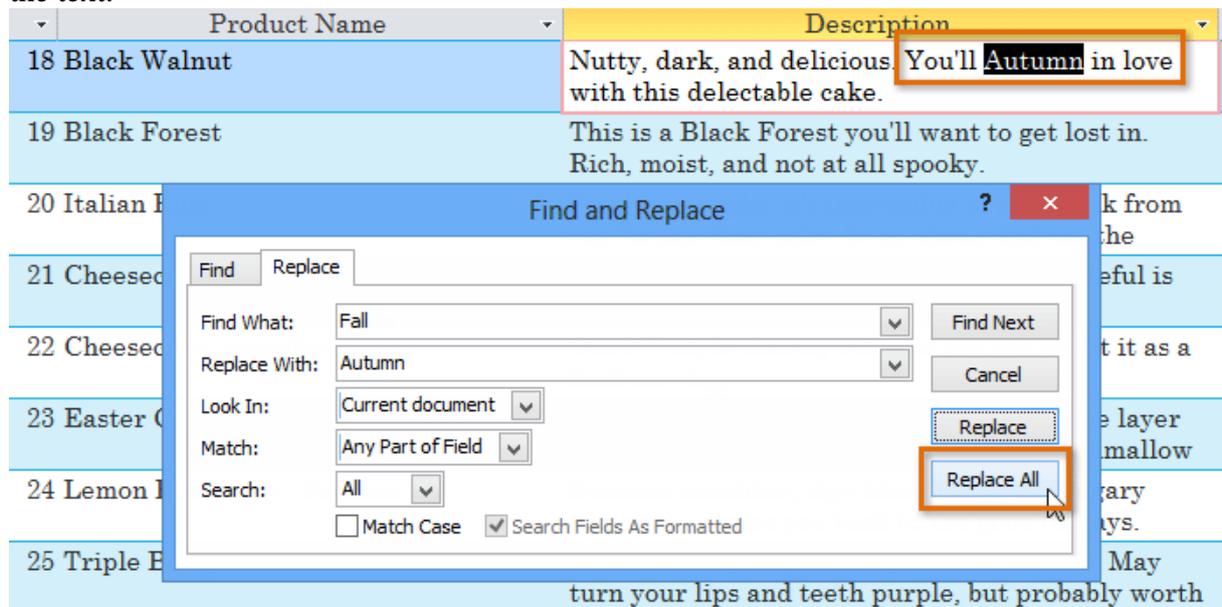
Review the text to make sure you want to replace it. Click Replace to replace the original word with the new one.



Access will move to the next instance of the text in the object. When you are finished replacing text, click Cancel to close the dialog box.

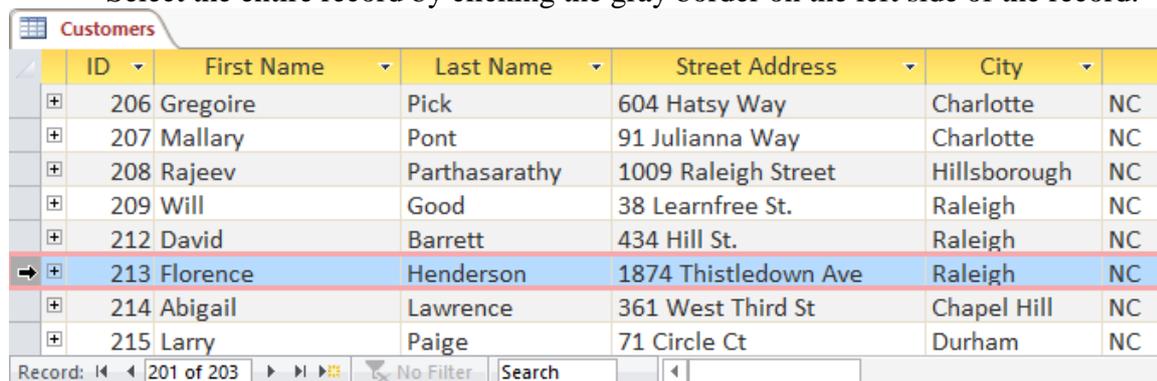
The Replace All option is powerful, and it may actually change some things you don't want to change. In the example below, the word fall did not refer to the season, so replacing it with Autumn would be incorrect. Using the normal Replace option allows you check each instance

before replacing the text. You can click Find Next to skip to the next instance without replacing the text.

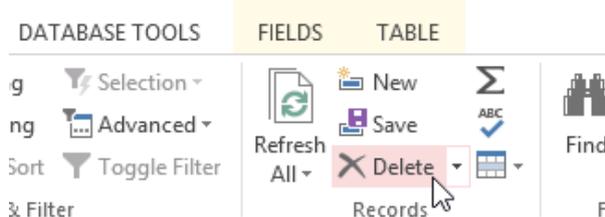


To delete a record:

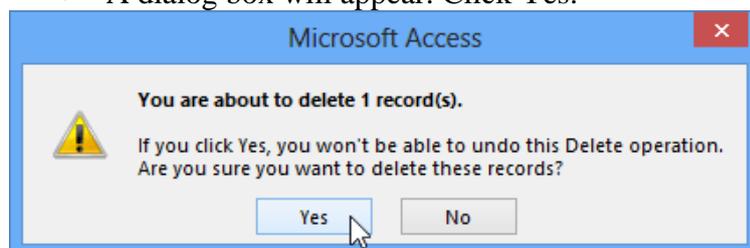
- Select the entire record by clicking the gray border on the left side of the record.



- Select the Home tab and locate the Records group.
- Click the Delete command.



- A dialog box will appear. Click Yes.



The record will be permanently deleted.

The ID numbers assigned to records stay the same even after you delete a record. For example, if you delete the 213th record in a table the sequence of record ID numbers will read ...212, 214, 215... rather than ...212, 213, 214, 215...

ID	First Name	Last Name	Street Address	City	State
204	Tobias	Inman	34 Peace St.	Raleigh	NC
205	Teyonah		321 Home Dr.	Raleigh	NC
206	Gregoire		604 Hatsy Way	Charlotte	NC
207	Mallary		91 Julianna Way	Charlotte	NC
208	Rajeev		1009 Raleigh Street	Hillsborough	NC
209	Will	Good	38 Learnfree St.	Raleigh	NC
212	David	Barrett	434 Hill St.	Raleigh	NC
214	Abigail	Lawrence	361 West Third St	Chapel Hill	NC
215	Larry	Paige	71 Circle Ct	Durham	NC

### Modifying table appearance

Access offers various ways to modify the appearance of tables, including resizing fields and rows and temporarily hiding information you don't need to see. These changes aren't just about making your table look good; they also can make the table easier to read.

### Resizing fields and rows

If your fields and rows are too small or large for the data contained with them, you can always resize them so all of the text is displayed.

To resize a field:

- Place your cursor over the right gridline in the field title. Your mouse will become a double arrow.

ID	Product Name	Description
20	Italian Rum	Try as we might, it's impossible to get drunk from our Italian
21	Cheesecake	Moist, rich and dreamily creamy. Every biteful is sinfully delic
22	Cheesecake, straw	Our NY-style classic, but now you can count it as a fruit ser
23	Easter Creme Cal	Like a Chocolate Crème Egg, except a three layer cake. Topp
24	Lemon Blueberry	Summer sunshine, ripe blueberries and sugary lemonade. Tal
25	Triple Berry Short	Strawberries, raspberries, and blueberries. May turn your lip
26	Hummingbird - Su	Made out of actual hummingbirds. No, not really. But this pir
27	Pumpkin Spice - A	Spicy and sweet-- the best thing about Autumn. Bring it to T
28	Apple Spice - Aut	Much easier to eat than bobbing for apples, but the caramel
29	Gingerbread - Wi	A bite of this cake will give you a great deal more pleasure th

- Click and drag the gridline to the right to increase the field width or to the left to decrease the field width, then release the mouse. The field width will be changed.

ID	Category ID	Product Name	Description
23	2	Easter Creme Cake- Spring	Like a Chocolate
24	2	Lemon Blueberry - Summer	Summer sunsh
25	2	Triple Berry Shortcake - Summer	Strawberries,
26	2	Hummingbird - Summer	Made out of a
27	2	Pumpkin Spice - Autumn	Spicy and swe
28	2	Apple Spice - Autumn	Much easier to
29	2	Gingerbread - Winter	A bite of this c

To resize a row:

- Place your cursor over the bottom gridline in the gray area to the left of the row. Your mouse will become a double arrow.

ID	Product Name	Description
20	Italian Rum	Try as we might, it's impossible to get drunk from
21	Cheesecake	Moist, rich and dreamily creamy. Every biteful is s
22	Cheesecake, strawberry	Our NY-style classic, but now you can count it as
23	Easter Creme Cake- Spring	Like a Chocolate Crème Egg, except a three layer
24	Lemon Blueberry - Summer	Summer sunshine, ripe blueberries and sugary len
25	Triple Berry Shortcake - Summer	Strawberries, raspberries, and blueberries. May tu
26	Hummingbird - Summer	Made out of actual hummingbirds. No, not really.
27	Pumpkin Spice - Autumn	Spicy and sweet-- the best thing about Autumn. B
28	Apple Spice - Autumn	Much easier to eat than bobbing for apples, but th
29	Gingerbread - Winter	A bite of this cake will give you a great deal more

- Click and drag the gridline downward to increase the row height or upward to decrease the row height, then release the mouse. The row height will be changed.

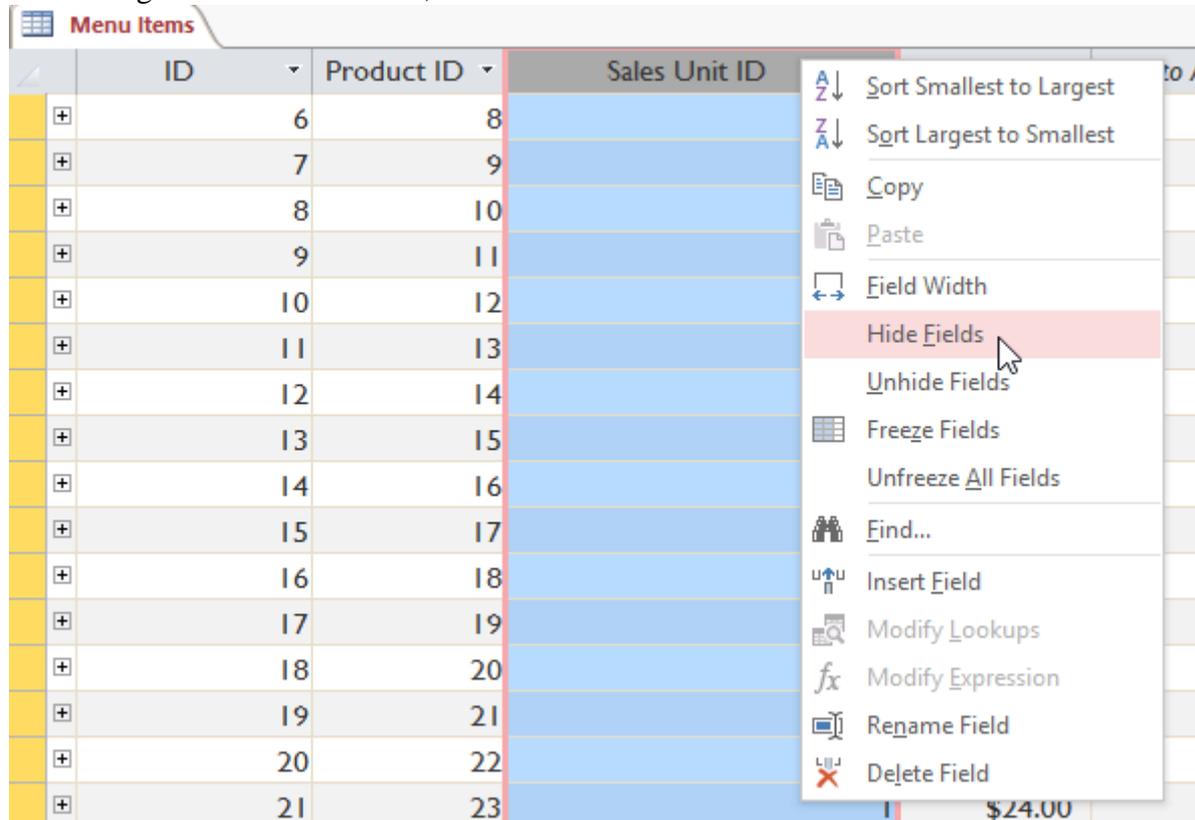
ID	Product Name	Description
20	Italian Rum	Try as we might, it's impossible to get drunk from our Italian Rum cake. So go ahead and eat the whole thing.
21	Cheesecake	Moist, rich and dreamily creamy. Every biteful is sinfully delicious.
22	Cheesecake, strawberry	Our NY-style classic, but now you can count it as a fruit serving.
23	Easter Creme Cake- Spring	Like a Chocolate Crème Egg, except a three layer cake. Topped with icing bunnies and marshmallow chicks.
24	Lemon Blueberry - Summer	Summer sunshine, ripe blueberries and sugary lemonade. Takes you back to the good ol' days.

## Hiding fields

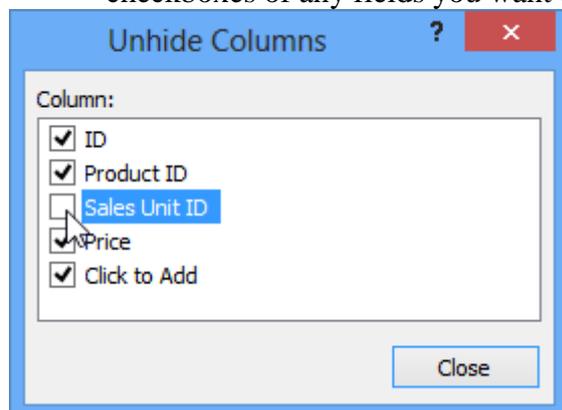
If you have a field you don't plan on editing or don't want other people to edit, you can hide it. A hidden field is invisible but is still part of your database. Data within a hidden field can still be accessed from forms, queries, reports, and any related tables.

To hide a field:

- Right-click the field title, then select Hide Fields.



- The field will be hidden.
- If you decide you want the field to be visible again, you can unhide it. Simply right-click any field title, then select Unhide Fields. A dialog box will appear. Click the checkboxes of any fields you want to be visible again, then click Close.



## Table formatting options

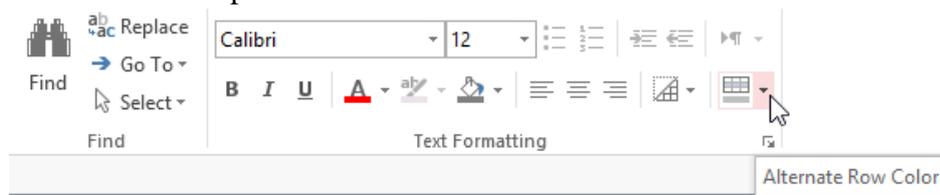
### Alternate row color

By default, the background of every other row in an Access table is a few shades darker than the background of the rest of the table. This darker alternate row color makes your table easier to read by offering a visual distinction between each record and the records directly above and below it.

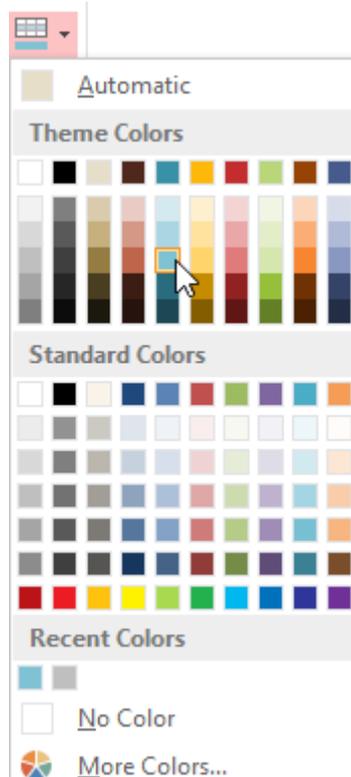
ID	First Name	Last Name	Street Address	City	State
1	Tracey	Beckham	7 East Walker Dr.	Raleigh	NC
2	Lucinda	George	789 Brewer St.	Cary	NC
3	Jerrold	Smith	211 St. George Ave.	Raleigh	NC
4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
8	Nisha	Hall	123 Huntington St.	Raleigh	NC
9	Hillary	Clayton	2516 Newman	Raleigh	NC
10	Kiara	Williams	9014 Miller Ln.	Durham	NC

To change the alternate row color:

- Select the Home tab, locate the Text Formatting group, and click the Alternate Row Color drop-down arrow.



- Select a color from the drop-down menu, or select No Color to remove the alternate row color.



The alternate row color will be updated.

ID	First Name	Last Name	Street Address	City	State
1	Tracey	Beckham	7 East Walker Dr.	Raleigh	NC
2	Lucinda	George	789 Brewer St.	Cary	NC
3	Jerrod	Smith	211 St. George Ave.	Raleigh	NC
4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
8	Nisha	Hall	123 Huntington St.	Raleigh	NC
9	Hillary	Clayton	2516 Newman	Raleigh	NC
10	Kiara	Williams	9014 Miller Ln.	Durham	NC

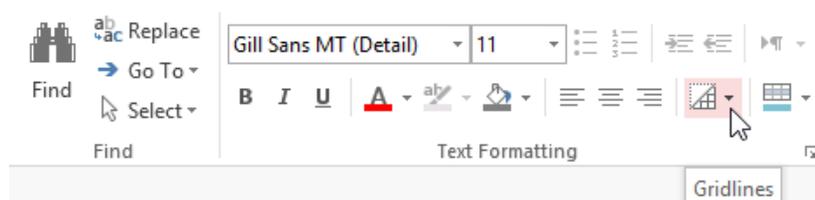
### Modifying gridlines

Another way Access makes your tables easier to read is by adding gridlines that mark the borders of each cell. Gridlines are the thin lines that appear between each cell, row, and column of your table. By default, gridlines are dark gray and appear on every side of a cell, but you can change their color and hide undesired gridlines.

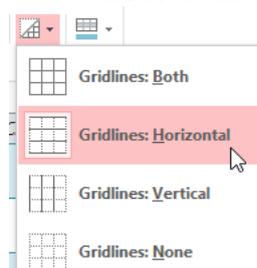
ID	Product Name	Description
17	Coconut	Ever tried cracking a coconut? It's hard! Better stick to our moist Coconut Cake-- all you need is your favorite
18	Black Walnut	Nutty, dark, and delicious. You'll fall in love with this delectable cake.
19	Black Forest	This is a Black Forest you'll want to get lost in. Rich and not at all spooky.
20	Italian Rum	Try as we might, it's impossible to get drunk from this Italian Rum cake. So go ahead and eat the whole thing!
21	Cheesecake	Moist, rich and dreamily creamy. Every biteful is simply delicious.
22	Cheesecake, strawberry	Our NY-style classic, but now you can count it as a healthy serving.

To customize which gridlines appear:

- Select the Home tab, locate the Text Formatting group, and click the Gridlines drop-down arrow.



- Select the gridlines you want to appear. You can choose to have horizontal gridlines between the rows, vertical gridlines between the columns, both types of gridlines, or none at all.

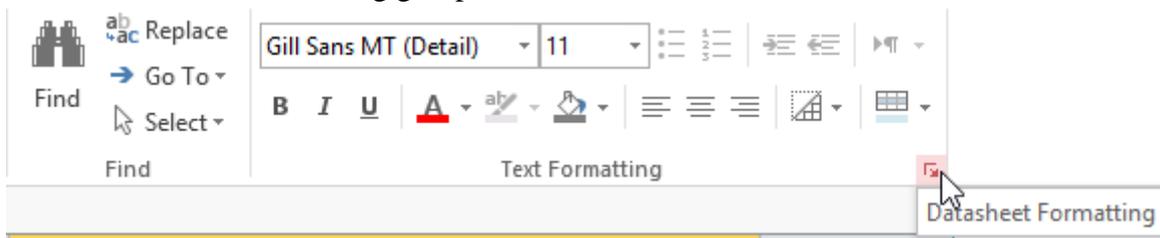


The gridlines on your table will be updated.

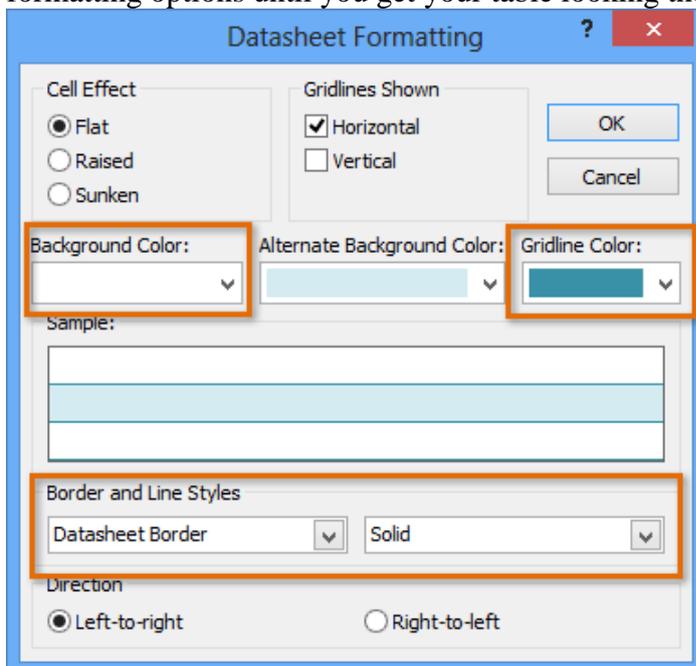
ID	Product Name
17	Coconut
18	Black Walnut
19	Black Forest
20	Italian Rum
21	Cheesecake
22	Cheesecake, strawberry

### Additional formatting options

To view additional formatting options, click the Datasheet Formatting arrow in the bottom-right corner of the Text Formatting group.



The Datasheet Formatting dialog box offers several advanced formatting options, including the ability to modify background color, gridline color, and border and line style. It even includes the ability to view a sample table with your formatting choices, so play around with the various formatting options until you get your table looking the way you want it.



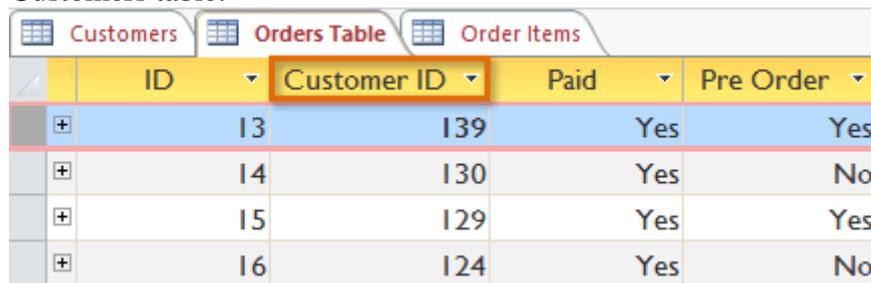
## Challenge!

1. Open an existing Access sample database.
2. Open the Customers table.
3. Add a new record to the table. Be sure to enter data for every field.
4. Find the record with the name Tyra Kirby, and replace it with a name of your choice.
5. Hide a field, then unhide it.
6. Change the alternate row color.

## Why use forms?

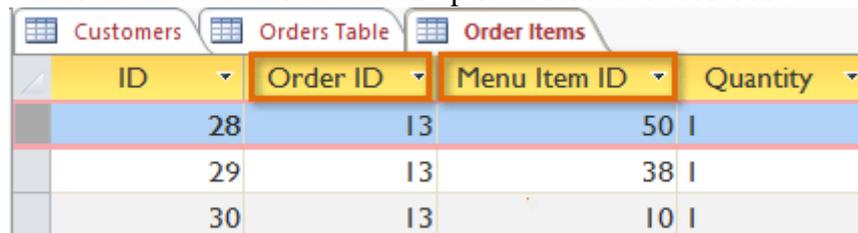
Many of us fill out forms so often that we hardly notice when we're asked to use them. Forms are so popular because they're useful to the person asking for the information and to the person providing it. They are a way of requiring information in a specific format, which means the person filling out the form knows exactly which information to include and where to put it.

This is just as true of forms in Access. When you enter information into a form in Access, the data goes exactly where it's supposed to go: into one or more related tables. While entering data into simple tables is fairly straightforward, data entry becomes more complicated as you start populating tables with records from elsewhere in the database. For instance, the orders table in a bakery's database might link to information on customers, products, and prices drawn from related tables. For example, in the Orders Table below the Customer ID field is linked to the Customers table.



ID	Customer ID	Paid	Pre Order
13	139	Yes	Yes
14	130	Yes	No
15	129	Yes	Yes
16	124	Yes	No

In fact, in order to see the entire order you would also have to look at the Order Items table, where the menu items that make up each order are recorded.



ID	Order ID	Menu Item ID	Quantity
28	13	50	
29	13	38	
30	13	10	

The records in these tables include ID numbers of records from other tables. You can't learn much just by glancing at these records because the ID numbers don't tell you much about the data they relate to. Plus, because you have to look at two tables just to view one order, you might have a difficult time even finding the right data. It's easy to see how viewing or entering many records this way could become a difficult and tedious task.

A form containing the same data might look like this:

Customers Orders Table Order Items Orders

## Orders

New Order

Customer:  Order #:  Pickup Date:

Notes:

Pre Order  
 Paid

Add Item

Category	Product	Quantity	Unit	Price	Subtotal
Cookies	Oatmeal Raisin	1	One Dozen	\$14.00	\$14.00
Cookies	Butter Pecan	1	One Dozen	\$14.00	\$14.00
Cakes	Cookies n' Cream	1	Single	\$22.00	\$22.00
*					
<b>Total</b>					<b>\$50.00</b>

Record: 1 of 3 No Filter Search

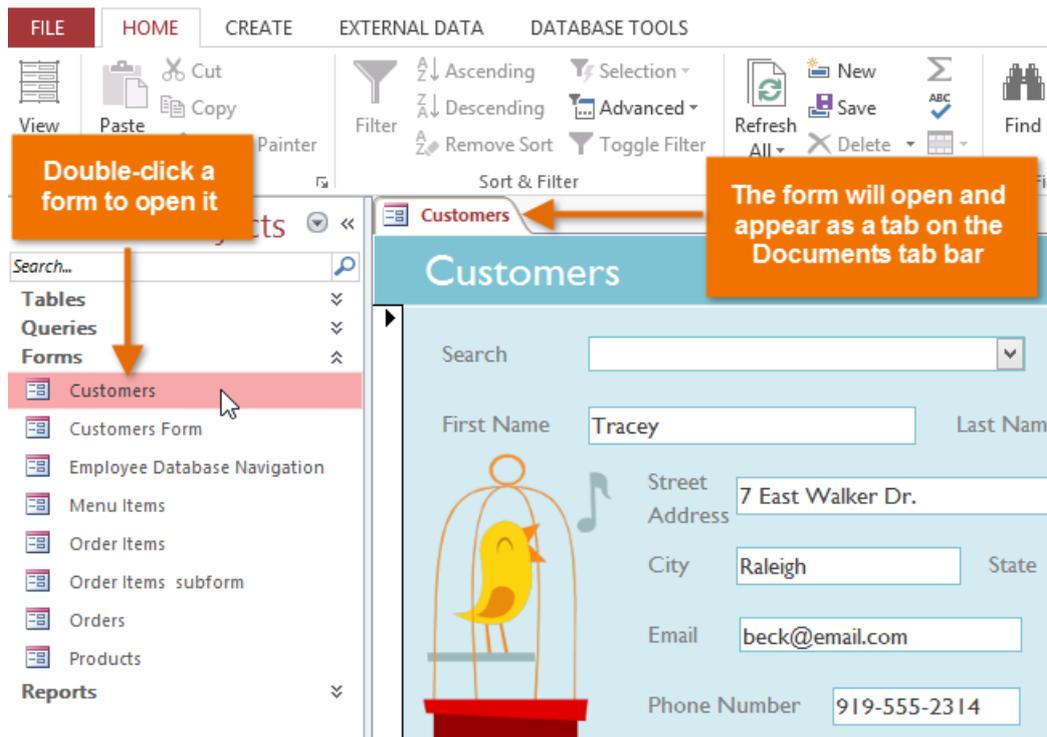
As you can see, this record is much easier to understand when viewed in a form. Modifying the record also would be easier because you wouldn't have to know any ID numbers to enter new data. When you're using a form, you don't have to worry about entering data into the right tables or in the right format—the form can handle these things itself. There's no need to go back and forth between tables because forms bring all of the information you need together in one place.

Not only do forms make the data entry process easier for the user, but they also keep the database itself working smoothly. With forms, database designers can control exactly how users are able to interact with the database. They can even set restrictions on individual form components to ensure all of the needed data is entered and that it's all entered in a valid format. This is useful because keeping data consistent and organized is essential for an accurate and powerful database.

### Working with forms

To open an existing form:

- Open your database, and locate the Navigation pane.
- In the Navigation pane, locate the form you want to open. Forms are marked with the icon.
- Double-click the desired form. It will open and appear as a tab in the Document Tabs bar.



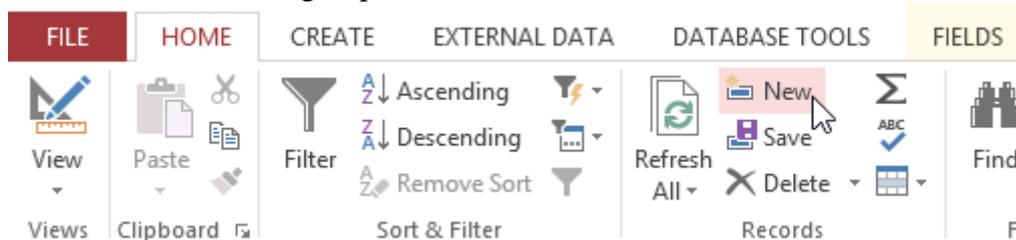
### Entering and modifying data

Depending on the database you're using, the forms you work with may include special tools and features that let you perform common tasks with one click of a button. You'll see examples of these tools in the interactives on the next page. However, no matter what type of form you're working with, you can follow the same procedures for carrying out certain basic tasks.

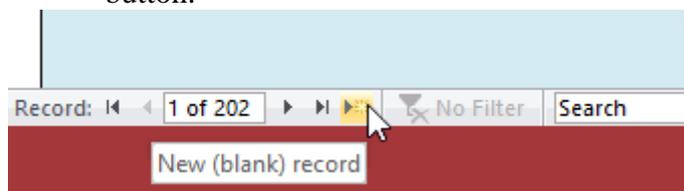
To add a new record:

There are two ways to add a new record to a form:

- In the Records group on the Home tab of the Ribbon, click the New command.



- On the Record Navigation bar at the bottom of the window, click the New Record button.



To find an existing record to view or edit:

There are two ways to find and view an existing record using a form, and they both use the Navigation bar at the bottom of the screen:

To look through records one at a time, click the navigation arrows. The right arrow will take you to the next record, and the left arrow will take you to the previous one.

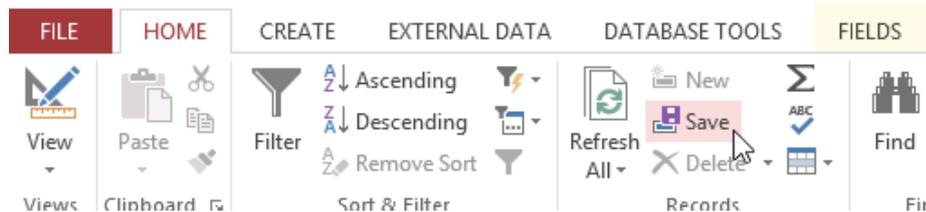


To search for a record, type a word you know is contained in that record in the navigation search box.



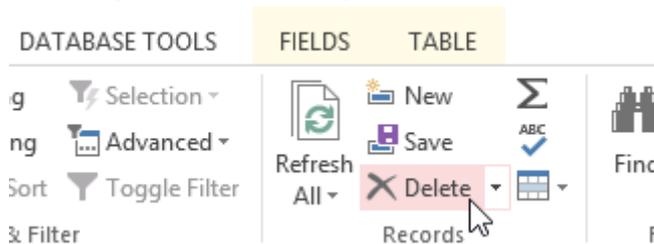
To save the current record:

- Select the Home tab and locate the Records group.
- Click the Save command. The current record will be saved.

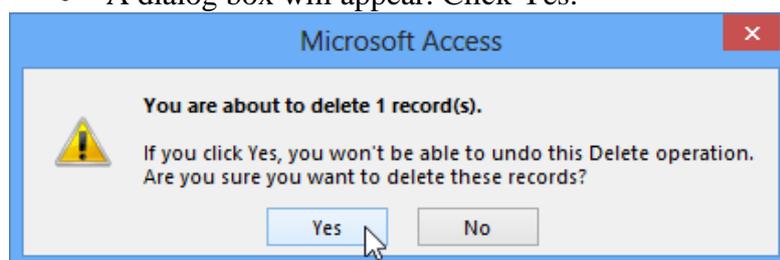


To delete the current record:

- Select the Home tab and locate the Records group.
- Click the Delete command.



- A dialog box will appear. Click Yes.



The record will be permanently deleted.

## Using form features

The exact procedure you use for filling out a form will vary depending on the content and design of the form you're using. The forms in your database might be similar to the examples in the two interactives below. Between them, they include most of the features you'll commonly encounter in forms.

**Customers**

Search

First Name  Last Name

Street Address

City  State  Zip Code

Email  Add to Mailing List?

Phone Number

Some forms may include more options, like calendar buttons, drop-down lists, yes-no checkboxes, subforms, and embedded tables.

**Orders**

Customer  Order #  Pickup Date

Notes

Pre Order  Paid

Category	Product	Quantity	"Unit"	Price	Subtotal
Pies	Pumpkin	1	Single	\$15.00	\$15.00
Pies	Peanut Butter Chocolate	1	Single	\$16.00	\$16.00
Cakes	Carrot Cake	3	Single	\$22.00	\$66.00
Cakes	Italian Rum	1	Single	\$22.00	\$22.00
Cakes	German Chocolate	1	Single	\$22.00	\$22.00
Cakes	Gingerbread - Winter	1	Single	\$24.00	\$24.00
Cakes	Gingerbread - Winter	1	Single	\$24.00	\$24.00
Pastries	Tiramisu	1	One Dozen	\$30.00	\$30.00
Cakes	Buche de Noel (Christmas Cake	1	Single	\$32.00	\$32.00
<b>Total</b>					<b>\$251.00</b>

Record: 1 of 9

## Challenge!

1. Open an existing Access sample database.
2. Open the Orders Form.
3. Create a new record with the following data:
  - Customer: Eric Oglesby
  - Pickup date: February 14, 2014
  - Order items: Cakes: Coconut (1)
  - Notes: Write "Happy Valentine's Day!" with pink frosting.
  - Pre Order: Yes
  - Paid: Yes
4. Open the Customers Form.
5. Find the record for customer Dwight Parker and make the following changes:
  - Street Address: 190 Cook Street
  - City: Chapel Hill
  - Zip Code: 27514
  - Email: dwightp@email.com

## About sorting and filtering

Access gives you the ability to work with enormous amounts of data, which means it can be difficult to learn anything about your database just by glancing at it. Sorting and filtering are two tools that let you customize how you organize and view your data, making it more convenient to work with. In this lesson, you'll learn how to sort and filter records.

Essentially, sorting and filtering are tools that let you organize your data. When you sort data, you are putting it in order. Filtering data lets you hide unimportant data and focus only on the data you're interested in.

### Sorting records

When you sort records, you are putting them into a logical order, with similar data grouped together. As a result, sorted data is often simpler to read and understand than unsorted data. By default, Access sorts records by their ID numbers. However, there are many other ways records can be sorted. For example, the information in a database belonging to a bakery could be sorted in a number of ways:

- Orders could be sorted by order date or by the last name of the customers who placed the orders.
- Customers could be sorted by name or by the city or zip code where they live.
- Products could be sorted by name, category (like pies, cakes, and cupcakes), or price.

You can sort both text and numbers in two ways: in ascending order and descending order. Ascending means going up, so an ascending sort will arrange numbers from smallest to largest and text from A to Z. Descending means going down, or largest to smallest for numbers and Z to A for text. The default ID number sort that appears in your tables is an ascending sort, which is why the lowest ID numbers appear first.

In our example, we will be performing a sort on a table. However, you can sort records in any Access object. The procedure is largely the same.

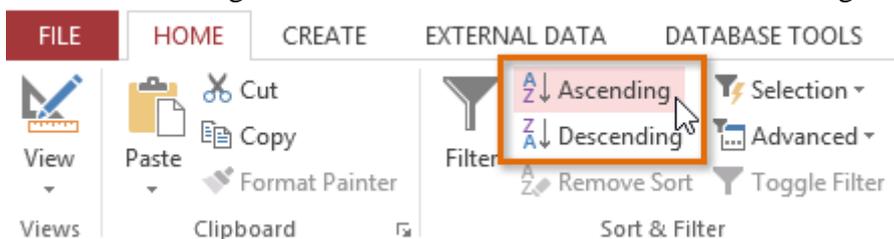
To sort records:

Select a field you want to sort by. In this example, we will sort by customers' last names.

ID	First Name	Last Name	Street Address
1	Tracey	Beckham	7 East Walker Dr.
2	Lucinda	George	789 Brewer St.
3	Jerrod	Smith	211 St. George Ave.
4	Brett	Newkirk	47 Hillsborough St.
5	Chloe	Jones	23 Solo Ln.
6	Quinton	Boyd	4 Cypress Cr.
7	Alex	Hinton	1011 Hodge Ln.
8	Nisha	Hall	123 Huntington St.
9	Hillary	Clayton	2516 Newman
10	Kiara	Williams	9014 Miller Ln.
11	Katy	Jones	456 Denver Rd.
12	Beatrix	Joslin	85 North West St.
13	Mariah	Allen	12 Jupe
14	Jennifer	Hill	2100 Field Ave.

- Click the Home tab on the Ribbon, and locate the Sort & Filter group.
- Sort the field by selecting the Ascending or Descending command.

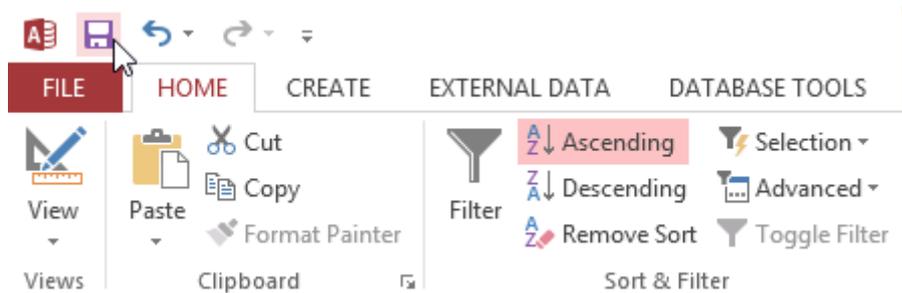
Select Ascending to sort text A to Z or to sort numbers from smallest to largest. We will select this in our example because we want the last names to be in A-to-Z order. Select Descending to sort text Z to A or to sort numbers from largest to smallest.



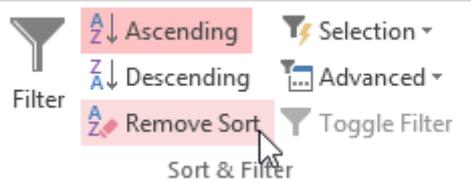
The table will now be sorted by the selected field.

ID	First Name	Last Name	Street Address
102	Theodore	Achi	120 Baker St.
195	Kris	Ackerman	1311 Coretta Scott Way
78	Michiko	Akiwana	901 Glenwood Ave.
188	Nathan	Albee	76-C Meadowview Ln.
13	Mariah	Allen	12 Jupe
37	Carol	Allenson	3201 Glenwood Ave. Unit A
38	Zoey	Altman	817 Hillsborough St. Apt E10
163	Franz	Angelou	291 Hinton St.
87	Robert	Armisen	21 MLK Blvd.
47	Hakim	Auden	921 Dawson St.
129	Yann	Augerot	88 Carolina Rd.
40	Vig	Aurelio	53 Pine St.
212	David	Barrett	434 Hill St.

To save the new sort, click the Save command on the Quick Access toolbar.



After you save the sort, the records will stay sorted this way until you perform another sort or remove the current one. To remove a sort, click the Remove Sort command.



### Filtering records

Filters allow you to view only the data you want to see. When you create a filter, you set criteria for the data you want to display. The filter then searches all of the records in the table, finds the ones that meet your search criteria, and temporarily hides the ones that don't.

Filters are useful because they allow you to focus in on specific records without being distracted by the data you're uninterested in. For instance, if you had a database that included customer and order information, you could create a filter to display only customers living within a certain city or only orders containing a certain product. Viewing this data with a filter would be far more convenient than searching for it in a large table.

In our examples and explanations, we will be applying filters to tables. However, you can apply filters to any Access object. The procedure is largely the same.

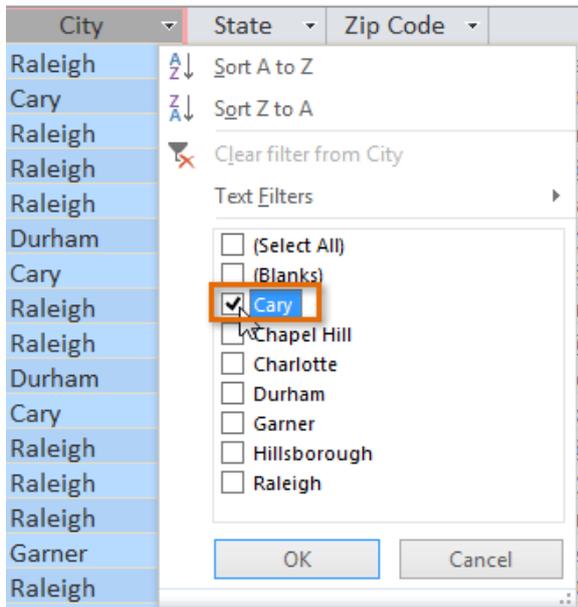
To create a simple filter:

- Click the drop-down arrow next to the field you want to filter by. We will filter by city because we want to see a list of customers who live in a certain city.

ID	First Name	Last Name	Street Address	City	State
1	Tracey	Beckham	7 East Walker Dr.	Raleigh	NC
2	Lucinda	George	789 Brewer St.	Cary	NC
3	Jerrold	Smith	211 St. George Ave.	Raleigh	NC
4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
8	Nisha	Hall	123 Huntington St.	Raleigh	NC
9	Hillary	Clayton	2516 Newman	Raleigh	NC
10	Kiara	Williams	9014 Miller Ln.	Durham	NC
11	Katy	Jones	456 Denver Rd.	Cary	NC
12	Beatrix	Joslin	85 North West St.	Raleigh	NC

A drop-down menu with a checklist will appear. Only checked items will be included in the filtered results. Use the following options to determine which items will be included in your filter:

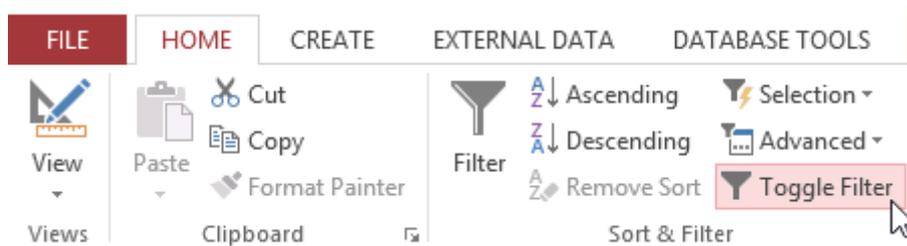
- Select and deselect items one at a time by clicking their checkboxes.
- Click Select All to include every item in the filter. If all items are already selected, this option will deselect all items.
- Click Blanks to set the filter to find only the records with no data in the selected field.



- Click OK. The filter will be applied. Our customers table now displays only customers who live in Cary.

Last Name	Street Address	City	State
George	789 Brewer St.	Cary	NC
Hinton	1011 Hodge Ln.	Cary	NC
Jones	456 Denver Rd.	Cary	NC
Kellerman	76 Murphy Ave.	Cary	NC
Hamm	1221 Coretta Scott Way	Cary	NC
James	4221 Basil Ct.	Cary	NC
Slobodowski	7 Greene St.	Cary	NC
White	911 Oregon Tr.	Cary	NC
Sigrudsdatter	55 Cameron Ct.	Cary	NC
Yuen	8 Marcus Ln.	Cary	NC
Hanlon	31 Crispus Ct. Apt B	Cary	NC

toggling your filter allows you to turn it on and off. To view the records without the filter, click the Toggle Filter command. To restore the filter, click it again.



### Creating a filter from a selection

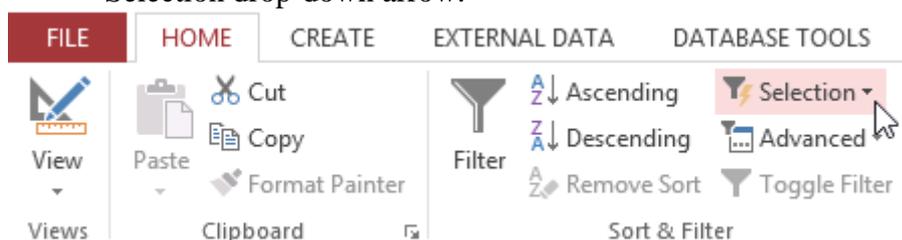
Filtering by selection allows you to select specific data from your table and find data that is similar or dissimilar to it. For instance, if you were working with a bakery's database and wanted to search for all products whose names contained the word chocolate, you could select that word in one product name and create a filter with that selection. Creating a filter with a selection can be more convenient than setting up a simple filter if the field you're working with contains many items.

To create a filter from a selection:

- Select the cell or data you want to create a filter with. We want to see a list of all of our products that contain the word chocolate in their names, so we'll select the word chocolate in the Product Name field.

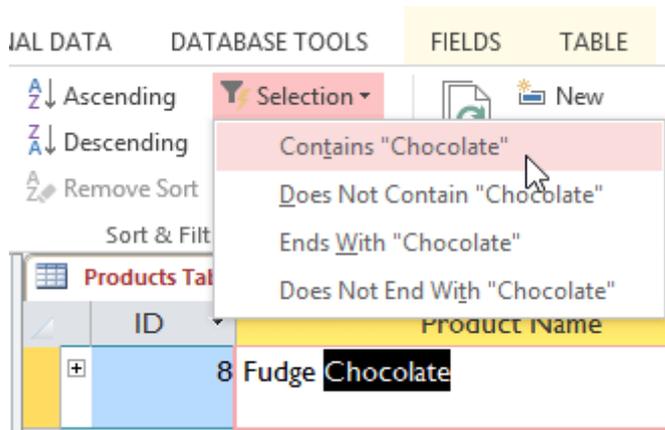
ID	Product Name
8	Fudge <b>Chocolate</b>
9	Fudge Marble
10	French french vanilla
11	Strawberry Swirl

- Select the Home tab on the Ribbon, locate the Sort & Filter group, and click the Selection drop-down arrow.



Select the type of filter you want to apply:

- Contains includes only records with cells that contain the selected data. We'll select this because we want to see records that contain the word chocolate anywhere in the title.
- Does Not Contain includes all records except for those with cells that contain the selected data.
- Ends With includes only records whose data for the selected field ends with the search term.
- Does Not End With includes all records except for those whose data for the selected field ends with the search term.



The filter will be applied. Our table now displays only products with the word chocolate in their names.



### Creating a filter from a search term

You can also create a filter by entering a search term and specifying the way Access should match data to that term. Creating a filter from a search term is similar to creating a filter from a selection.

### Filtering text by a search term

When filtering text by entering a search term, you can use some of the same options you use when filtering by a selection, like Contains, Does Not Contain, Ends With, and Does Not End With. You can also choose from the following options:

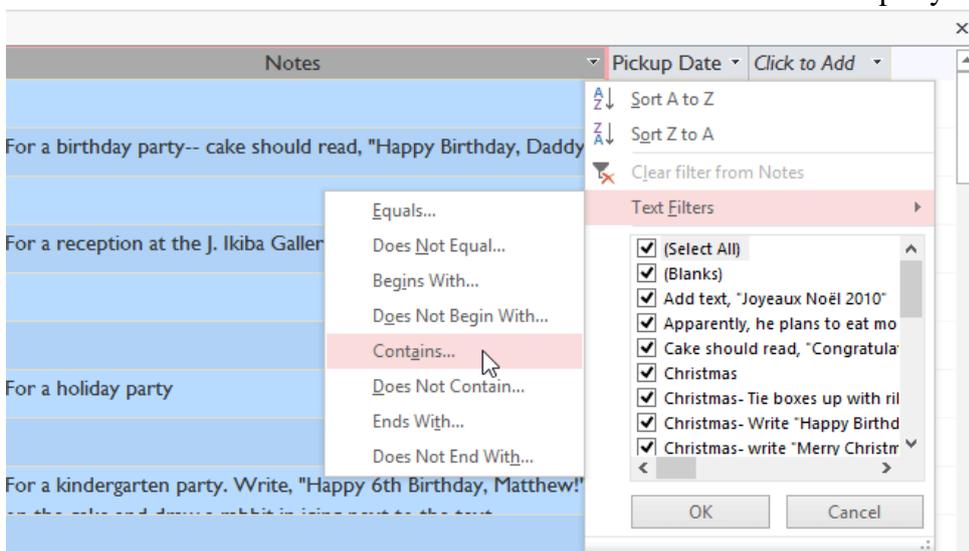
- Equals, which includes only records with data that is identical to the selected data
- Does Not Equal, which includes all records except for the data that is identical to the selection
- Begins With, which includes only records whose data for the selected field begins with the search term
- Does Not Begin With, which includes all records except for those whose data for the selected field begins with the search term

To filter text by a search term:

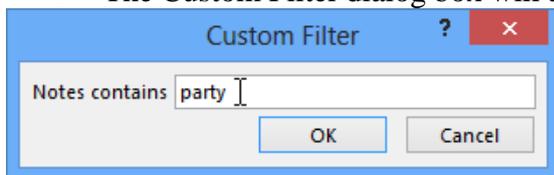
- Click the drop-down arrow next to the field you want to filter by. We want to filter the records in our orders table to display only those that contain notes with certain information, so we'll click the arrow in the Notes field.

ID	Customer ID	Paid	Pre Order	Notes
5	44	Yes	No	
6	136	Yes	Yes	For a birthday party-- cake should read, "Happy Birthday, Daddy!"
7	131	Yes	No	
8	145	Yes	Yes	For a reception at the J. Ikiba Gallery

- In the drop-down menu, hover your mouse over Text Filters. From the list that appears, select the way you want the filter to match the term you enter. In this example, we want to view only records whose notes indicate the order was placed for a party. We'll select Contains so we can search for records that contain the word party.



- The Custom Filter dialog box will appear. Type the word you want to use in your filter.



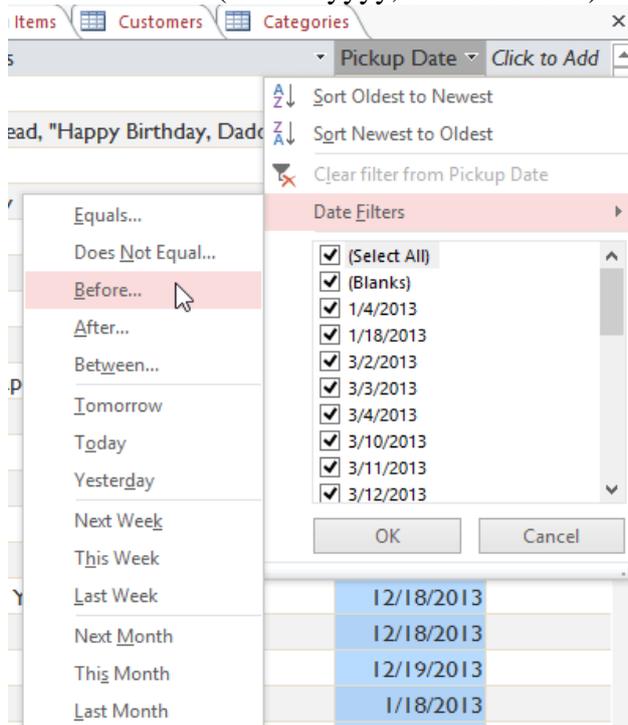
- Click OK. The filter will be applied.

ID	Customer ID	Paid	Pre Order	Notes
6	136	Yes	Yes	For a birthday party-- cake should read, "Happy Birthday, Daddy!"
11	92	Yes	Yes	For a holiday party
13	139	Yes	Yes	For a kindergarten party. Write, "Happy 6th Birthday, Matthew!" on the cake and draw a rabbit in icing next to the text.
15	129	Yes	Yes	For a holiday party
18	96	Yes	No	For a Christmas party
21	71	Yes	Yes	For an office party
41	111	Yes	Yes	For a NYE party



ID	Product ID	Sales Unit ID	Price
30	46		
33	47	I	\$1.50
36	58	I	\$1.50
39	59	I	\$1.50
42	60	I	\$1.50
45	61	I	\$1.50
48	62	I	\$1.50
51	63	I	\$1.50
54	64	I	\$1.50
57	65	I	\$2.00
60	66	I	\$2.00

Specific types of numbers may include other filtering options. For instance, dates stored in numerical form (mm/dd/yyyy, or 12/01/2013) include options to filter by periods of time.



## Challenge!

1. Open an existing Access sample database.
2. Open the query called Cakes and Pies Sold.
3. Apply a filter to the Product Types field that shows only Cakes.
4. In the Sum of Quantity field, apply a filter that only shows numbers greater than five.
5. Apply an ascending sort to the Sum of Quantity field.
6. Save the database.

## What are queries?

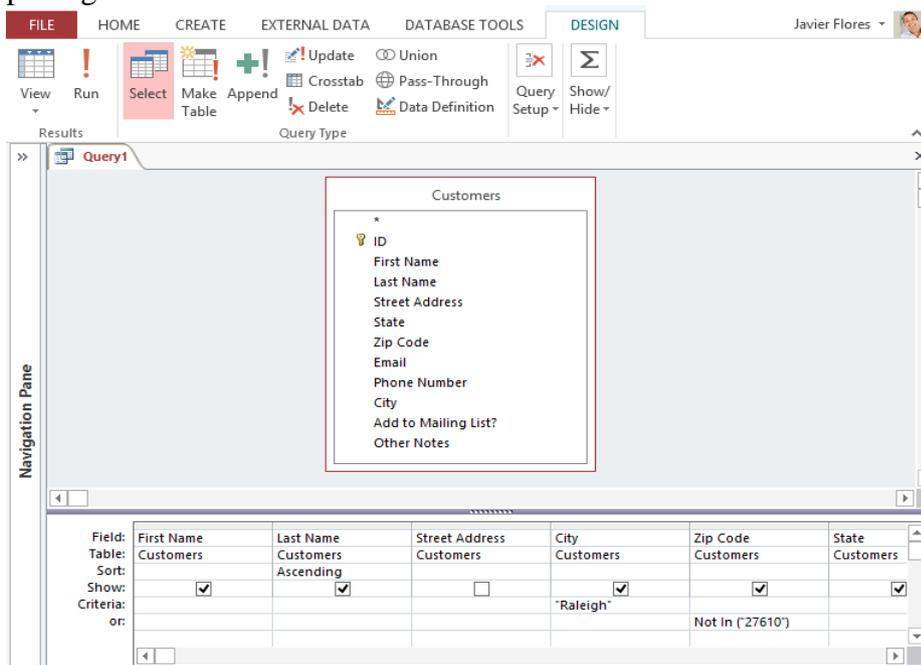
The real power of a relational database lies in its ability to quickly retrieve and analyze your data by running a query. Queries allow you to pull information from one or more tables based on a set of search conditions you define. In this lesson, you will learn how to create a simple one-table query.

Queries are a way of searching for and compiling data from one or more tables. Running a query is like asking a detailed question of your database. When you build a query in Access, you are defining specific search conditions to find exactly the data you want.

## How are queries used?

Queries are far more powerful than the simple searches or filters you might use to find data within a table. This is because queries can draw their information from multiple tables. For example, while you could use a search in the customers table to find the name of one customer at your business or a filter on the orders table to view only orders placed within the past week, neither would let you view both customers and orders at once. However, you could easily run a query to find the name and phone number of every customer who's made a purchase within the past week. A well-designed query can give information you might not be able to find out just by examining the data in your tables.

When you run a query, the results are presented to you in a table, but when you design one you use a different view. This is called Query Design view, and it lets you see how your query is put together.



## One-table queries

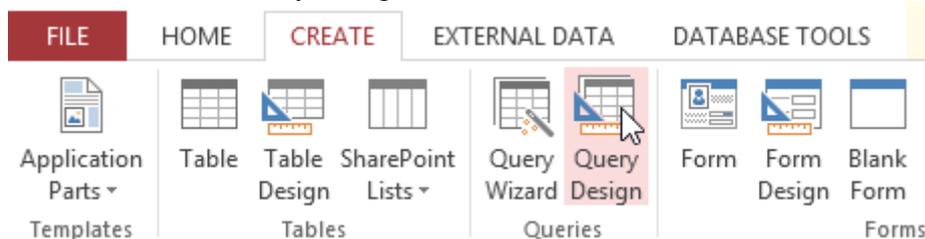
Let's familiarize ourselves with the query-building process by building the simplest query possible: a one-table query.

We will run a query on the Customers table of our bakery database. Let's say our bakery is having a special event, and we want to invite our customers who live nearby because they are the most likely to come. This means we need to see a list of all customers who live close by, and only those customers.

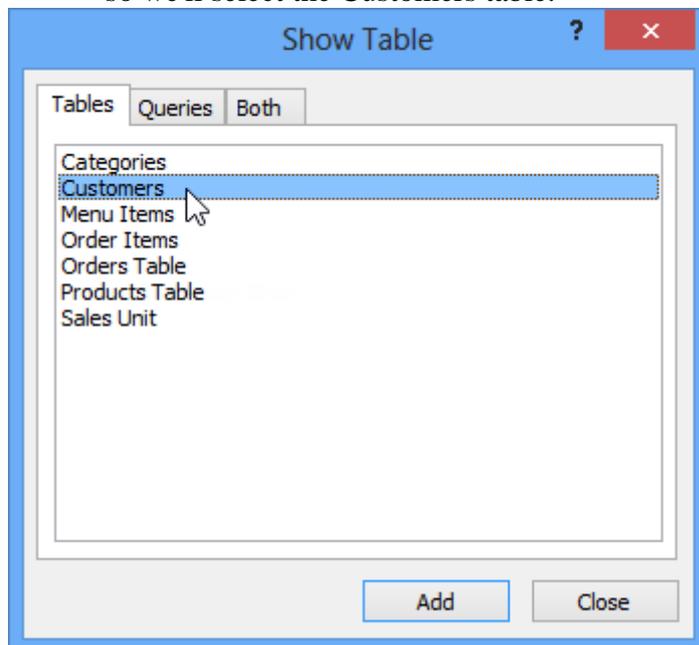
If you think this sounds a little like applying a filter, you're right. A one-table query is actually just an advanced filter applied to a table.

To create a simple one-table query:

- Select the Create tab on the Ribbon, and locate the Queries group.
- Click the Query Design command.



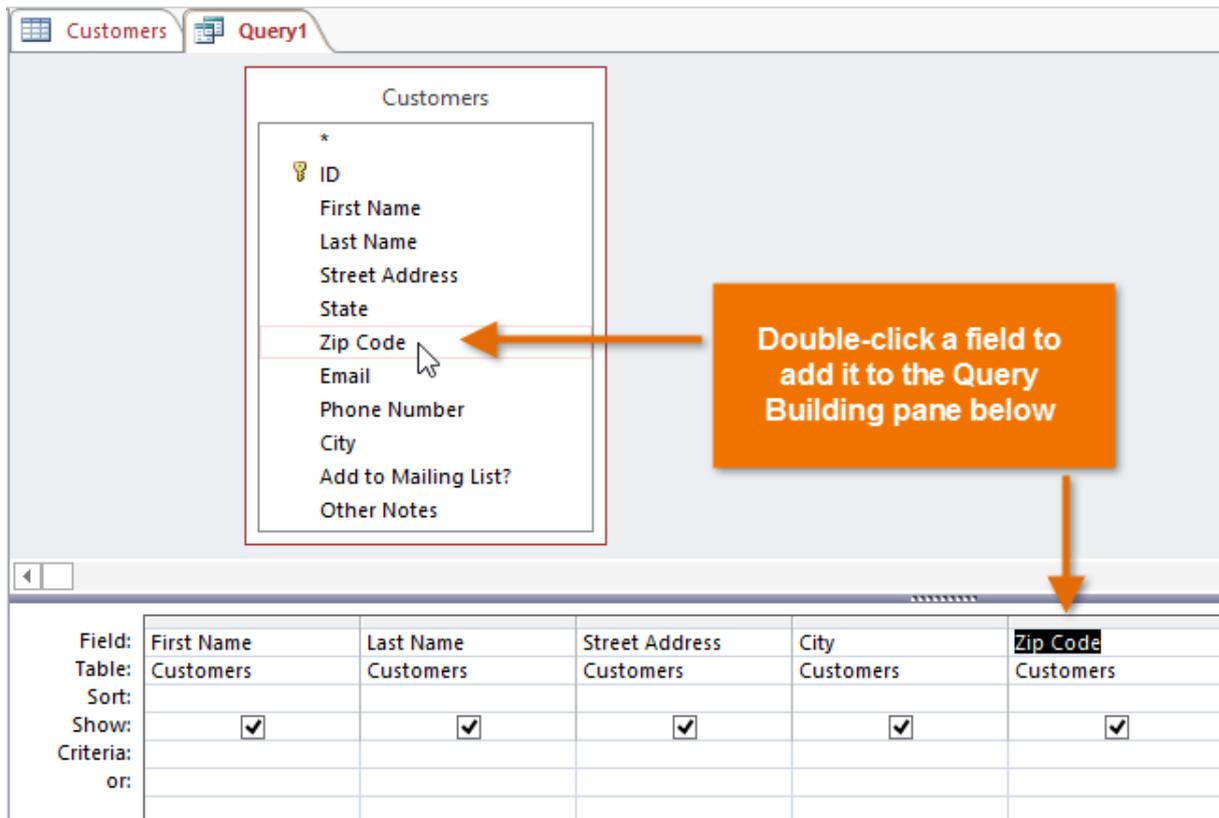
- Access will switch to Query Design view. In the Show Table dialog box that appears, select the table you want to run a query on. We are running a query about our customers, so we'll select the Customers table.



- Click Add, then click Close.

The selected table will appear as a small window in the Object Relationship pane. In the table window, double-click the field names you want to include in your query. They will be added to the design grid in the bottom part of the screen.

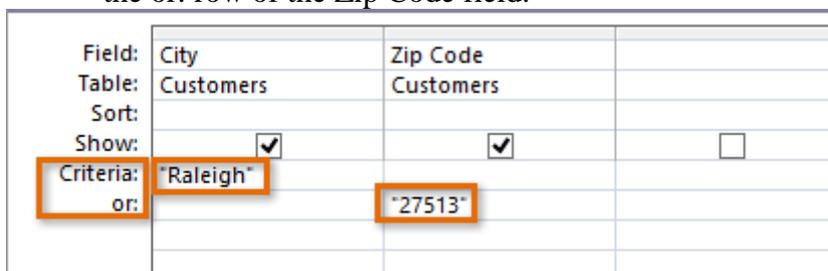
In our example, we want to mail invitations to customers who live in a certain area, so we'll include the First Name, Last Name, Street Address, City, and Zip Code fields. We aren't planning on calling or emailing our customers, so we don't have to include the Phone Number or Email fields.



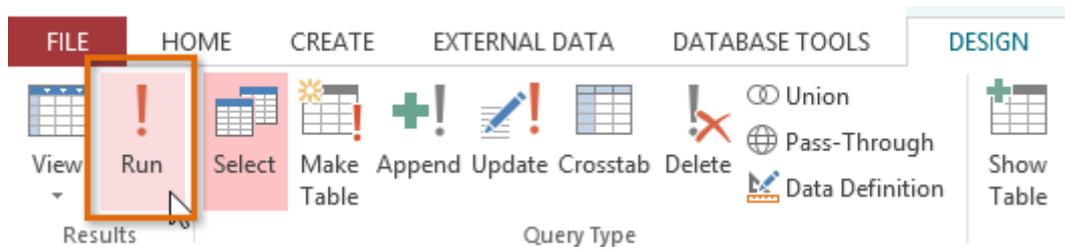
Set the search criteria by clicking the cell in the Criteria: row of each field you want to filter. Typing criteria into more than one field in the Criteria: row will set your query to include only results that meet all criteria. If you want to set multiple criteria but don't need the records shown in your results to meet all of them, type the first criteria in the Criteria: row and additional criteria in the or: row and the rows beneath it.

For this one-table query, we'll use simple search criteria.

- We want to find our customers who live in the city of Raleigh, so in our City field we'll type "Raleigh". Typing Raleigh in quotation marks will retrieve all records with an exact match for Raleigh in the City field.
- Some customers who live in the suburbs live fairly close by, and we'd like to invite them as well. We'll add their zip code, 27513, as another criteria. Because we want to find customers who either live in Raleigh or in the 27513 zip code, we'll type "27513" into the or: row of the Zip Code field.



After you have set your criteria, run the query by clicking the Run command on the Design tab.



The query results will be displayed in the query's Datasheet view, which looks like a table. If you want, save your query by clicking the Save command in the Quick Access toolbar. When prompted to name it, type the desired name, then click OK.

First Name	Last Name	Street Address	City	Zip Code
Tracey	Beckham	7 East Walker Dr.	Raleigh	27612
Lucinda	George	789 Brewer St.	Cary	27513
Jerrold	Smith	211 St. George Ave	Raleigh	27610
Brett			Raleigh	27608
Chloe			Raleigh	27609
Alex			Cary	27513
Nisha			Raleigh	27612
Hillary			Raleigh	27606
Katy			Cary	27513
Beatrix	Joslin	85 North West St.	Raleigh	27606
Mariah	Allen	12 Jupe	Raleigh	27605
Jennifer	Hill	2100 Field Ave.	Raleigh	27609
Cody	Hayes	65 North St.	Raleigh	27609
Amaya	Gibson	5 West St.	Raleigh	27612

Now you know how to create the simplest type of query with only one table. In the next lesson, you'll learn how to create a query that uses multiple tables.

### Challenge!

1. Open an existing Access sample database.
2. Create a new query.
3. Select the Customers table to include in your query.
4. Add the following fields from the Customers table to your query:
  - First Name
  - Last Name
  - City
  - Zip Code
5. Set the following criteria:
  - In the City field, type "Durham" to return only records with Durham in the City field.
  - In the Zip Code field, type "27514" in the or: row to return records that are either in Durham or zip code 27514.
6. Run the query. If you entered the query correctly, your results will include customers who live in Durham OR zip code 27514.
7. Save the query with the name Customers who live in Durham.

Most queries you design in Access will likely use multiple tables, allowing you to answer more complex questions. In this lesson, you'll learn how to design and create a multi-table query.

### Designing a multi-table query

Queries can be difficult to understand and build if you don't have a good idea of what you're trying to find and how to find it. A one-table query can be simple enough to make up as you go along, but to build anything more powerful you'll need to plan the query in advance.

### Planning a query

When planning a query that uses more than one table, you should go through these four steps:

1. Pinpoint exactly what you want to know. If you could ask your database any question, what would it be? Building a query is more complicated than just asking a question, but knowing precisely what question you want to answer is essential to building a useful query.
2. Identify every type of information you want included in your query results. Which fields contain this information?
3. Locate the fields you want to include in your query. Which tables are they contained in?
4. Determine the criteria the information in each field needs to meet. Think about the question you asked in the first step. Which fields do you need to search for specific information? What information are you looking for? How will you search for it?

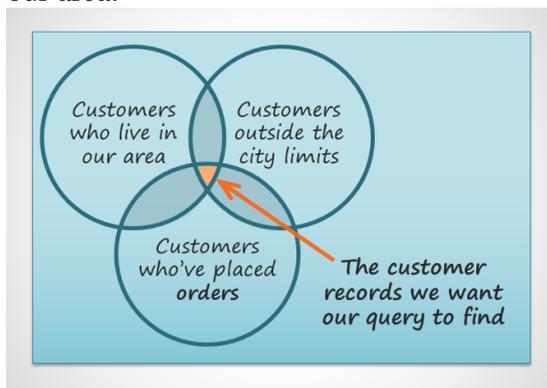
This process might seem abstract at first, but as we go through the process of planning our own multi-table query you should start to understand how planning your queries can make building them a lot easier.

### Planning our query

Let's go through this planning process with a query we'll run on our bakery database. As you read through the planning process step by step, think about how each part of the planning process could apply to other queries you might run.

#### Step 1: Pinpointing the question we want to ask

Our bakery database contains many customers, some of whom have never placed an order but who are in our database because they signed up for our mailing list. Most of them live within the city limits, but others live out of town or even out of state. We want to get our out-of-town customers who've placed orders in the past to come back and give us another try, so we're going to mail them some coupons. We don't actually want our list to include customers who live too far away; sending a coupon to someone who doesn't live in our area probably won't make that person come in. So we just want to find people who don't live in our city but who still live in our area.



In short, the question we want our query to answer is this: Which customers live in our area, are outside the city limits, and have placed an order at our bakery?

Step 2: Identifying the information we need

What information might we want to see in a list about these customers? Obviously, we'll need the customers' names and their contact information—their addresses, phone numbers, and email addresses. But how are we going to know if they've placed orders? Each record of an order identifies the customer who placed that order. If we include the order ID numbers, we should be able to narrow our list down to only customers who have previously placed orders.

*Information we need to answer our question*

- \* Names
- \* Addresses
- \* Phone numbers
- \* Email addresses
- \* Order ID Numbers

Step 3: Locating the tables containing the information we need

In order to write a query, you need to be familiar with the different tables in your database. From working extensively with our own database, we know that the customer information we need is located in fields in the Customers table. Our Order ID numbers are in a field in the Orders table. We only need to include these two tables to find all of the information we need.

*Information we need to answer our question*

- \* Names
- \* Addresses
- \* Phone numbers
- \* Email addresses
- \* Order ID Numbers

*Where we can find the info we need*

- the Customers table
- the Orders table

#### Step 4: Determining the criteria our query should search for

When you set criteria for a field in a query, you are basically applying a filter to it that tells the query to retrieve only information that matches your criteria. Review the list of fields we are including in this query. How and where can we set criteria that will best help us answer our question?

We don't want customers who live in our town, Raleigh, so we want a criteria that will return all records except for those with Raleigh in the city field. We don't want customers who live too far away, either. All of the phone numbers in the area start with the area code 919, so we'll also include a criteria that will only return records whose entries from the phone number field begin with 919. This should guarantee that we'll only send coupons to customers who live close enough to actually come back and use them.

We won't set a criteria for the order ID field or any other fields because we want to see all of the orders made by people who meet the two criteria we just set.

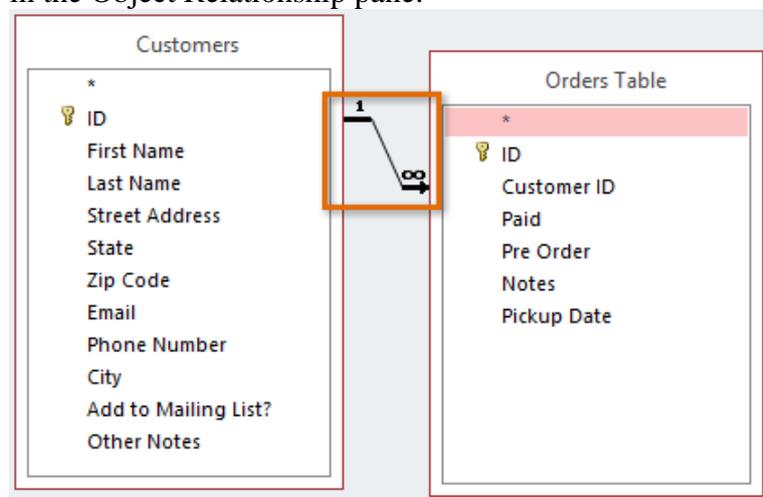
*Criteria the query should use to find customer records:*

- ✱ No one living in our town, Raleigh
  - ✱ In the City field, type **Not in ("Raleigh")**
- ✱ Only customers with phone numbers that start with "919"  
(So we only get customers who live nearby)
  - ✱ In the Phone Number field, type **Like ("919\*")**

To write queries, you'll need to be able to set criteria in a language that Access understands. As you can see in the image above, our criteria requiring phone numbers to begin with 919 must be typed like this: Like ("919\*").

#### Joining tables in queries

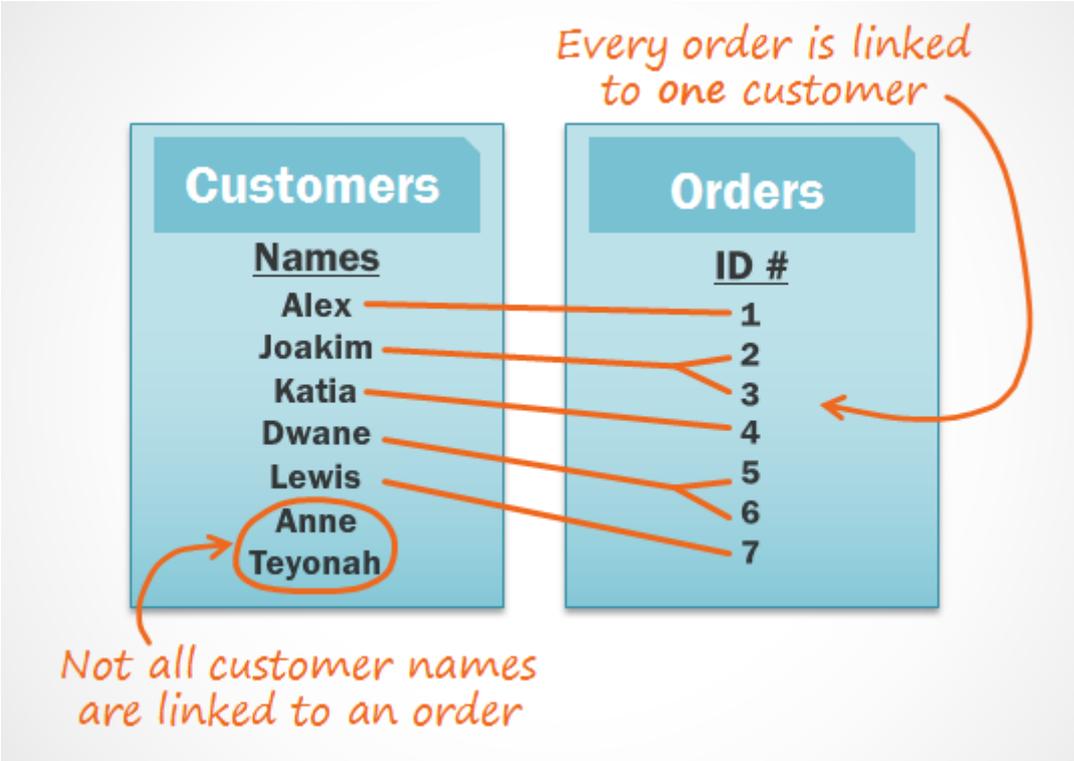
The final thing you need to consider when designing a query is the way you link—or join—the tables you're working with. When you add two tables to an Access query, this is what you'll see in the Object Relationship pane:



The line connecting the two tables is called the join line. See how the join line is actually an arrow? This is because it indicates the order in which the query looks at data from the two tables. In the image above, the arrow is pointing from left to right, which means the query will look at data in the left table first, then look at only the data in the right table that relates to the records it's already seen in the left table.

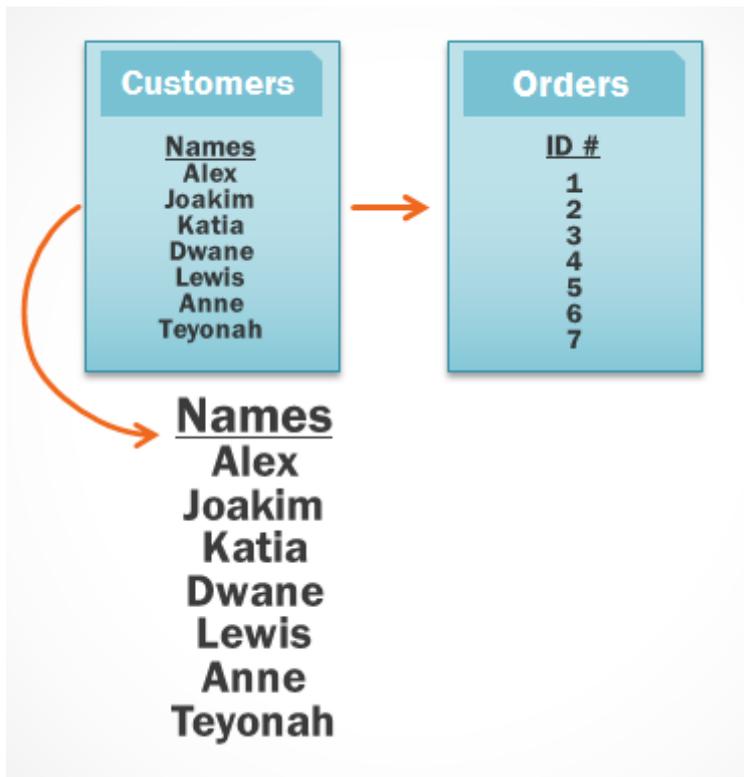
Your tables won't always be joined this way. Sometimes Access will join them right to left. In either case, you might need to change the direction of the join to make sure your query includes the correct information. The join direction can affect which information your query retrieves.

To understand what this means, consider the query we're designing. For our query, we need to see customers who have placed orders, so we've included the Customers table and the Orders table. Let's take a look at some of the data contained in these tables.

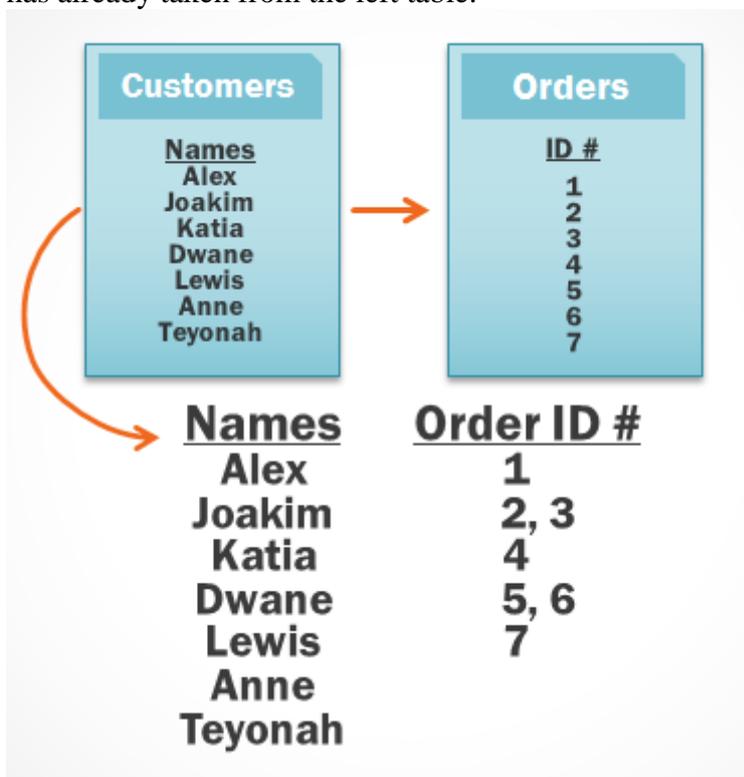


What do you notice when you look at these lists? First of all, every single order in the Orders table is linked to someone in the Customers table—the customer who placed that order. However, when you look at the Customers table, you'll see that the customers who've placed multiple orders are linked to more than one order, and those who've never placed an order are linked to no orders. As you can see, even when two tables are linked it's possible to have records in one table that have no relationship to any record in the other table.

So what happens when Access tries to run our query with the current join, left to right? It pulls every record from the table to the left: our Customers table.

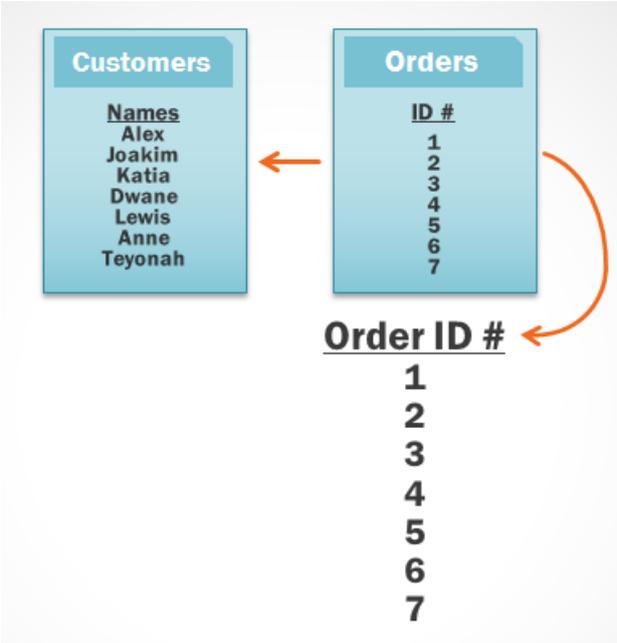


It then retrieves every record from the right table that has a relationship with a record Access has already taken from the left table.



Because our join began with the Customers table, our query will include records for all of our customers, including those who've never placed orders. This is more information than we need. We only want to see records for customers who have placed orders.

Fortunately, we can fix this problem by changing the direction of the join line. If we join the tables from right to left instead, Access will first retrieve the orders from the right table, our Orders table:



Then Access will look at the left table and retrieve only the records of customers who are linked to an order on the right.



We now have exactly the information we want: all of the customers who have placed an order, and only those customers. As you can see, we had to join our tables in the correct direction to obtain the information we wanted.

Now that we understand which join direction we need to use, we're ready to build our query!

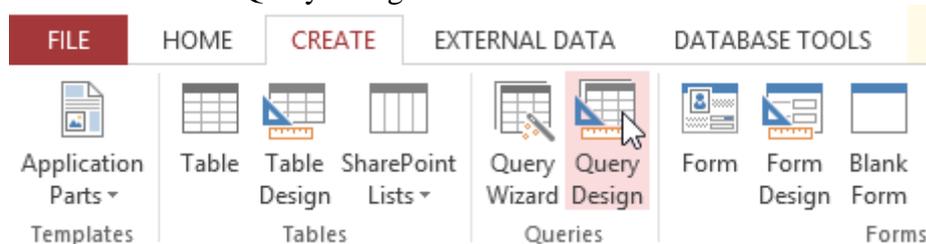
In our query, we needed to use the right-to-left join, but the correct join direction for the tables in your queries will depend on what information you want to see and where that information is stored. When you add tables to a query, Access will automatically join the tables for you, but it often doesn't join them in the correct direction. This is why it's important to always review the joins between your tables before you build a query.

### Creating a multi-table query

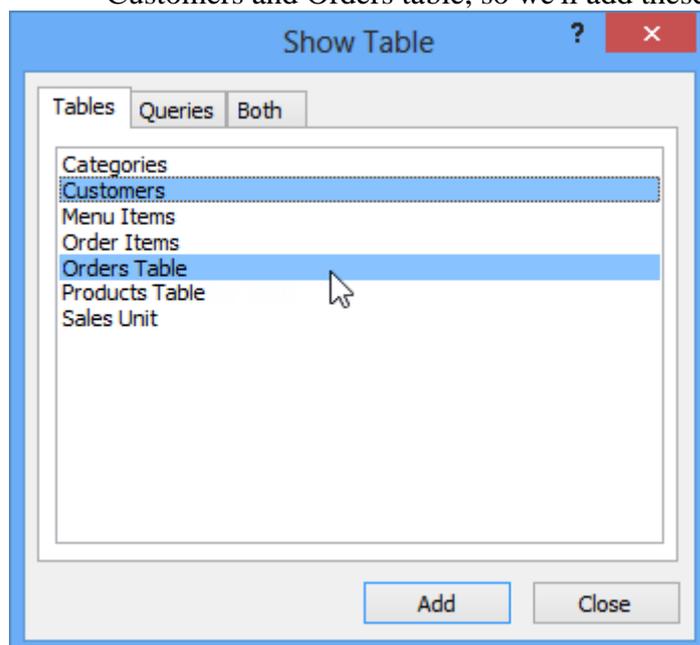
Now that we've planned our query, we're ready to design and run it. If you have created written plans for your query, be sure to reference them often throughout the query design process.

To create a multi-table query:

- Select the Query Design command from the Create tab on the Ribbon.

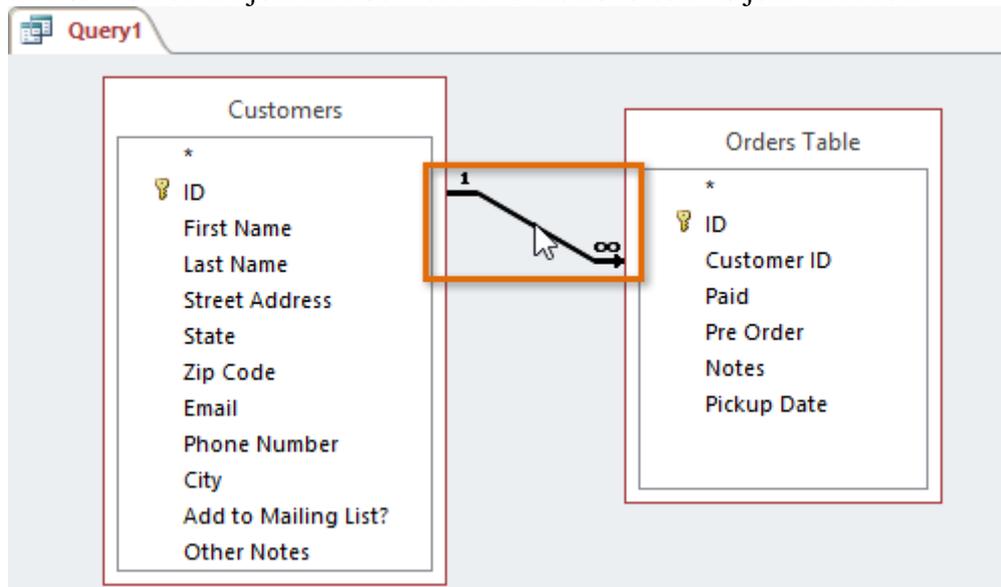


- In the dialog box that appears, select each table you want to include in your query and click Add. You can press and hold the Ctrl key on your keyboard to select more than one table. When we planned our query, we decided we needed information from the Customers and Orders table, so we'll add these.



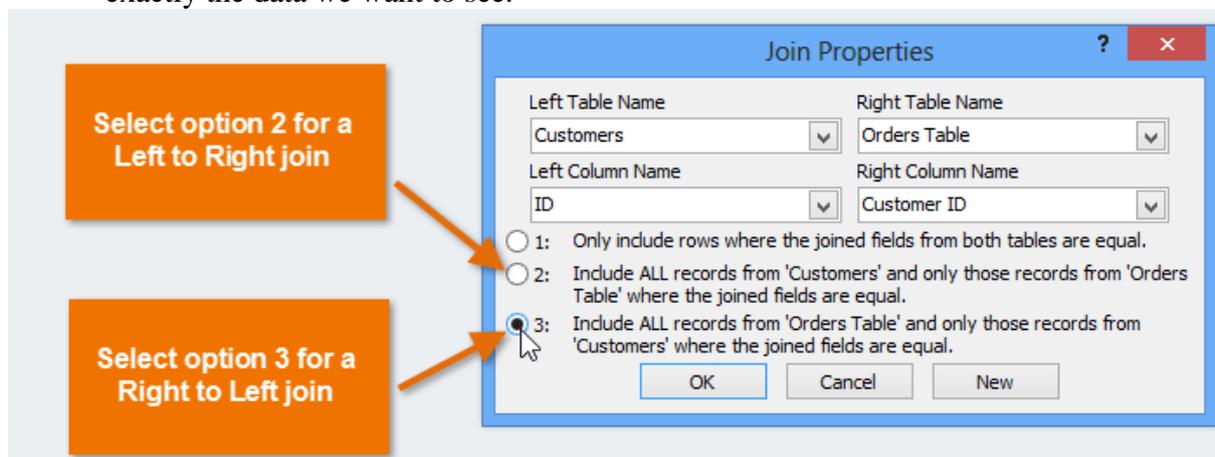
- After you have added all of the tables you want, click Close.

The tables will appear in the Object Relationship pane, linked by a join line. Double-click the thin section of the join line between two tables to edit its join direction.



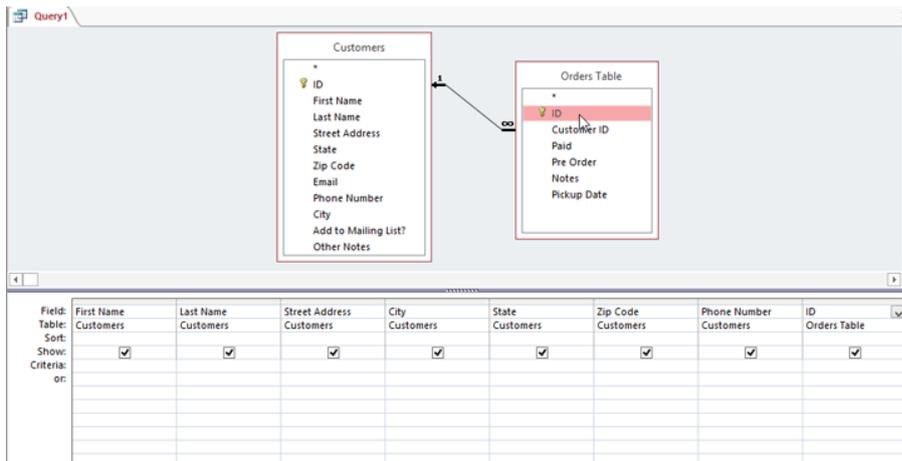
The Join Properties dialog box will appear. Select an option to choose the direction of your join.

- Choose option 2: for a left-to-right join. In our query, the left table is the Customers table, so choosing this would mean all of the customers who met our location criteria—whether or not they had placed an order—would be included in our results. We don't want to choose this option for our query.
- Choose option 3: for a right-to-left join. Because our right table is our Orders table, selecting this option will let us work with records for all of the orders and only the customers who've placed orders. We'll choose this option for our query because this is exactly the data we want to see.



In the table windows, double-click the field names you want to include in your query. They will be added to the design grid in the bottom part of the screen.

In our example, we'll include most of the fields from the Customers table: First Name, Last Name, Street Address, City, State, Zip Code, and Phone Number. We'll also include the ID number from the Orders table.

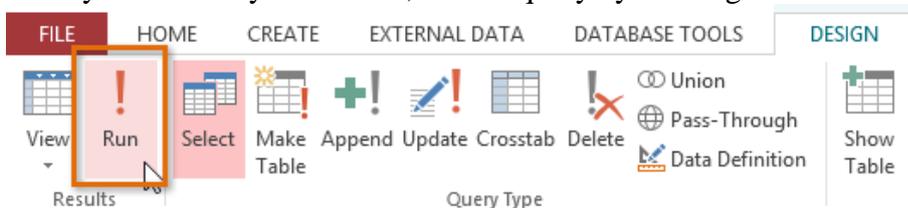


Set field criteria by entering the desired criteria in the criteria row of each field. We want to set two criteria:

- First, to find customers who do not live in Raleigh, we'll type Not in ("Raleigh") in the City field.
- Second, to find customers who have a phone number beginning with the area code 919, we'll type Like ("919\*") in the Phone Number field.

Field:	City	State	Zip Code	Phone Number	ID
Table:	Customers	Customers	Customers	Customers	Orders Table
Sort:					
Show:	<input checked="" type="checkbox"/>				
Criteria:	Not In ("Raleigh")			Like ("919*")	
or:					

After you have set your criteria, run the query by clicking the Run command on the Design tab.



The query results will be displayed in the query's Datasheet view, which looks like a table. If you want, save your query by clicking the Save command in the Quick Access toolbar. When prompted to name it, type the desired name and click OK.

City	State	Zip Code	Phone Number
Durham	NC	27714	919-555-8975
Chapel Hill	NC	27514	919-555-1096
Garner	NC	27529	919-555-1475
Cary	NC	27513	919-555-0089
Cary	NC	27513	919-555-8080
Chapel			7025
Cary			3021
Durham			2085
Cary			4526
Durham			7070
Durham			0578
Chapel Hill	NC	27514	919-555-4789
Garner	NC	27529	919-555-0007
Hillsborough	NC	27278	919-555-0321

Save As

Query Name:  
Customers Who've Ordered from Nearby Towns

OK Cancel

## Challenge!

1. Open an existing Access sample database.
2. Create a new query.
3. Select the Customers and Orders tables to include in your query.
4. Change the join direction to right to left.
5. Add the following fields from the Customers table to your query:
  - First Name
  - Last Name
  - City
6. Add the following fields from the Orders table to your query:
  - Notes
  - ID
7. Set the following criteria:
  - In the Last Name field, type Like "Go\*" to return only records with last names beginning with Go.
  - In the City field, type "Raleigh" to return only records with Raleigh in the City field.
  - In the ID field, type  $\geq 60$  to return only records with an ID number greater than or equal to 60.
8. Run the query. If you entered the query correctly, your results will include one record for a customer named Will Good. If not, click the View drop-down arrow on the Ribbon to return to Design view and check your work.
9. Save the query with the name Will Query.

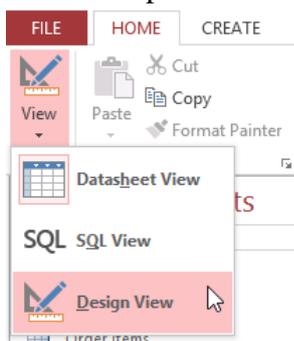
## Modifying queries

Access offers several options that let you design and run queries that return exactly the information you're looking for. For instance, what if you need to find out how many of something exists within your database? Or what if you would like your query results to automatically be sorted a certain way? If you know how to use Access's query options, you can design almost any query you want.

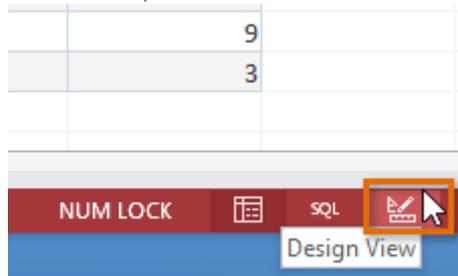
Access offers several options for making your queries work better for you. In addition to modifying your query criteria and joins after you build your queries, you can choose to sort and hide fields in your query results.

To modify your query:

- When you open an existing query in Access, it is displayed in Datasheet view, meaning you will see your query results in a table. To modify your query, you must enter Design view, the view you used when creating it. There are two ways to switch to Design view:
- On the Home tab of the Ribbon, click the View command. Select Design View from the drop-down menu that appears.



In the bottom-right corner of your Access window, locate the small view icons. Click the Design View icon, which is the icon farthest to the right.



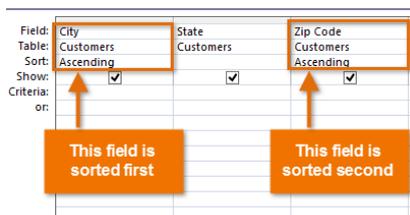
Once in Design view, make the desired changes, then select the Run command to view your updated results.

### Sorting queries

Access allows you to apply multiple sorts at once while you're designing your query. This allows you to view your data exactly the way you want.

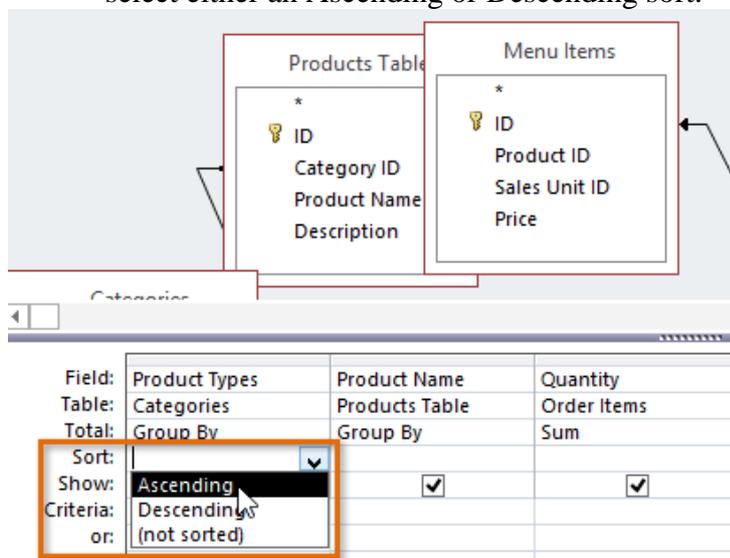
A sort that includes more than one sorted field is called a multilevel sort. A multilevel sort allows you to apply an initial sort, then further organize data with additional sorts. For instance, if you had a table full of customers and their addresses, you might choose to first sort the records by city, then alphabetically by last name.

When more than one sort is included in a query, Access reads the sorts from left to right. This means the leftmost sort will be applied first. In the example below, customers will be sorted first by the City where they live and then by the Zip Code within that city.



To apply a multilevel sort:

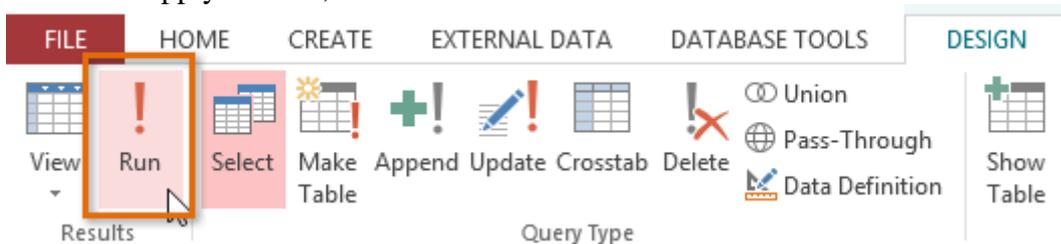
- Open the query and switch to Design view.
- Locate the field you want to sort first. In the Sort: row, click the drop-down arrow to select either an Ascending or Descending sort.



- Repeat the process in the other fields to add additional sorts. Remember, the sorts are applied from left to right, so any additional sorts must be applied to fields located to the right of your primary sort. If necessary, you can rearrange the fields by clicking the top of a field and dragging it to a new location.

Field:	Product Types	Product Name	Product Name	Quantity
Table:	Categories	Products Table	Sales Unit	Order Items
Total:	Group By	Group By	Group By	Sum
Sort:	Ascending			Descending
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				
or:				

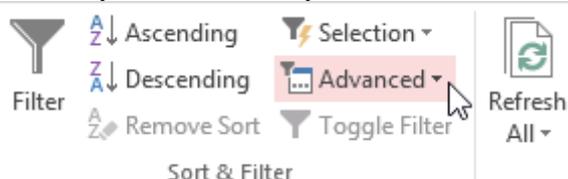
- To apply the sort, click the Run command.



- Your query results will appear with the desired sort.

Product Types	Product Name	SumOfQuantity
Cakes	Cheesecake	20
Cakes	Buche de Noel (Christmas Cake)- Winter	12
Cakes	Carrot Cake	9
Cakes	Black Forest	8
Cakes	Black Walnut	5
Cakes	Italian Rum	4
Cakes	Gingerbread - Winter	4
Cakes	Coconut	2
Cakes	French french vanilla	2
Cakes	German Chocolate	2
Cakes	Red Velvet	1
Cakes	Cookies n' Cream	1
Cookies	Fudge Brownie	7
Cookies	Fudge Chocolate	6
Cookies	Ginger Shortbread	6
Cookies	Chocolate Chip	5

You can also apply multilevel sorts to tables that don't have queries applied to them. On the Home tab on the Ribbon, select the Advanced drop-down command in the Sort & Filter group. From the menu that appears, select Advanced Filter/Sort and create the multilevel sort as you normally would. When you're finished, click the Toggle Filter command to apply your sort.



### Hiding fields within queries

Sometimes you might have fields that contain important criteria, but you might not need to actually see the information from that field in the final results. For example, take one of the queries we built in our last lesson: a query to find the names and contact information of customers who had placed orders. We included Order ID numbers in our query because we wanted to make sure we only pulled customers who had placed orders.

However, we really didn't need to see this information in our final query results. In fact, if we were just looking for customer names and addresses, seeing the order number mixed in there might have been distracting. Fortunately, Access makes it easy to hide fields while still including any criteria they contain.

To hide a field within a query:

- Open the query and switch to Design view.
- Locate the field you want to hide.
- Click the checkbox in the Show: row to uncheck it.

Field:	City	State	Zip Code	ID	Phone Number
Table:	Customers	Customers	Customers	Orders Table	Customers
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:	Not In ('Raleigh')				Like ('919*')
or:					

- To see the updated query, select the Run command. The field will be hidden.

To unhide a hidden field, simply return to Design view and click the checkbox in the field's Show: row again.

## More types of queries

By this point, you should understand how to create a simple one-table or multi-table query using multiple criteria. Additional queries offer you the ability to perform even more complex actions with your database. One of these is the totals query, which lets you perform calculations with your data.

## Totals queries

Sometimes setting simple criteria won't give you the results you need, especially when you're working with numerical values. You may want to see your query results grouped or counted in some way. For example, let's say we want to find out how many of each menu item at our bakery has been ordered—how many Almond Croissants, Apple Pies, and so on. To do this, we could create a totals query to find the sum of the quantities for each item.

First, the totals query will group all similar menu items from separate orders (for example, Almond Croissants). Then, the Sum function will add the values in the Quantity field to calculate the total number sold for that item.

The ungrouped data shows every occurrence of each item

Product Name	Sales Unit	Quantity
Almond Croissant	Single	1
Almond Croissant	Single	2
Almond Croissant	Single	1
Apple	Single	1
Apple Crumb	Single	1
Apple Crumb	Single	1
Apple Crumb	Single	1
Black Forest	Single	1
Black Walnut	Single	3

Our Totals query groups all like values together. The Sum function shows us how many of each item has been ordered.

Product Name	Sales Unit	Quantity
Almond Croissant	Single	4
Apple	Single	5
Apple Crumb	Single	3
Black Forest	Single	8
Black Walnut	Single	5

The Sum function helped us find the desired information in this example, but in other situations you may need to use a different function to find the answer you need. There are several functions you can choose from:

Count: Counts the total number of each item

Sum: Adds the values together

Average: Finds the average of the values

Maximum: Returns the highest value

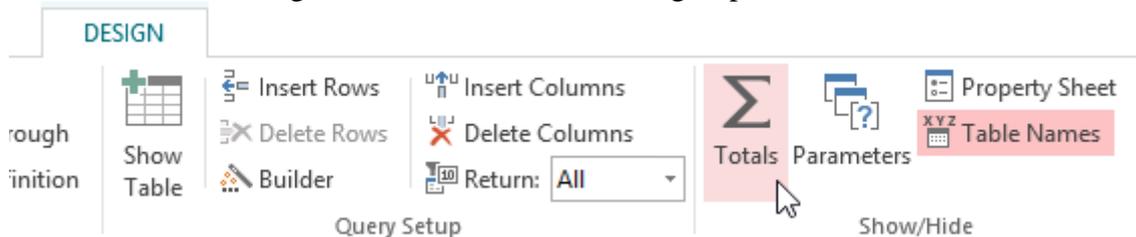
Minimum: Returns the lowest value

First: Returns the first—or earliest—value

Last: Returns the last—or most recent—value

To create a totals query:

- For our example, we want to find the total number we've sold of each of our menu items, so we'll use a query showing us all of the menu items we've sold. If you want to follow along in our database, open the Menu Items Ordered query.
- Create or open a query you want to use as a totals query.
- From the Design tab, locate the Show/Hide group, then select the Totals command.



A row will be added to the table in the design grid, with all values in that row set to Group By. Select the cell in the Total: row of the field you want to perform a calculation on, then click the drop-down arrow that appears.

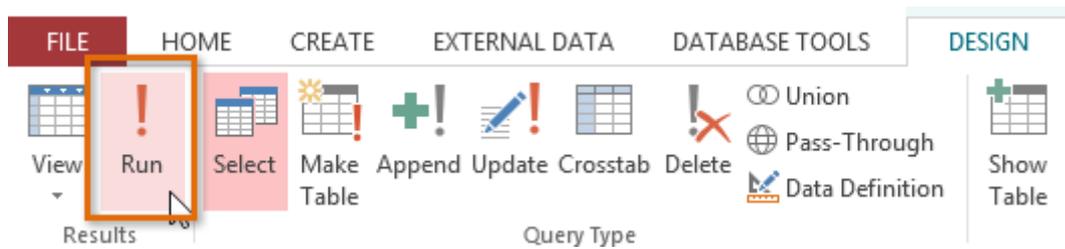
Field:	Product Types	Product Name	Product Name	Quantity
Table:	Categories	Products Table	Sales Unit	Order Items
Total:	Group By	Group By	Group By	Group By
Sort:	Ascending	Descending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				
or:				

Select the calculation you want to be performed in that field. In our example, we want to add the quantities of products we've sold, so we'll select the Sum option.

Field:	Product Types	Product Name	Product Name	Quantity
Table:	Categories	Products Table	Sales Unit	Order Items
Total:	Group By	Group By	Group By	Group By
Sort:	Ascending	Descending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				
or:				

The 'Group By' dropdown menu for the 'Quantity' field is open, showing the following options: Sum, Avg, Min, Max, Count, StDev, Var, First, Last, Expression, and Where. The 'Sum' option is highlighted.

When you are satisfied with your query design, select the Run command on the Query Tools Design tab to run the query.



The query results will be displayed in the query's Datasheet view, which looks like a table. If you want, save your query by clicking the Save command on the Quick Access toolbar.

Menu Items Ordered			
Product Types	Products Table.Product Name	Sales Unit.Product Name	SumOfQuantity
Cakes	Cheesecake	Single	20
Cakes	Buche de Noel (Christmas Cake)- Winter	Single	12
Cakes	Carrot Cake	Single	9
Cakes	Black Forest	Single	8
Cakes	Black Walnut	Single	5
Cakes	Italian Rum	Single	4
Cakes	Gingerbread - Winter	Single	4
Cakes	Coconut	Single	2
Cakes	French french vanilla	Single	2
Cakes	German Chocolate	Single	2
Cakes	Red Velvet	Single	1
Cakes	Cookies n' Cream	Single	1
Cookies	Fudge Brownie	One Dozen	7
Cookies	Fudge Chocolate	Single	6
Cookies	Ginger Shortbread	One Dozen	6
Cookies	Chocolate Chip	Single	5

### More query options

We offer mini-lessons on creating additional types of queries in the last lesson in this tutorial. Below is a list of the queries we currently cover.

#### Parameter query

A parameter query allows you to create a query that can be updated easily to reflect a new criterion, or search term. When you open a parameter query, Access will prompt you for a search term and then show you query results that reflect that search.

#### Find duplicates query

A find duplicates query lets you find all duplicate records in your database so you can delete them. Duplicate records can negatively affect the integrity of your database.

#### Query criteria quick reference guide

Below, you'll find a guide containing 20 of the most common criteria used in Access queries. While these criteria are all fairly simple, each one can help you carry out meaningful searches of your data. If you find this guide useful, download the printable version so you'll always have it handy. For a more comprehensive guide to criteria, look at Microsoft's official Examples of query criteria.

When entering the criteria, write them exactly as they are written in the second column, replacing x with your search term—or in the case of dates, replacing mm/dd/yyyy with the desired date.

### Simple criteria for all data types:

Criteria Name	Write it like...	Function
Equals	"x"	Searches for values equal to <i>x</i>
Does Not Equal	Not in ("x")	Searches for all values except those equal to <i>x</i>
Null	Is Null	Searches for empty fields
Not Null	Is Not Null	Searches for non-empty fields

### Simple criteria for text:

Criteria Name	Write it like...	Function
Contains	Like "*x*"	Searches for all values that contain <i>x</i>
Does Not Contain	Not like "*x*"	Searches for all values except those that contain <i>x</i>
Begins with	Like "x*"	Searches for all values beginning with <i>x</i>
Ends with	Like "*x"	Searches for all values ending with <i>x</i>
Comes After	>= "x"	Searches for all values that come after <i>x</i> in alphabetical order.
Comes Before	<= "x"	Searches for all values that come before <i>x</i> in alphabetical order.

### Simple criteria for numbers:

Criteria Name	Write it like...	Function
Between	Between "x" and "y"	Searches for values in the range between <i>x</i> and <i>y</i>
Less Than	< x	Searches for all values smaller than <i>x</i>
Less Than or Equal To	<= x	Searches for all values smaller than or equal to <i>x</i>
Greater Than	> x	Searches for all values larger than <i>x</i>
Greater Than or Equal To	>= x	Searches for all values larger than or equal to <i>x</i>

Simple criteria for dates:

Criteria Name	Write it like...	Function
Between	Between "#mm/dd/yy#" and "#mm/dd/yy#"	Searches for dates that fall between two dates.
Before	<#mm/dd/yy#	Searches for dates before a certain date
After	>#mm/dd/yy#	Searches for dates after a certain date.
Today	=Date()	Searches for all records containing today's date
Days Before Today	<=Date()-x	Searches for all records containing dates x or more days in the past

### Challenge!

1. Open an existing Access sample database
2. Open the Customers Who've Ordered from Nearby Towns query, and switch to Design view.
3. Add a Totals row to the query.
4. Set the Totals row in the Orders Table ID field to Count. This will let us count how many orders each customer has placed.
5. In the Customers table in the Object Relationship pane, double-click the word City to add another City field to the design grid below.
6. Click and drag the City field you just added so it is to the left of the First Name field. It should now be the leftmost field in the design grid.
7. Apply the following multilevel sort:
  - a. In the leftmost City field, apply an ascending sort.
  - b. In the Last Name field, apply an ascending sort.
8. Hide the leftmost City field.
9. Run the query. If you did it correctly, there should be 14 records in the query results.

### Creating Reports

If you need to share information from your database with someone but don't want that person actually working with your database, consider creating a report. Reports allow you to organize and present your data in a reader-friendly, visually appealing format. Access makes it easy to create and customize a report using data from any query or table in your database.

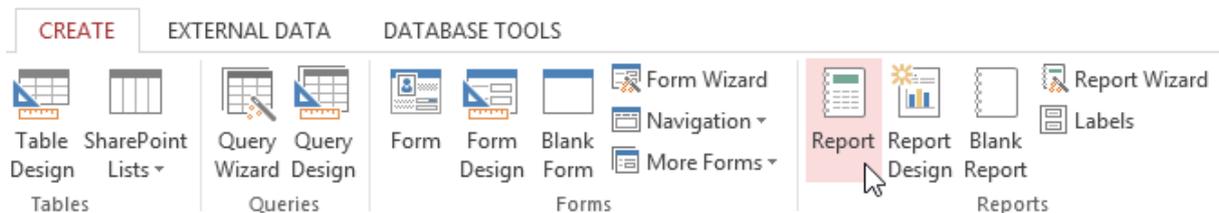
To create a report:

Reports give you the ability to present components of your database in an easy-to-read, printable format. Access lets you create reports from both tables and queries.

- Open the table or query you want to use in your report. We want to print a list of cookies we've sold, so we'll open the Cookies Sold query.

Product Types	Products Table.Product Name	Sales Unit.Product Name	SumOfQuan
Cookies	Fudge Brownie	One Dozen	7
Cookies	Fudge Chocolate	Single	6
Cookies	Ginger Shortbread	One Dozen	6
Cookies	Chocolate Chip	Single	5
Cookies	Butterscotch	Single	3
Cookies	Fudge Brownie	Single	3
Cookies	Cranberry Walnut	One Dozen	3
Cookies	White Chocolate Macademia Nut	Half-Dozen	3
Cookies	Snickerdoodle	Single	3

- Select the Create tab on the Ribbon. Locate the Reports group, then click the Report command.

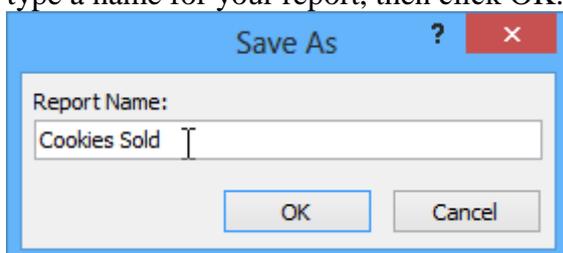


- Access will create a new report based on your object.

It's likely that some of your data will be located on the other side of the page break. To fix this, resize your fields. Simply select a field, then click and drag its edge until the field is the desired size. Repeat with additional fields until all of your fields fit.

Product Types	[Products Table].[Product Name]	[Sales Unit].[Produ
Cookies	Butter Pecan	One Dozen
Cookies	Butter Pecan	Single
Cookies	Butterscotch	Single
Cookies	Chocolate Banana Walnut	One Dozen
Cookies	Chocolate Banana Walnut	Single
Cookies	Chocolate Chip	Half-Dozen

To save your report, click the Save command on the Quick Access toolbar. When prompted, type a name for your report, then click OK.



Just like tables and queries, reports can be sorted and filtered. Simply right-click the field you want to sort or filter, then select the desired option from the menu.

### Deleting fields

You might find that your report contains some fields you don't really need to view. For instance, our report contains the Zip Code field, which isn't necessary in a list of orders. Fortunately, you can delete fields in reports without affecting the table or query where you grabbed your data.

To delete a field in a report:

- Click any cell in the field you want to delete, then press the Delete key on your keyboard.

The screenshot shows a report titled "Cookies Sold" for Wednesday. The table has three columns: "Product Types", "[Products Table].[Product Name]", and "[Sales Unit].[Product Name]". The first row is highlighted, showing "Cookies" under Product Types, "Butter Pecan" under Product Name, and "One Dozen" under Sales Unit. A mouse cursor is pointing at the "Cookies" cell.

Product Types	[Products Table].[Product Name]	[Sales Unit].[Product Name]
Cookies	Butter Pecan	One Dozen
Cookies	Butter Pecan	Single
Cookies	Butterscotch	Single
Cookies	Chocolate Banana Walnut	One Dozen
Cookies	Chocolate Banana Walnut	Single
Cookies	Chocolate Chip	Half-Dozen
Cookies	Chocolate Chip	One Dozen
Cookies	Chocolate Chip	Single
Cookies	Cranberry Walnut	One Dozen

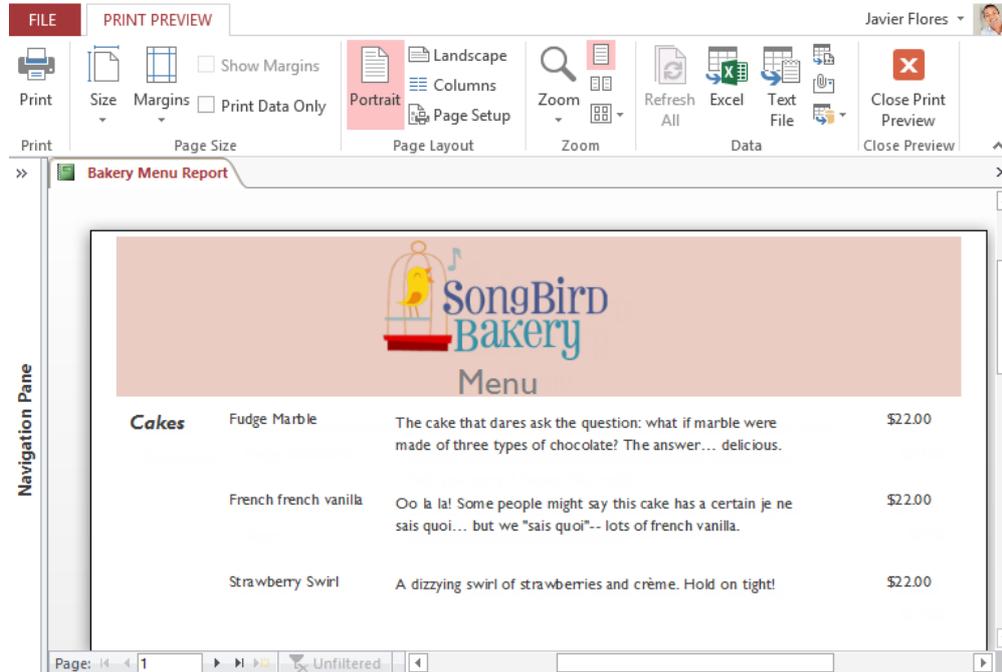
- The field will be deleted.
- When you delete a field, be sure to delete its header as well. Simply select the header and press the Delete key.

The screenshot shows the same report after the "Cookies" field has been deleted. The "Product Types" header is now highlighted with a mouse cursor. The data rows remain the same, but the first column is empty.

Product Types	[Products Table].[Product Name]	[Sales Unit].[Product Name]
	Butter Pecan	One Dozen
	Butter Pecan	Single
	Butterscotch	Single
	Chocolate Banana Walnut	One Dozen
	Chocolate Banana Walnut	Single
	Chocolate Chip	Half-Dozen
	Chocolate Chip	One Dozen
	Chocolate Chip	Single
	Cranberry Walnut	One Dozen

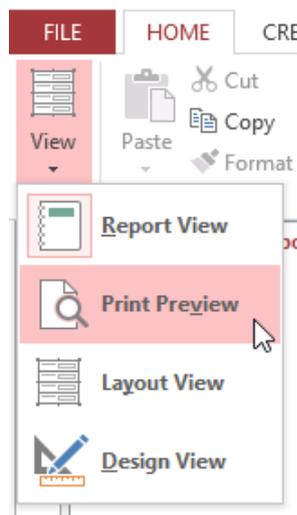
## Printing and saving reports in Print Preview

While you can print reports using commands in the Backstage view, you can also use Print Preview. Print Preview shows you how your report will appear on the printed page. It also allows you to modify the way your report is displayed, print it, and even save it as a different file type.

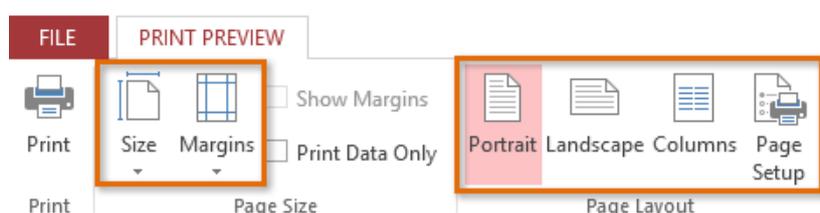


To print a report:

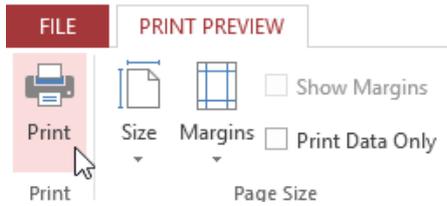
- From the Home tab, click the View command, then select Print Preview from the drop-down list. Your report will be shown as it will appear on the printed page.



- If necessary, modify the page size, margin width, and page orientation using the related commands on the Ribbon.



- Click the Print command.



The Print dialog box will appear. Set any desired print options, then click OK. The report will be printed.

### Saving reports

You can save reports in other formats so they'll be viewable outside of Access. This is called exporting a file, and it allows you to view and even modify reports in other formats and programs.

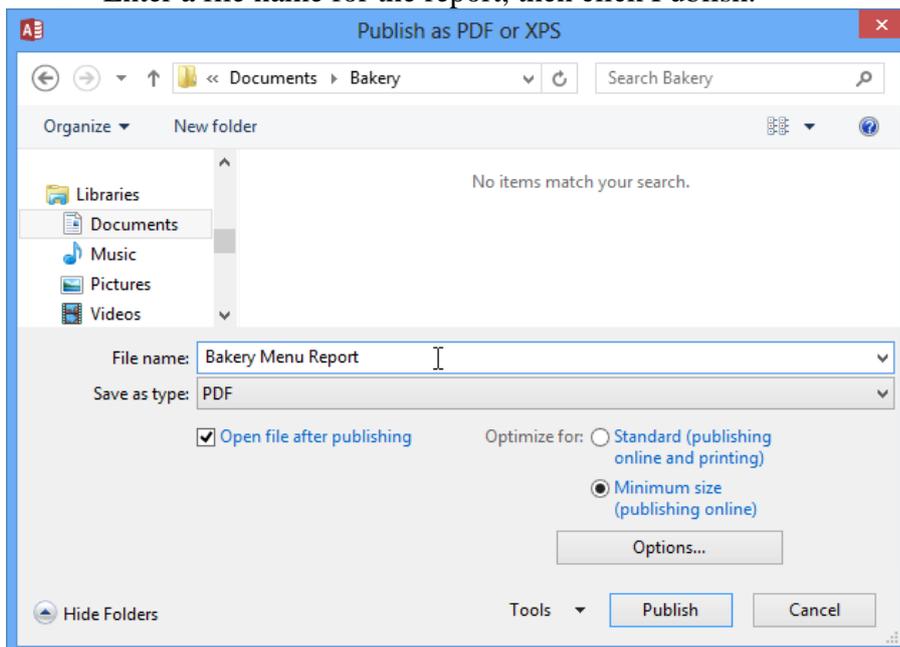
Access offers options to save your report as an Excel file, text file, PDF, HTML document, and more. Experiment with the different export options to find the one that best suits your needs.

To export a report:

- From the Home tab, click the View command, then select Print Preview from the drop-down list.
- Locate the Data group on the Ribbon.
- Select one of the file type options, or click More to see options to save your report as a Word or HTML file.

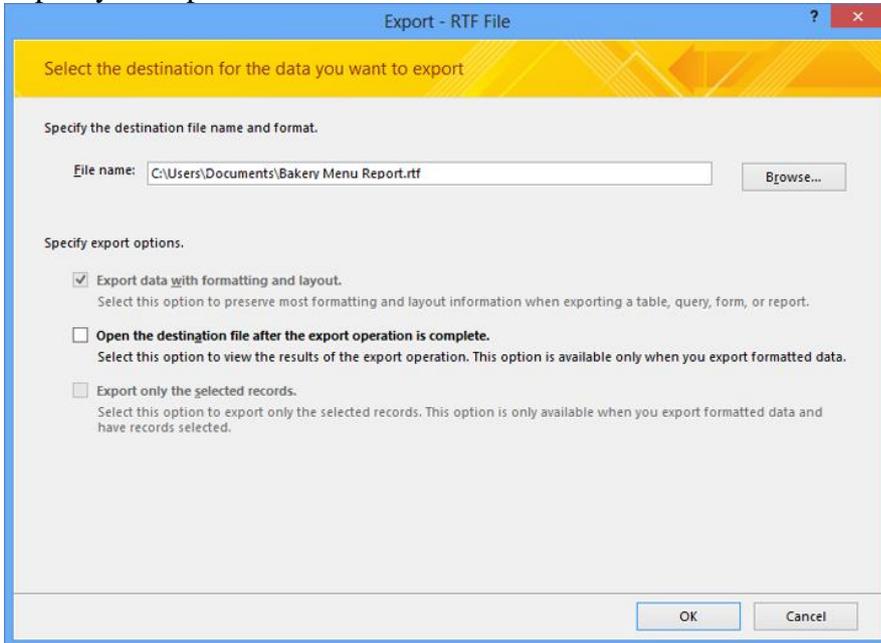


- A dialog box will appear. Select the location where you want to save the report.
- Enter a file name for the report, then click Publish.



- A dialog box will appear to notify you that your file has been successfully saved. Click Close to return to your report.

Some export options will cause the Export Wizard to appear. Simply follow the instructions to export your report.



## Challenge!

1. Open an existing Access sample database
2. Open the Customers Who Live Nearby query, and use it to create a report.
3. Resize the fields and rows so all information is visible.
4. Move any fields located on the right side of a page break onto the same page as the other fields.
5. Export the report as a PDF.

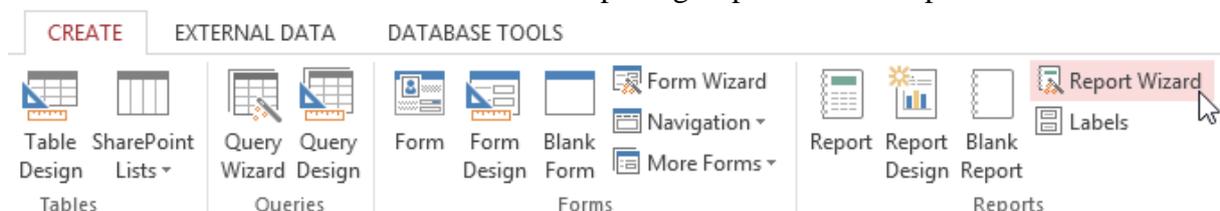
## The Report Wizard

Access offers several advanced options for creating and modifying reports. The Report Wizard is a tool that guides you through the process of creating complex reports. Once you've created a report—whether through the Report Wizard or the Report command—you can then format it to make it look exactly how you want.

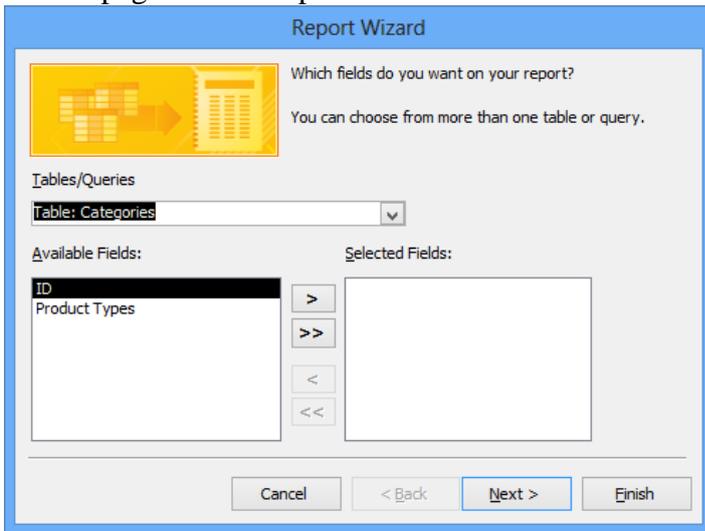
While using the Report command is a quick way to create reports from the current object, it's not as helpful if you want to create a report with data from multiple objects. The Report Wizard makes it easy to create reports using fields from multiple tables and queries. It even lets you choose how your data will be organized.

To create a report with the Report Wizard:

- Select the Create tab and locate the Reports group. Click the Report Wizard command.

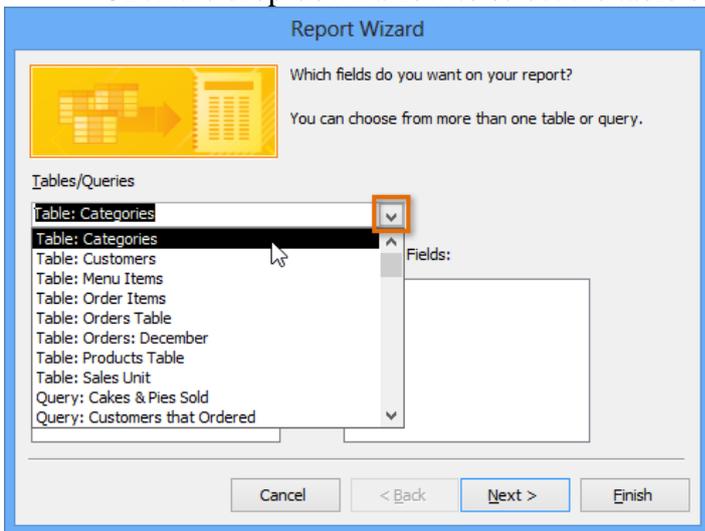


- The Report Wizard will appear. In the procedures below, we'll discuss the different pages in the Report Wizard.

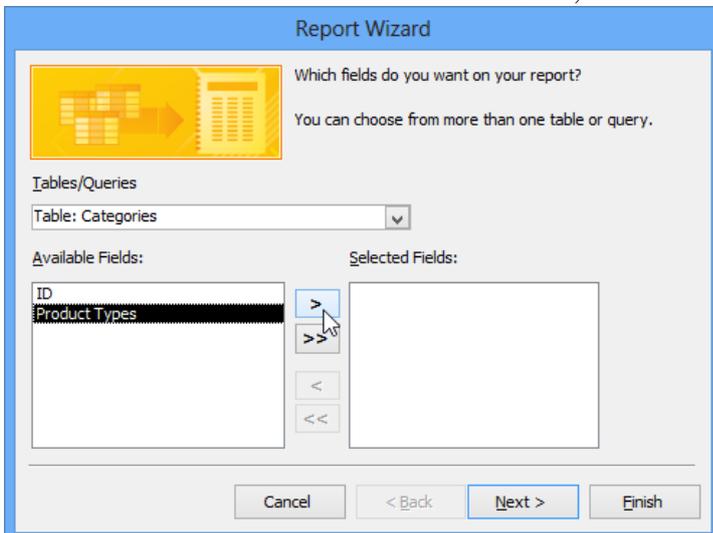


### Step 1: Select the fields to include in your report

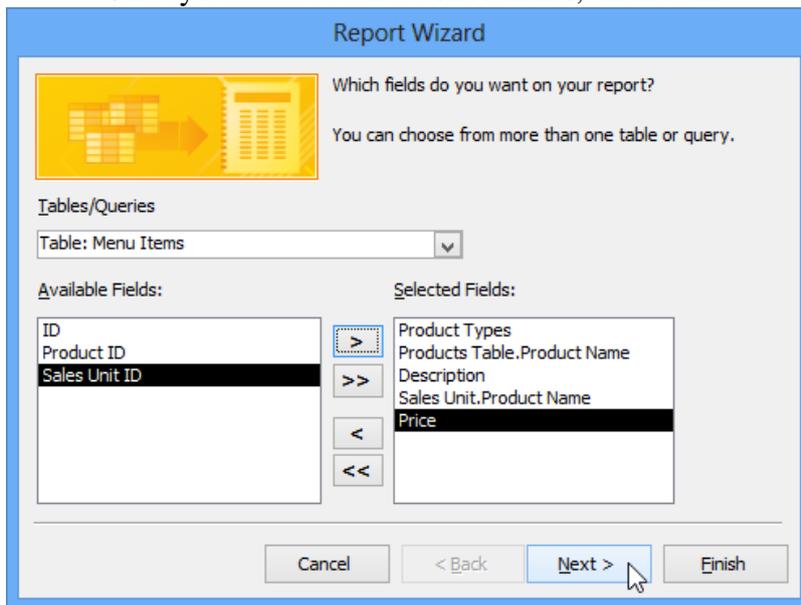
- Click the drop-down arrow to select the table or query that contains the desired field(s).



- Select a field from the list on the left, and click the right arrow to add it to the report.



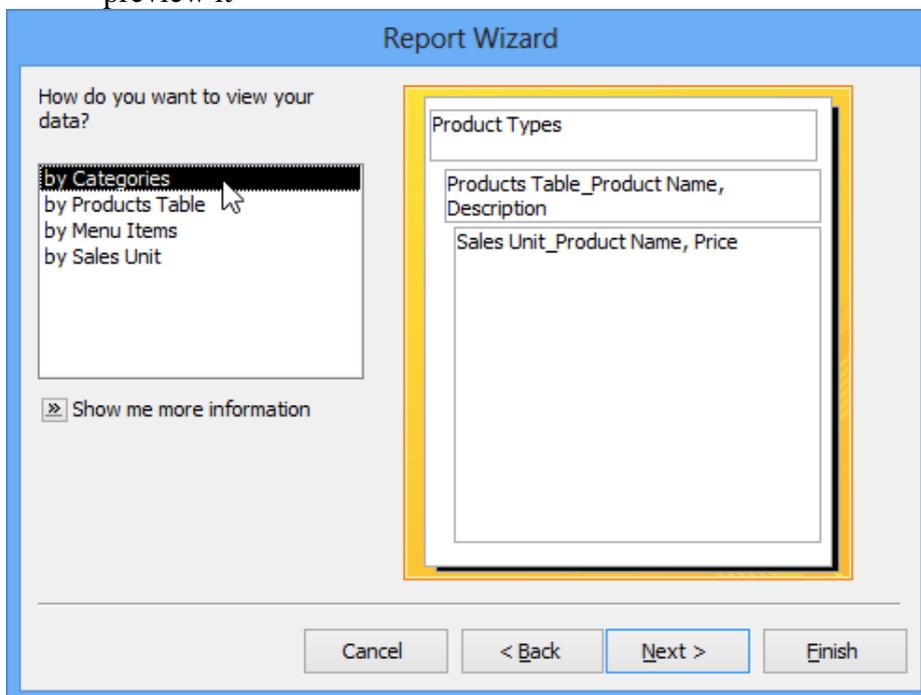
- You can add fields from more than one table or query by repeating the above steps. Once you've added the desired fields, click Next.



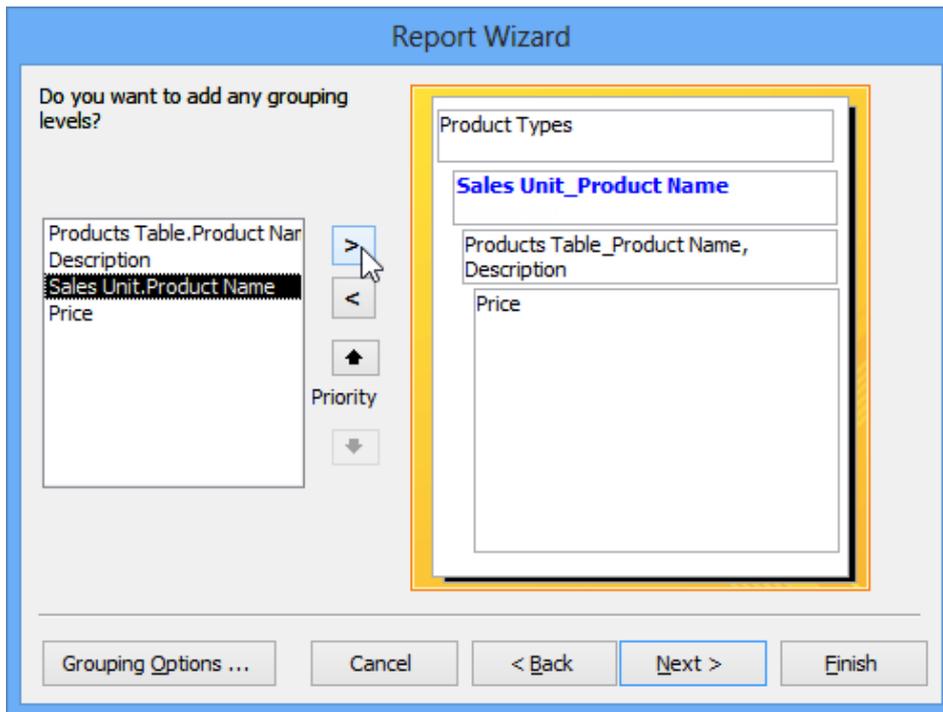
## Step 2: Organize the report

The Report Wizard will provide you with options that let you choose how to view and organize your data. These options group similar data within your fields and organize these fields into multiple levels, like in an outline or bulleted list.

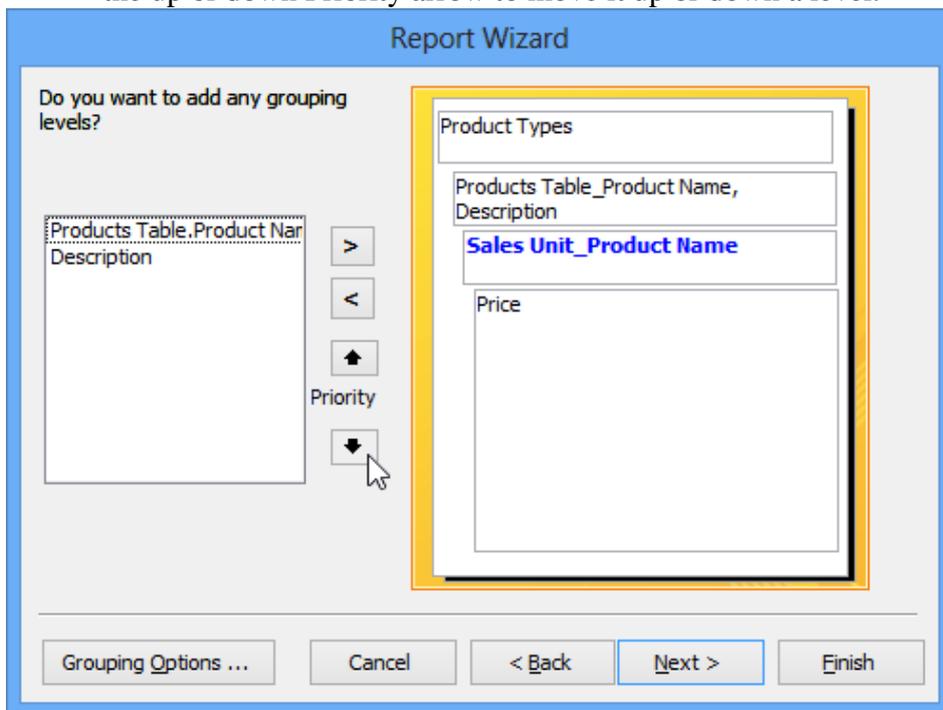
- Access will offer a list of several organization options. Select an option from the list to preview it



- Click Next when you are satisfied with the basic organization of your data.
- If you're not satisfied with the way your data is organized, you can now modify the grouping levels. Select a field from the list, and click the right arrow to add it as a new level.



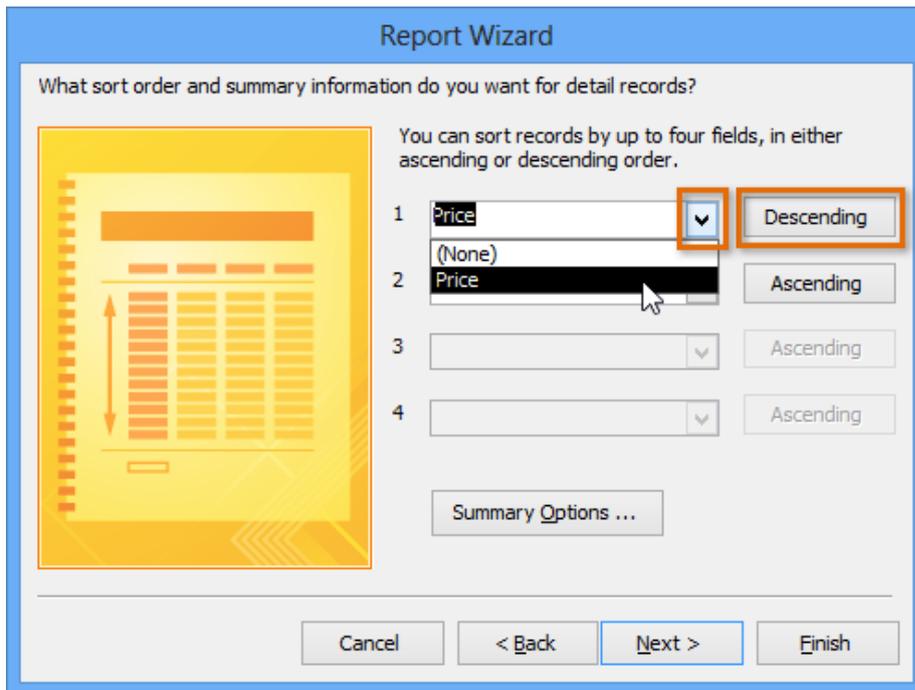
- If necessary, modify the order of your grouped fields by selecting a field and clicking the up or down Priority arrow to move it up or down a level.



- Once you are satisfied with the organization of your report, click Next.

### Step 3: Sort your report data

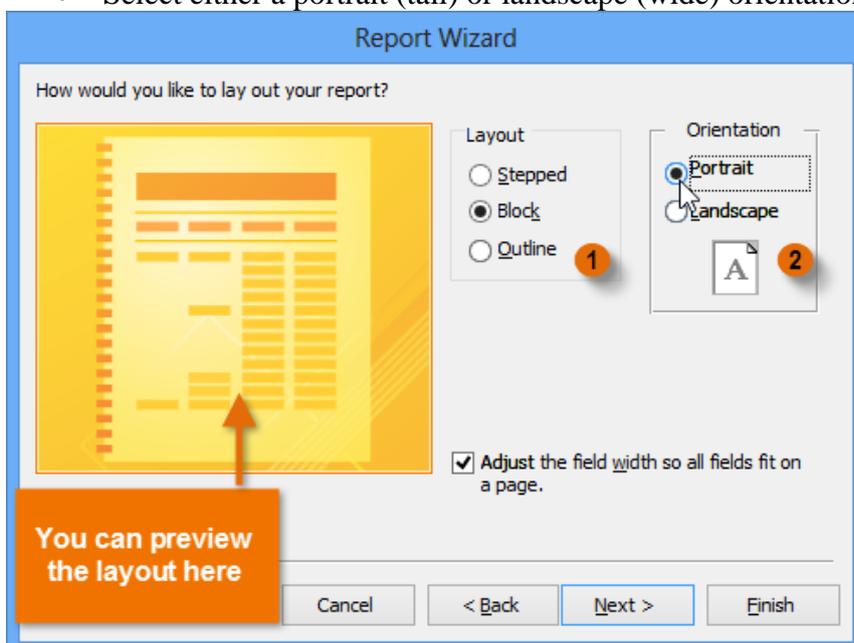
- Click the top drop-down arrow, and select the name of the first field you want to sort.
- Click the button on the right to change the sort to ascending or descending.



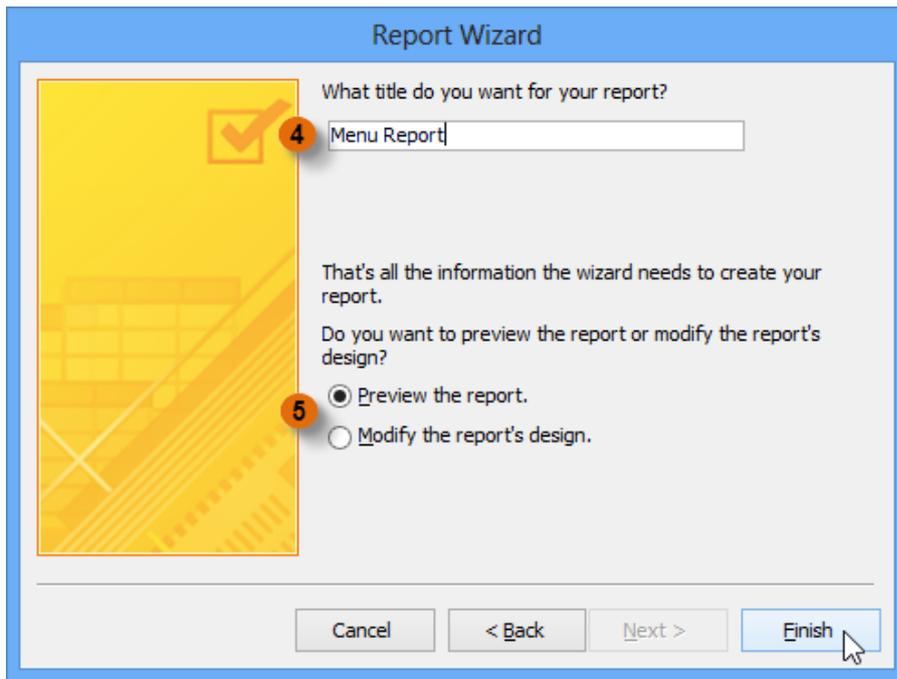
- Add any additional sorts. You can sort up to four fields. The sort will be applied from top to bottom, meaning the sort at the top of the list will be the main sort.
- When you are satisfied with the way your data is sorted, click Next.

#### Step 4: Select a layout and title

- Click the various layout options to see how they look, then select one to use in your report.
- Select either a portrait (tall) or landscape (wide) orientation for your report.



- Once you are satisfied with your report layout, click Next.
- Select the text box, and type the title you would like for your report.
- Select whether you want to preview the report or modify its design, then click Finish.



- Your report will be created and saved.

## Formatting reports

One of the strengths of reports is that you can modify their appearance to make them look how you want. You can add headers and footers, apply new colors, and even add a logo. All of these things can help you create visually appealing reports.

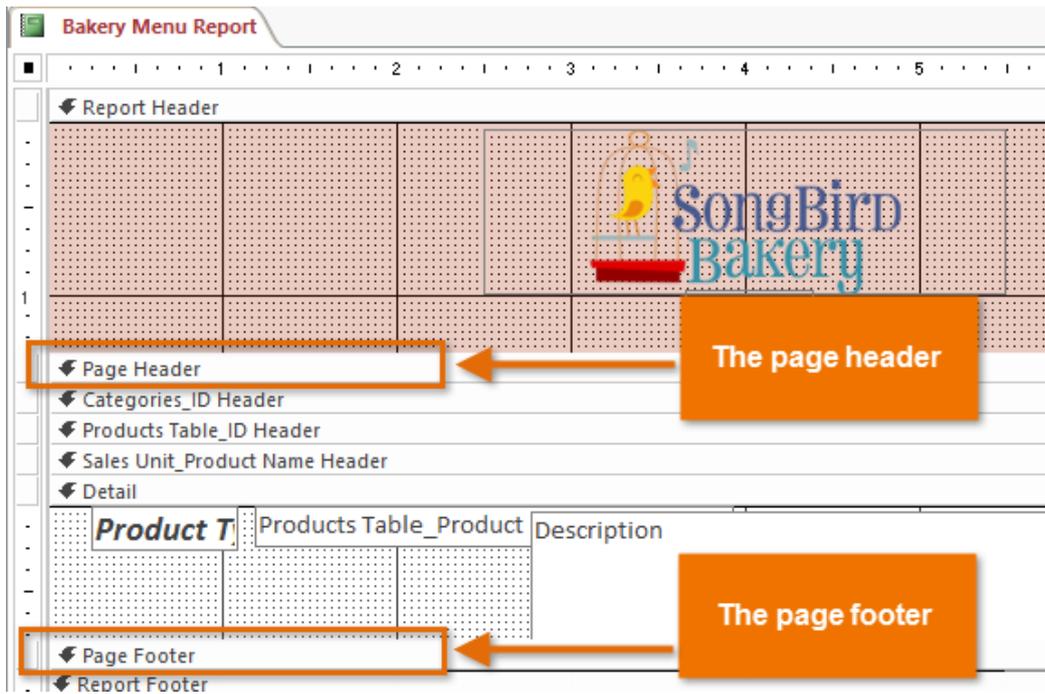
## Modifying report text

The bulk of the information in your report comes straight from the query or table you built it from, which means you can't edit it within the report. However, you can change, add, or delete label text, headers, and footers to make your report clearer and easier to read. For example, in our report we decided we didn't need the field headings to understand our data, so we simply deleted them.

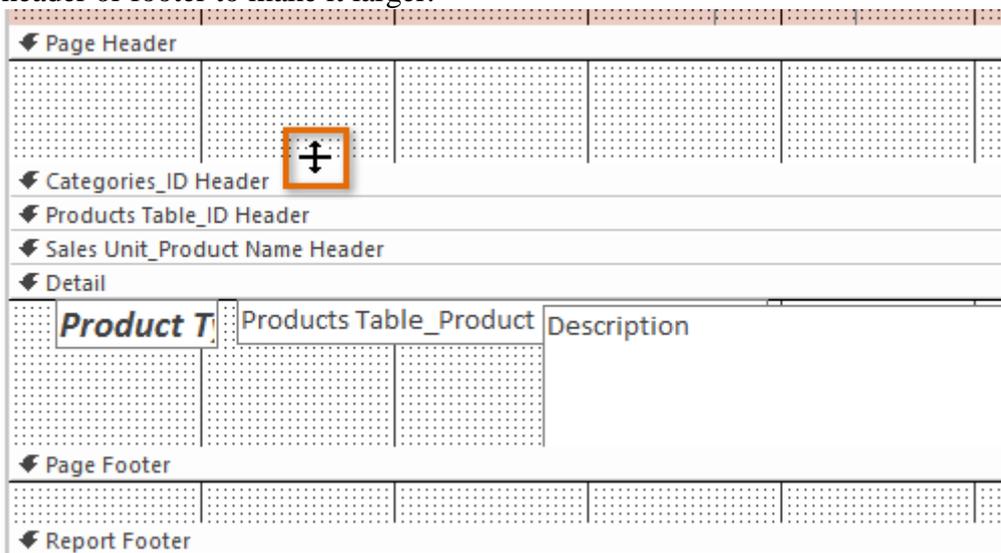
<b>Cakes</b>	Strawberry Swirl	A dizzying swirl of strawberries and crème. Hold on tight!	\$22.00
<b>Cakes</b>	Cookies n' Cream	Like dipping oreos and milk, but a cake, and not at all soggy.	\$22.00
<b>Cakes</b>	Lemon	A simple classic-- sweet and sour.	\$22.00
<b>Cakes</b>	German Chocolate	"Chocolate" in German is "schokolade." You don't have to be able to say that to enjoy this cake.	\$22.00

## Modifying the page header and footer

To view and modify the header and footer that appear on each page of your report, select the View command on the Ribbon and switch to Design view. The header and footer are located in the white space beneath the Page Header and Page Footer bars.

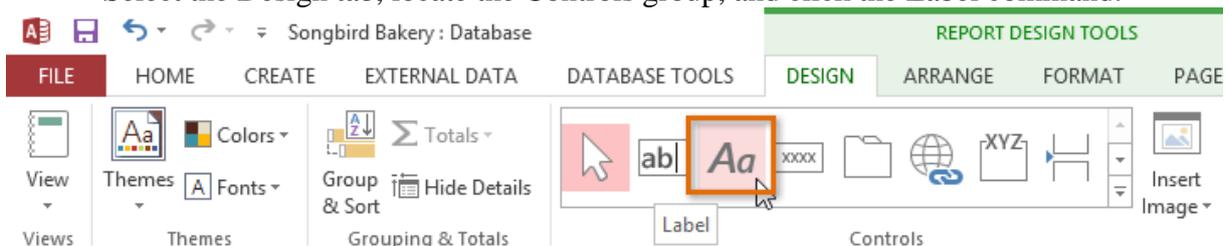


Depending on your report's design, sometimes you may find that there is no white space in the page header and footer, as in the image above. If this is the case, you must resize the header and footer before you can add anything to them. Simply click and drag the bottom border of the header or footer to make it larger.

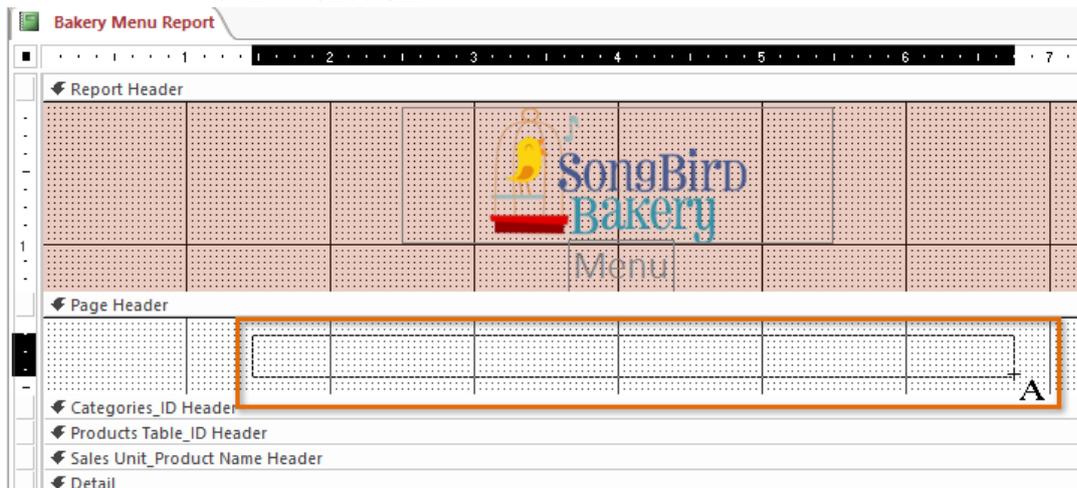


To add text to a header or footer:

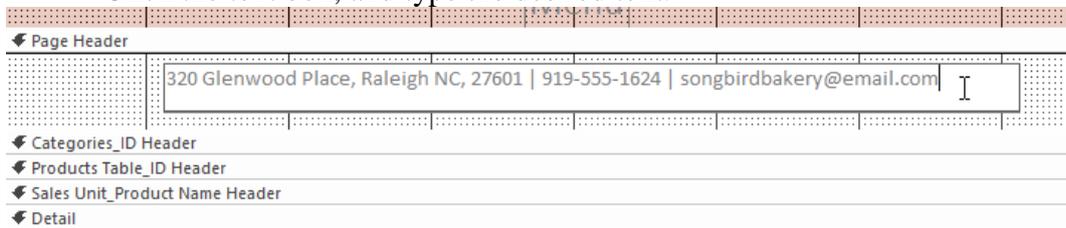
- Select the Design tab, locate the Controls group, and click the Label command.



- Click and drag the mouse inside the white area to create your label. Release the mouse when it is the desired size.

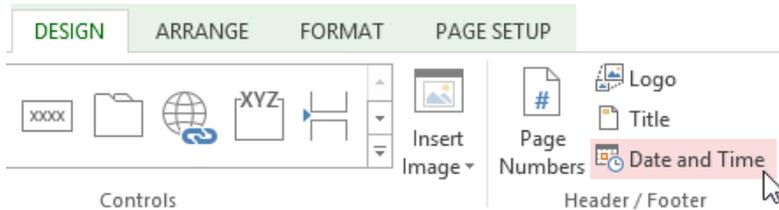


- Click the text box, and type the desired text.

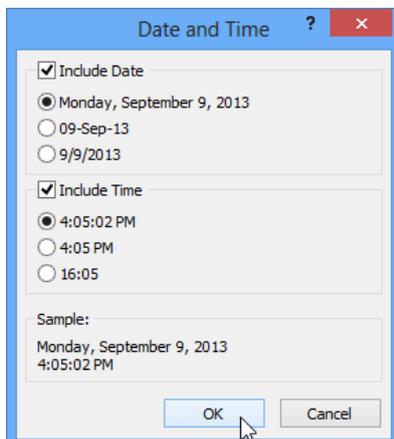


To add the date and time to a header or footer:

- Select the Design tab, locate the Header/Footer group, and click the Date and Time command.



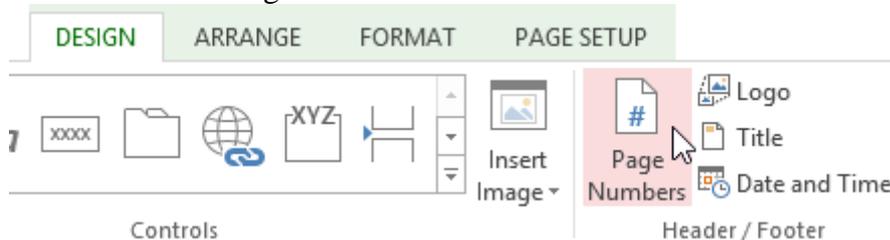
- A dialog box will appear. Select the desired formatting options. A preview of the text that will be included in your report will appear.
- When you are satisfied with the appearance of the date and time, click OK.



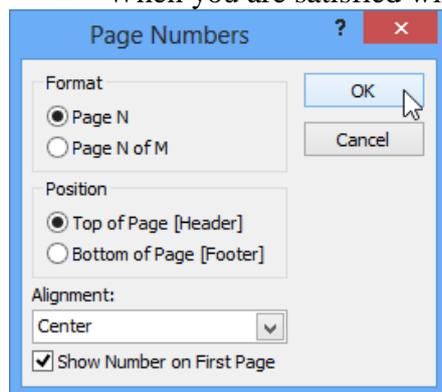
By default, the date and time appear in the header. If you would like to move them to the footer instead, simply click the date and time boxes and drag them to the desired location.

To add page numbers to a header or footer:

- Select the Design tab, then locate the Header/Footer group.
- Click the Page Numbers command.



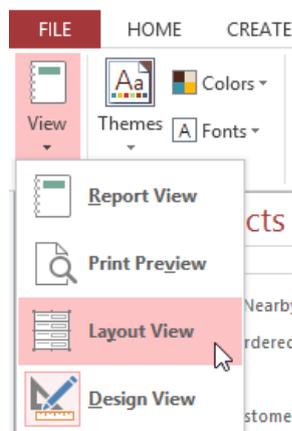
- The Page Numbers dialog box will appear. Select the format of the page numbers.
  - Select Page N to display the number of only the current page.
  - Select Page N of M to display the number of the current page and the number of total pages.
- Under Position, choose Top of Page or Bottom of Page to control where the page numbers appear.
- Click the drop-down arrow to select the alignment of the page numbers.
- When you are satisfied with the settings, click OK.



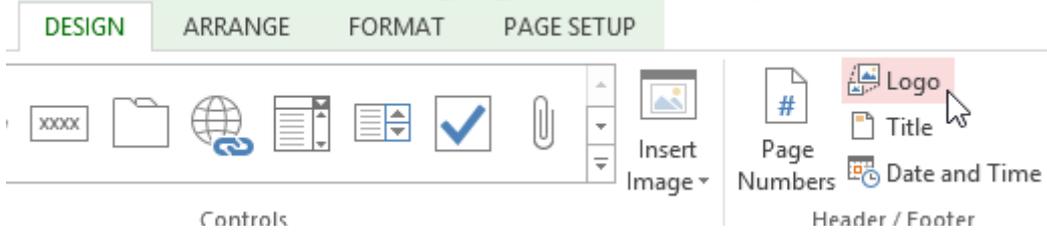
## Modifying your report's appearance

To add a logo:

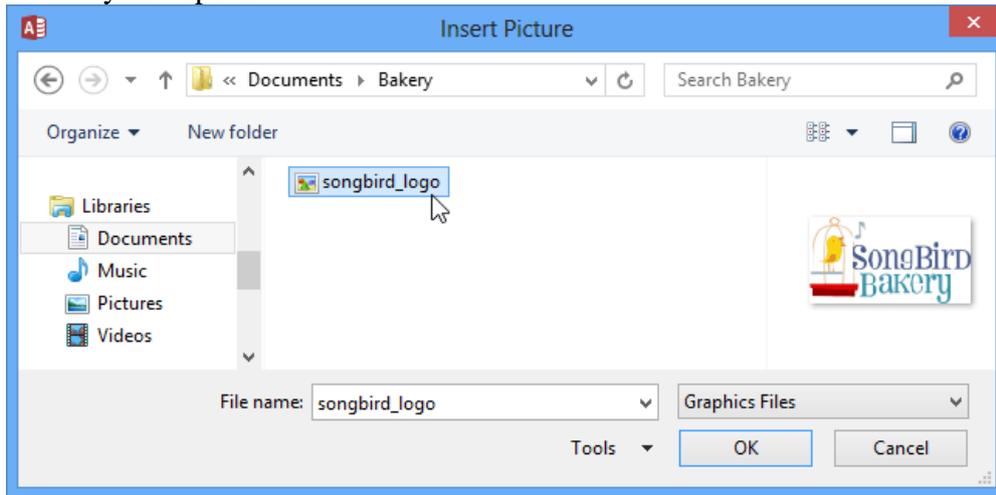
- From the Design tab, click the View command, then select Layout View from the drop-down list.



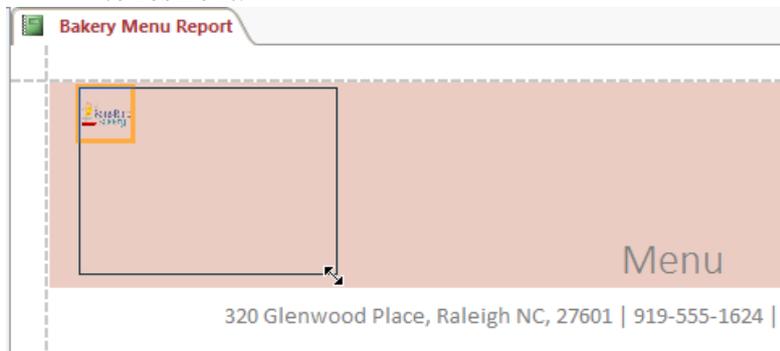
- Locate the Header/Footer group, then click the Logo command.



- A dialog box will appear. Locate and select the desired file, then click OK to add it to your report.



- A small version of the image will appear in the header. Click and drag the image border to resize it.



- If necessary, move your logo to the desired location by clicking and dragging it.

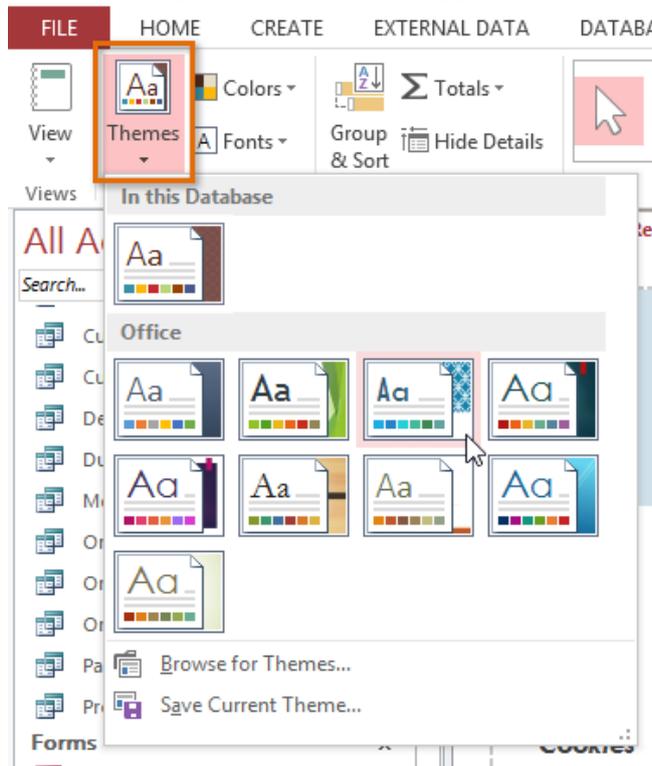


## Themes and fonts

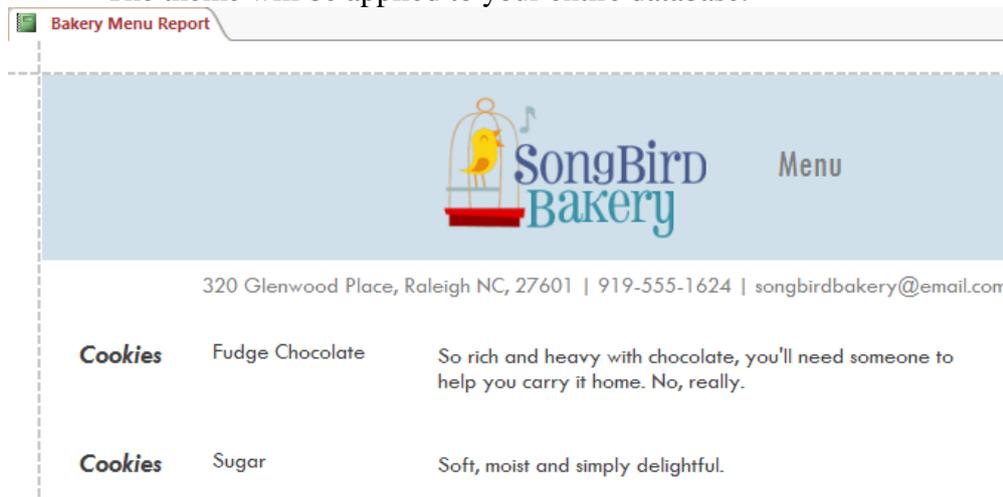
A theme is a set of colors and fonts that applies to the entire database to give it a consistent, professional look. By default, databases use the Office theme. When you change the theme, all of the theme fonts and colors in your database change to match the new theme. Designing and modifying reports using theme elements can help you keep the appearance of your reports consistent.

To change the theme:

- Select the Design tab, locate the Themes group, and click the Themes command.
- A drop-down menu will appear. Select the desired theme.



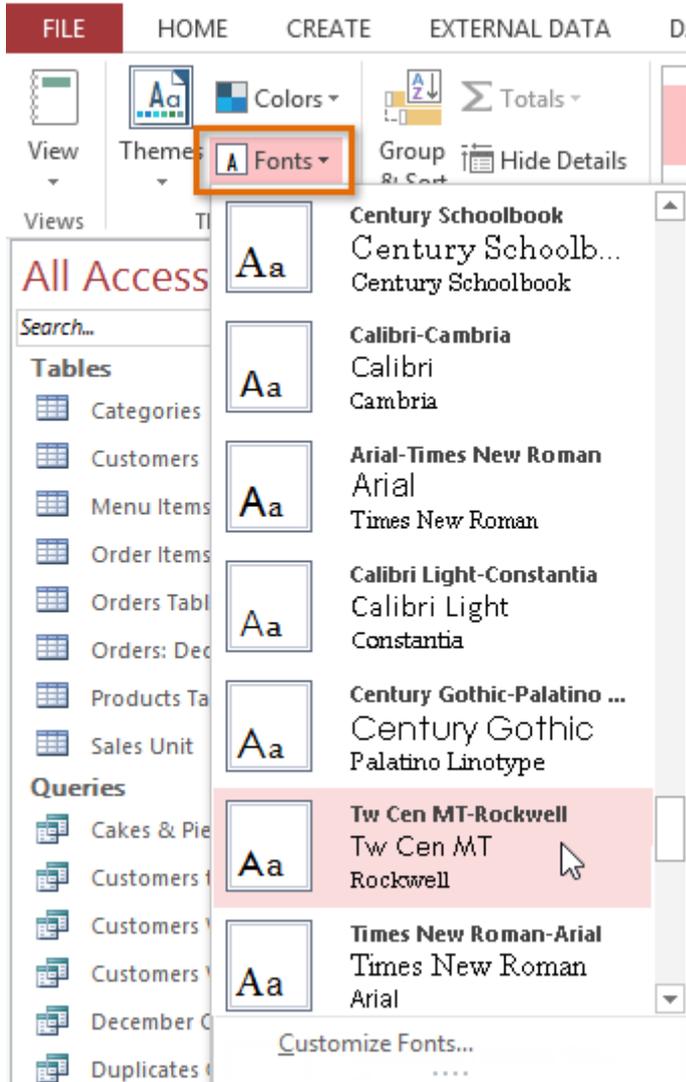
- The theme will be applied to your entire database.



To change the theme fonts:

- Select the Design tab, locate the Themes group, and click the Fonts command.

- A drop-down menu will appear. Select a set of theme fonts.



- The fonts will be applied to your entire database.



320 Glenwood Place, Raleigh NC, 27601 | 919-555-1624 |  
 songbirdbakery@email.com

- |                |                 |  |
|----------------|-----------------|--|
| <b>Cookies</b> | Fudge Chocolate | So rich and heavy with chocolate, you'll need someone to help you carry it home. No, really. |
| <b>Cookies</b> | Sugar           | Soft, moist and simply delightful.   |

## Challenge!

1. Open an existing Access sample database.
2. Open the Cookies Sold report.
3. Add the date and time to the header.
4. Add page numbers to the footer.
5. Choose a new theme and theme fonts.
6. Add a logo. You can use an image from your computer.

## Modifying tables

After working with your database, you might find that you need to make some changes to the tables that store your data. Access makes it easy to modify your tables to suit your database's needs.

In this lesson, you'll learn how to create and rearrange table fields. You'll also learn how to ensure your table data is correctly and consistently formatted by setting validation rules, character limits, and data types in your fields. Finally, we will direct you to additional options for performing simple math functions within your tables.

In addition to making basic modifications to your tables, like adding and moving fields, you can make more advanced modifications that let you set rules for your data. All of these changes can help make your tables even more useful.

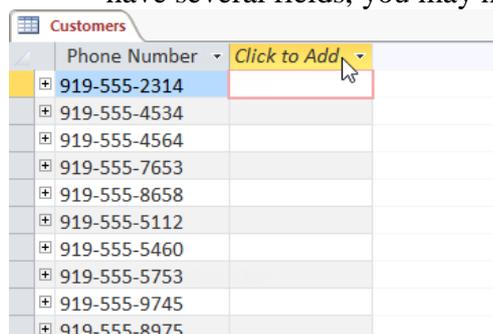
## Adding and rearranging fields

Access makes it easy to rearrange existing fields and add new ones. When you add a new field, you can even set the data type, which dictates which type of data can be entered into that field. There are several types of fields you can add to a table:

- **Short Text:** This is the default option and is best for most text in Access. You should also choose it for numbers you don't plan to do math with, like postal codes and phone numbers.
- **Number:** This is best for numbers you might want to do calculations with, like quantities of an item ordered or sold.
- **Currency:** This automatically formats numbers in the currency used in your region.
- **Date & Time:** This allows you to choose a date from a pop-out calendar.
- **Yes/No:** This inserts a checkbox into your field.
- **Rich Text:** This allows you to add formatting to text, like bold and italics.
- **Long Text:** This is ideal for large amounts of text, like product descriptions.
- **Attachment:** This allows you to attach files, like images.
- **Hyperlink:** This creates a link to a URL or email address.

To add a new field to an existing table:

- Open the desired table, then click the header with the text **Click to Add**. If you already have several fields, you may need to scroll all the way to the right to see this option.



The screenshot shows a table named 'Customers' with a header row containing 'Phone Number' and 'Click to Add'. The 'Click to Add' button is highlighted with a mouse cursor. Below the header, there are ten rows of data, each with a plus sign in the first column and a phone number in the second column.

	Phone Number	Click to Add
+	919-555-2314	
+	919-555-4534	
+	919-555-4564	
+	919-555-7653	
+	919-555-8658	
+	919-555-5112	
+	919-555-5460	
+	919-555-5753	
+	919-555-9745	
+	919-555-8975	

- A drop-down menu will appear. Select the desired data type for the new field.

Phone Number	Click to Add
919-555-2314	
919-555-4534	
919-555-4564	
919-555-7653	
919-555-8658	
919-555-5112	
919-555-5460	
919-555-5753	
919-555-9745	
919-555-8975	
919-555-2332	
919-555-1123	
919-555-3432	
919-555-5467	
919-555-7755	

AB Short Text

12 Number

Currency

Date & Time

Yes/No

Lookup & Relationship

Aa Rich Text

AB Long Text

Attachment

Hyperlink

Calculated Field

Paste as Fields

- Type a name for your field, then press the Enter key.

Phone Number	Add to Mailing List	Click to Add
919-555-2314	<input type="checkbox"/>	
919-555-4534	<input type="checkbox"/>	
919-555-4564	<input type="checkbox"/>	
919-555-7653	<input type="checkbox"/>	
919-555-8658	<input type="checkbox"/>	
919-555-5112	<input type="checkbox"/>	
919-555-5460	<input type="checkbox"/>	
919-555-5753	<input type="checkbox"/>	
919-555-9745	<input type="checkbox"/>	
919-555-8975	<input type="checkbox"/>	
919-555-2332	<input type="checkbox"/>	
919-555-1123	<input type="checkbox"/>	
919-555-3432	<input type="checkbox"/>	

To move a field:

- Locate the field you want to move, then hover your mouse over the bottom border of the field header. The cursor will become a four-sided arrow.

Email	Phone Number	Add to Mailing List	Click to Add
beck@email.com	919-555-2314	<input checked="" type="checkbox"/>	
lugeo@email.com	919-555-4534	<input type="checkbox"/>	
texj@email.com	919-555-4564	<input type="checkbox"/>	
newkb@email.com	919-555-7653	<input type="checkbox"/>	
lo@email.com	919-555-8658	<input type="checkbox"/>	
denqui@email.com	919-555-5112	<input type="checkbox"/>	
dhoda@email.com	919-555-5460	<input type="checkbox"/>	
hall@email.com	919-555-5753	<input type="checkbox"/>	
mshill@email.com	919-555-9745	<input type="checkbox"/>	
rogki@email.com	919-555-8975	<input checked="" type="checkbox"/>	

- Click and drag the field to its new location.

	Email	Phone Number	Add to Mailing List	Click to Add
+	beck@email.com	919-555-2314	<input checked="" type="checkbox"/>	
+	lugeo@email.com	919-555-4534	<input type="checkbox"/>	
+	texj@email.com	919-555-4564	<input type="checkbox"/>	
+	newkb@email.com	919-555-7653	<input type="checkbox"/>	
+	lo@email.com	919-555-8658	<input type="checkbox"/>	
+	denqui@email.com	919-555-5112	<input type="checkbox"/>	
+	dhoda@email.com	919-555-5460	<input type="checkbox"/>	

- Release the mouse. The field will appear in the new location.

	Email	Add to Mailing List	Phone Number	Click to Add
+	beck@email.com	<input checked="" type="checkbox"/>	919-555-2314	
+	lugeo@email.com	<input type="checkbox"/>	919-555-4534	
+	texj@email.com	<input type="checkbox"/>	919-555-4564	
+	newkb@email.com	<input type="checkbox"/>	919-555-7653	
+	lo@email.com	<input type="checkbox"/>	919-555-8658	
+	denqui@email.com	<input type="checkbox"/>	919-555-5112	
+	dhoda@email.com	<input type="checkbox"/>	919-555-5460	

## Advanced field options

On the previous page, you learned about setting the data type for new fields. When you set field data type, you are really setting a rule for that field. Databases often include rules because they help ensure users enter the correct type of data.

Why is this important? Computers aren't as smart as humans about certain things. While you might recognize that two and 2 or NC and North Carolina are the same thing, Access will not and therefore won't group these things together. Making sure to enter your data in a standard format will help you better organize, count, and understand it.

Rules can also determine which options you have for working with your data. For example, you can only do math with data entered in number or currency fields, and you can only format text entered into text fields.

There are three main types of rules you can set for a field: data type, character limit, and validation rules.

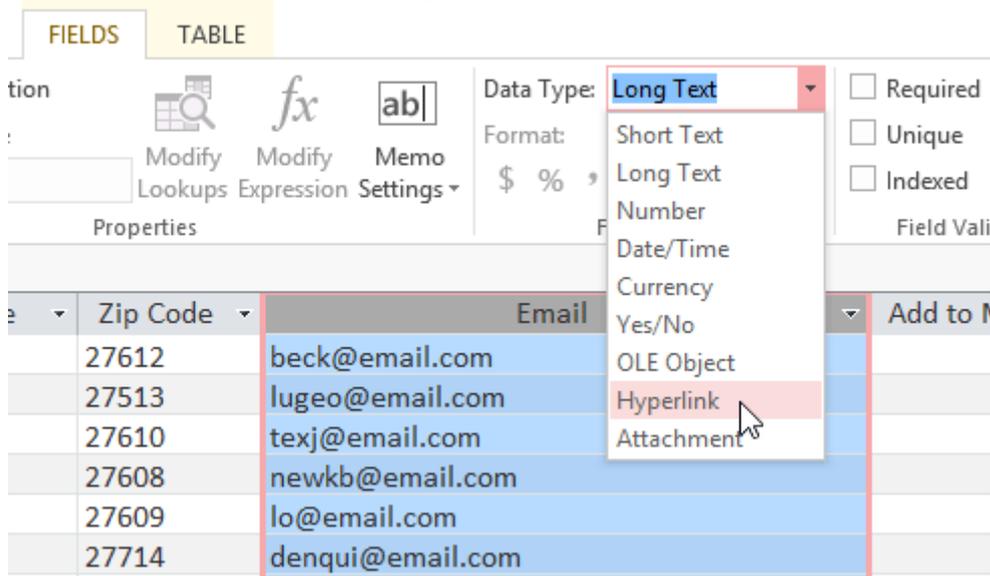
To change the data type for existing fields:

- Select the field whose data type you want to change.
- Select the Fields tab, then locate the Formatting group. Click the Data Type drop-down arrow.

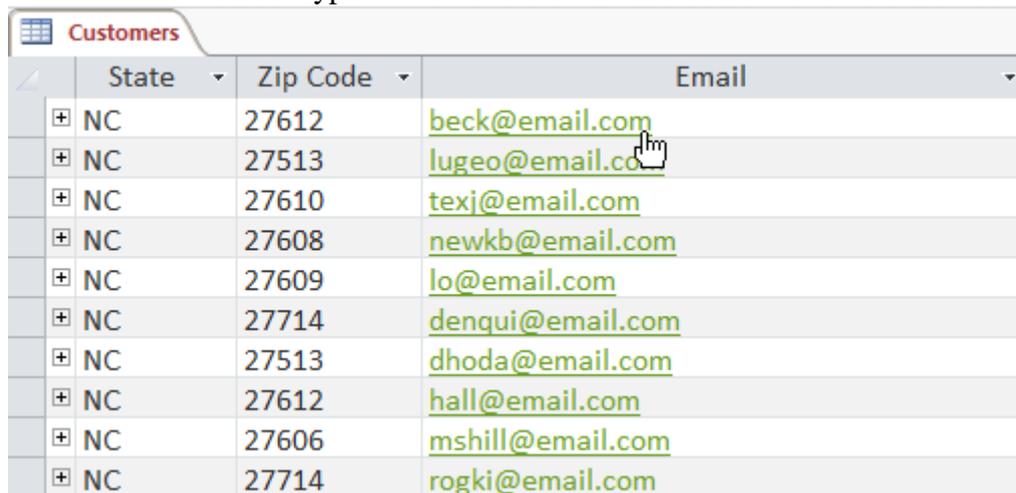
The screenshot shows the 'FIELDS' tab in Microsoft Access. The 'Data Type' dropdown menu is open, showing 'Long Text' selected. A tooltip is displayed over the dropdown menu, stating: 'Data Type: Set the data type for the field. Data types control the type of data that a field stores, such as integers, text, and currency.'

Field Name	Data Type
Zip Code	Long Text
beck@email.com	Long Text
lugeo@email.com	Long Text
texj@email.com	Long Text
newkb@email.com	Long Text
lo@email.com	Long Text
denqui@email.com	Long Text

- Select the desired data type.



- The field data type will be changed. Depending on the data type you chose, you may notice changes to your information. For instance, because we set the data type for the Email field to Hyperlink all of the email addresses in the field are now clickable links.



You shouldn't change field data type unless you are certain your field data is in the correct format for the new data type. Changing a field containing only text to the Number type, for instance, will delete all of your field data. This process is often irreversible.

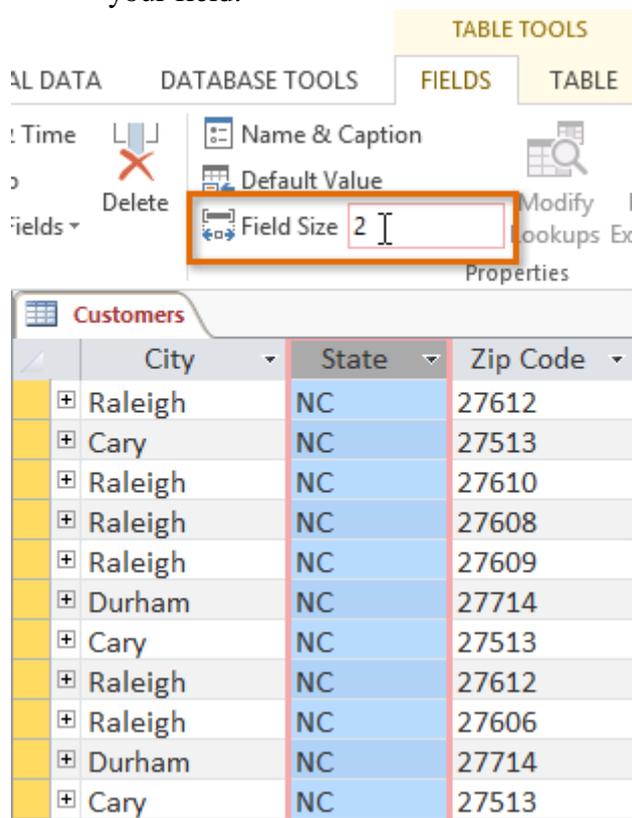
### Field character limits

Setting the character limit for a field sets a rule about how many characters—letters, numbers, punctuation, and even spaces—can be entered into that field. This can help to keep the data in your records concise and even force users to enter data a certain way.

In the example below, a user is entering records that include addresses. If you set the character limit in the State field to 2, users can only enter two characters of information. This means they must enter postal abbreviations for the states instead of the full name—here, NC instead of North Carolina. Note that you can only set a character limit for fields defined as text.

To set a character limit for a field:

- Select the desired field.
- Click the Fields tab, then locate the Properties group.
- In the Field Size box, type the maximum number of characters you want to allow in your field.



- Save your table. The character limit for the field will be set.

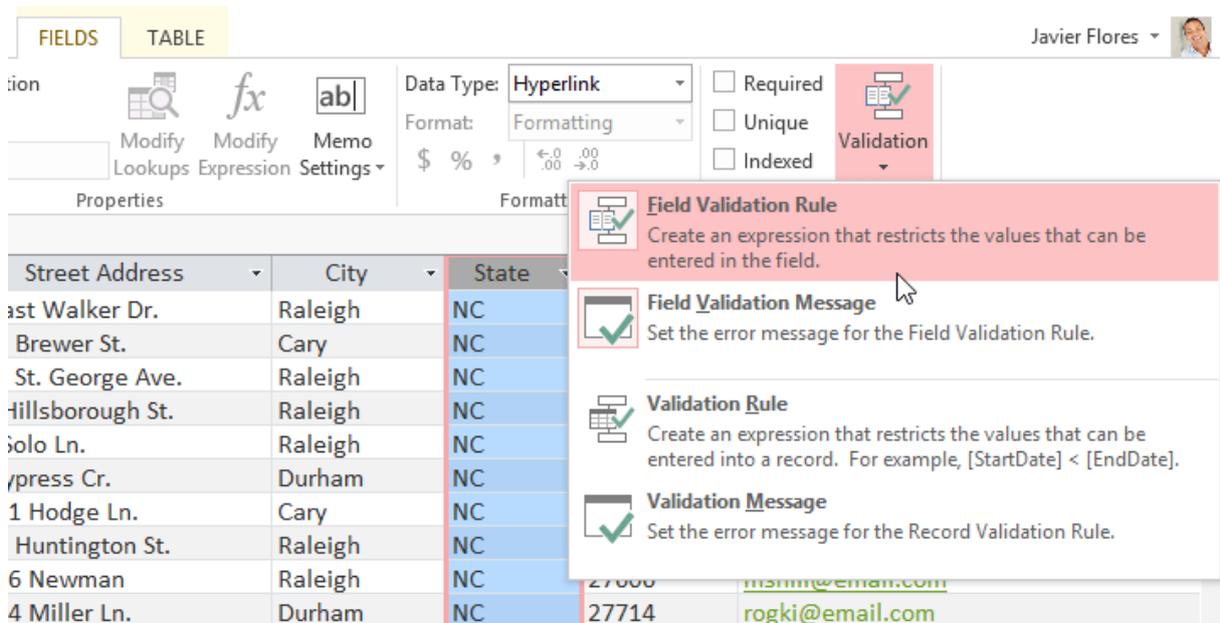
## Validation rules

A validation rule is a rule that dictates which information can be entered into a field. When a validation rule is in place, it is impossible for a user to enter data that violates the rule. For example, if we were asking users to input a state name into a table with contact information, we might create a rule that limits the valid responses to U.S. state postal codes. This would prevent users from typing something that wasn't actually a real state postal code.

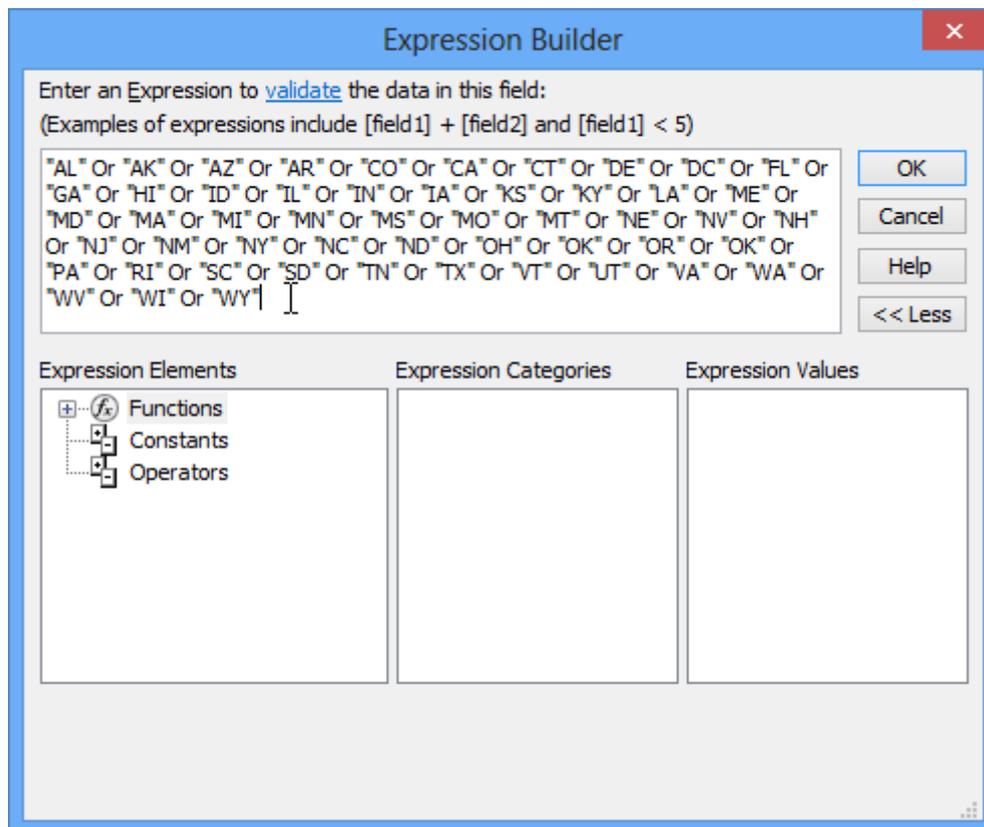
In the example below, we will apply that rule to our Customers table. It's a fairly simple validation rule—we'll just name all of the valid responses a user could enter, which will mean users can't type anything else into the record. However, it's possible to create validation rules that are much more complex. For detailed information on how to write validation rules, review this tutorial from Microsoft on creating validation rules.

To create a validation rule:

- Select the field you want to add a validation rule to. In our example, we'll set a rule for the State field.
- Select the Fields tab, then locate the Field Validation group. Click the Validation drop-down command, then select Field Validation Rule.



- The Expression Builder dialog box will appear. Click the text box and type your validation rule. In our example, we want to limit data in the State field to actual state postal codes. We'll type each of the valid responses in quotation marks and separate them with the word Or, which lets Access know that this field can accept the response "AL" Or "AK" Or "AZ" or any of the other terms we've entered.



- Once you're satisfied with the validation rule, click OK. The dialog box will close.
- Click the Validation drop-down command again. This time, select Field Validation Message.

FIELD | TABLE | Javier Flores

Properties: Lookups, Expression, Settings

Format: Formatting

Data Type: Hyperlink

Required, Unique, Indexed

Validation

Street Address	City	State
Luna St.	Durham	NC
Peace St.	Raleigh	NC
Home Dr.	Raleigh	NC
Hatsy Way	Charlotte	NC
Juliana Way	Charlotte	NC
9 Raleigh Street	Hillsborough	NC
Learnfree St.	Raleigh	NC
Hill St.	Raleigh	NC
West Third St	Chapel Hill	NC

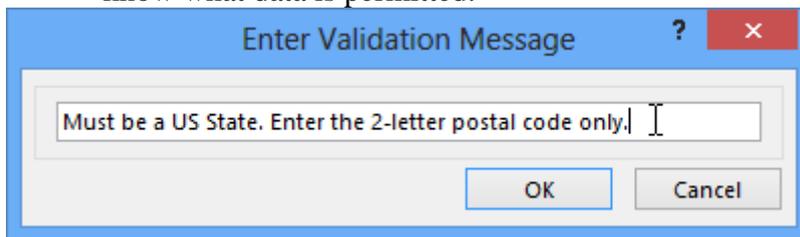
**Field Validation Rule**  
Create an expression that restricts the values that can be entered in the field.

**Field Validation Message**  
Set the error message for the Field Validation Rule.

**Validation Rule**  
Create an expression that restricts the values that can be entered into a record. For example, [StartDate] < [EndDate].

**Validation Message**  
Set the error message for the Record Validation Rule.

- A dialog box will appear. Type the phrase you want to appear in an error message when users try to enter data that violates the validation rule. Your message should let them know what data is permitted.



- When you're satisfied with the error message, click OK.
- The validation rule is now included in the field. Users will be unable to enter data that violates the rule.

Raleigh	NC	27603	tobv@email.com
Raleigh	NC		
Charlotte	NC		
Charlotte	NC		
Hillsborough	NC		
Raleigh	NC		
Raleigh	NC		
Chapel Hill	NC	27894	
Durham	NC	27704	
Raleigh	Nx		

Microsoft Access

Must be a US State. Enter the 2-letter postal code only.

OK Help

## More table options

### Calculated fields and totals rows

Adding calculated fields and totals rows to your table lets you perform calculations using your table data. A calculated field calculates data within one record, while a totals row performs a calculation on an entire field of data. Whenever you see a subtotal for one record, you are looking at a calculated field. Similarly, whenever you see a grand total at the bottom of a table, you're looking at a totals row.

Product	Quantity	Unit	Price	Subtotal
German Chocolate	1	Single	\$22.00	\$22.00
German Chocolate	1		\$22.00	\$22.00
Chocolate Banana Walnut	1		\$19.00	\$19.00
Fudge Chocolate	3		\$22.00	\$66.00
Fudge Chocolate	2		\$22.00	\$44.00
Chocolate Chip	2		\$1.50	\$3.00
Chocolate Chip	3	Single	\$1.50	\$4.50
Chocolate Chip	1	Half-Dozen	\$7.50	\$7.50
Chocolate Chip	2	One Dozen	\$14.00	\$28.00
White Chocolate Macademia Nut	3	Half-Dozen	\$10.50	\$31.50
White Chocolate Macademia Nut	2	One Dozen	\$19.00	\$38.00
Fudge Chocolate	1	Single	\$22.00	\$22.00
Chocolate Banana Walnut	1		\$2.00	\$2.00
Chocolate Amaretto	2		\$24.00	\$48.00
Chocolate Amaretto	1		\$24.00	\$24.00
<b>Total</b>				<b>\$371.50</b>

This calculated field multiplies the data in the Quantity and Price fields

The totals row adds all of the subtotals to calculate a grand total

## Challenge!

1. Open an existing Access sample database.
2. Open the Products Table, and change the data type for the description field to Long Text.
3. Open the Customers Table and add a new field that uses the Short Text data type. Name the new field Credit Card.
4. Add the following Field Validation Rule to the Credit Card field: "VS" Or "MC" Or "AMX".
5. Set a field validation message for the same field. It should say Enter a valid Credit Card Type: Must be VS, MC, or AMX.
6. Test your field validation rule by typing Visa into a cell in the Credit Card field. If you've added the rule correctly, a dialog box should appear with the message you added above.

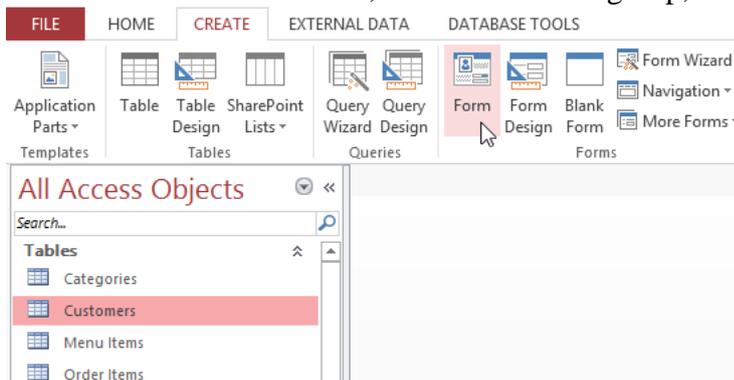
## Creating Forms

Creating forms for your database can make entering data more convenient. When you create a form, you can design it in a way that works with your database and that makes sense to you. In this lesson, you will learn how to create and modify forms. You'll also learn how to use form options like design controls and form properties to make sure your form works exactly the way you want.

To create a form:

Access makes it easy to create a form from any table in your database. Any form you create from a table will let you view the data that's already in that table and add new data. Once you've created a form, you can modify it by adding additional fields and design controls like combo boxes.

- In the Navigation pane, select the table you want to use to create a form. You do not need to open the table.
- Select the Create tab, locate the Forms group, and click the Form command.



- Your form will be created and opened in Layout view.

ID	Paid	Pre Order	Notes
38	Yes	No	
(New)	No	No	

- To save the form, click the Save command on the Quick Access toolbar. When prompted, type a name for the form, then click OK.

### About subforms

If you created a form from a table whose records are linked to another table, your form probably includes a subform. A subform is a datasheet form that displays linked records in a table-like format. For instance, the subform included in the Customers form we just created displays linked customer orders.

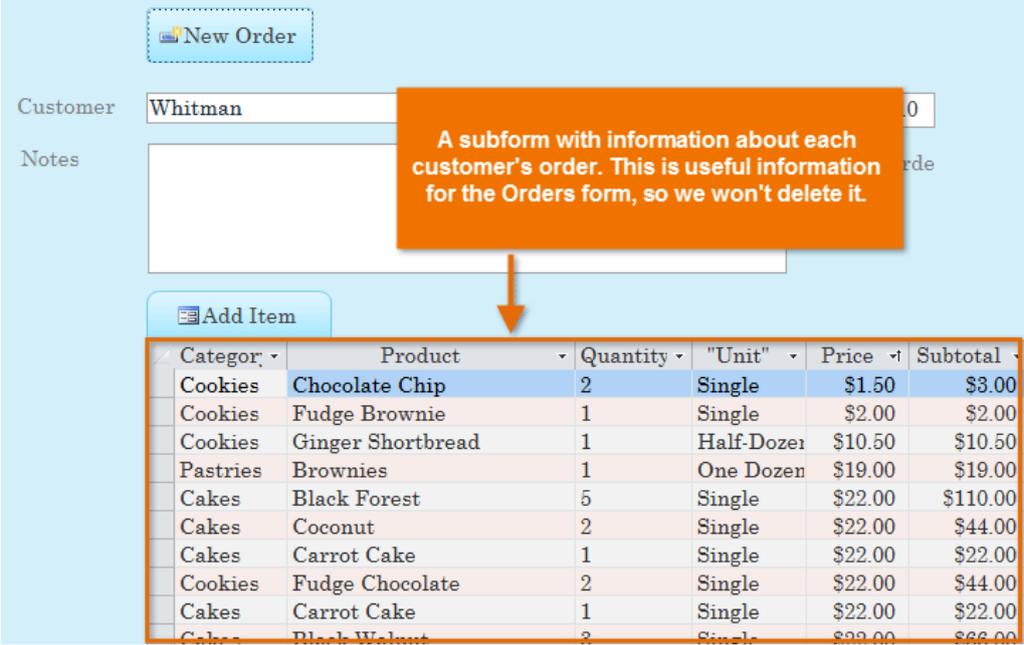
We probably don't need to include this subform because we just want to use the Customers form to enter and review contact information. If you find that you don't need a subform, you can easily delete it. To do this, simply click it and press the Delete key on your keyboard.

A subform with information about each customer's order. This is more information than we need for the Customers form.

ID	Paid	Pre Order	Notes
38	Yes	No	
(New)	No	No	

Record: 1 of 1 | No Filter | Search

However, subforms are often quite helpful. Depending on the content and source of your form, you might find that the subform contains useful information, like in the example below. In our Orders form, the subform contains the name, quantity, and price of each item contained in the order, which is all useful information.

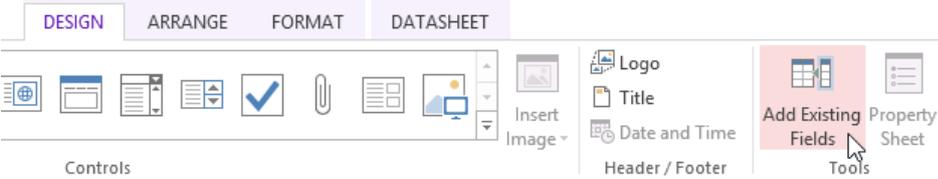


### Adding additional fields to a form

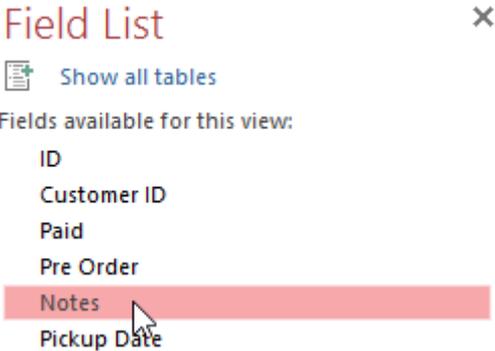
When you use the Form command on an existing table, all of the fields from the table are included in the form. However, if you later add additional fields to the table, these fields will not automatically show up in existing forms. In situations like this, you can add additional fields to a form.

To add a field to a form:

- Select the Design tab, then locate the Tools group on the right side of the Ribbon.
- Click the Add Existing Fields command.



- The Field List pane will appear. Double-click the desired field(s).



- The field will be added.

Add to Mailing List?

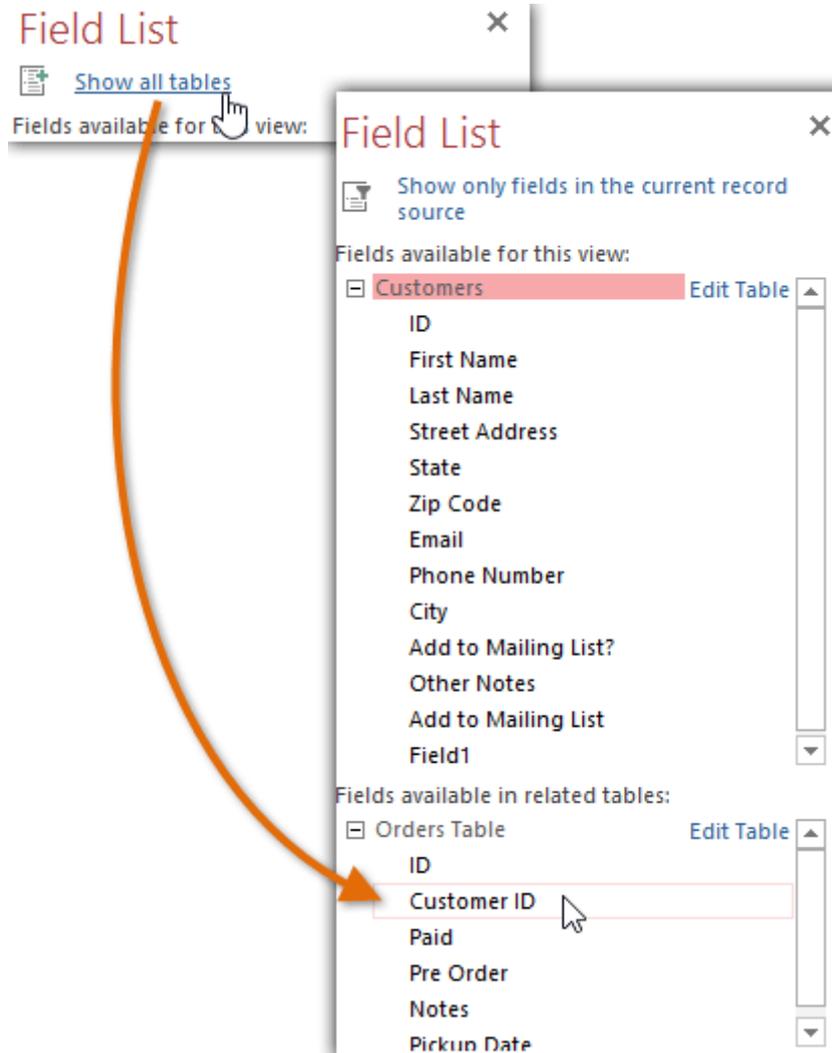
Notes

You can also use the above procedure to add fields to a totally blank form. Simply create a form by clicking the Blank Form command on the Create tab, then follow the above steps to add the desired fields.

To add a field from a different table:

You can also add fields from different tables in your database to the form.

- From the Field List pane, click Show All Tables.
- Click the plus sign + next to the table that contains the field you want to add, then double-click the desired field.



- The new field will be added.

## Adding design controls

Design controls set restrictions on the fields in your forms. This helps you better control how the data is entered into your forms, which in turn helps keep the database consistent.

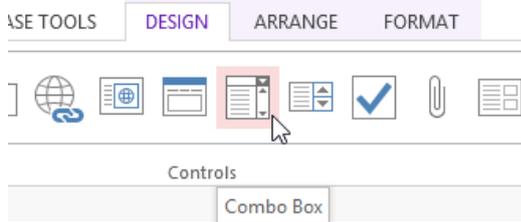
### Combo boxes

A combo box is a drop-down list you can use in your form in place of a field. Combo boxes limit the information users can enter by forcing them to select only the options you have specified.

Combo boxes are useful for fields that have a limited number of possible valid responses. For instance, you might use a combo box to make sure people only enter a valid U.S. state while entering an address, or that they only choose products that already exist in your database while placing an order.

To create a combo box:

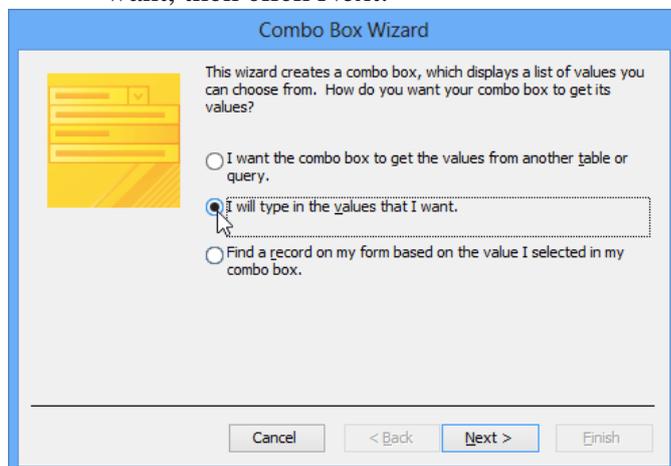
- In Form Layout view, select the Design tab, then locate the Controls group.
- Select the Combo Box command, which looks like a drop-down list.



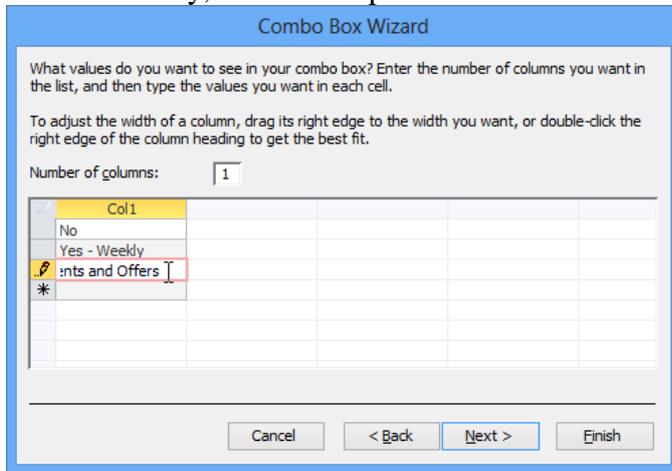
- Select the desired location for the combo box. A line will appear to indicate the location where your combo box will be created. In our example, we'll place it between the City field and the Add to Mailing List? fields.

Email	<input type="text" value="beck@email.com"/>
Phone Number	<input type="text" value="919-555-2314"/>
City	<input type="text" value="Raleigh"/>
Add to Mailing List?	<input type="text" value="No"/> 

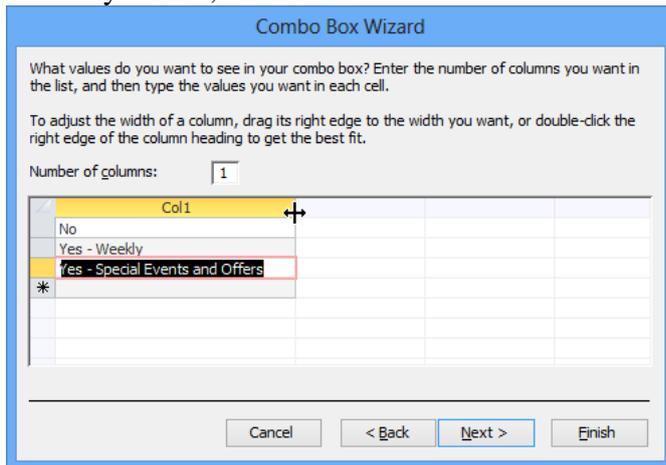
- The Combo Box Wizard dialog box will appear. Select I will type in the values that I want, then click Next.



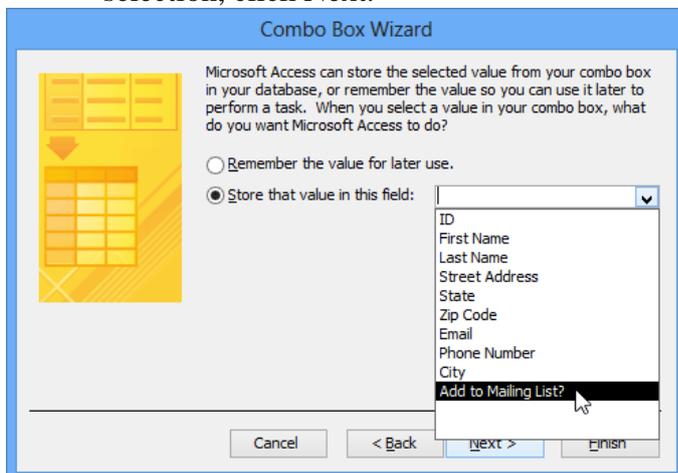
- Type the choices you want to appear in your drop-down list. Each choice should be on its own row. In our example, we are creating a combo box for the Add to Mailing List? field in our form, so we will enter all of the possible valid responses for this field. Users will be able to select one of three choices from our finished combo box: No, Yes - Weekly, and Yes - Special Events and Offers.



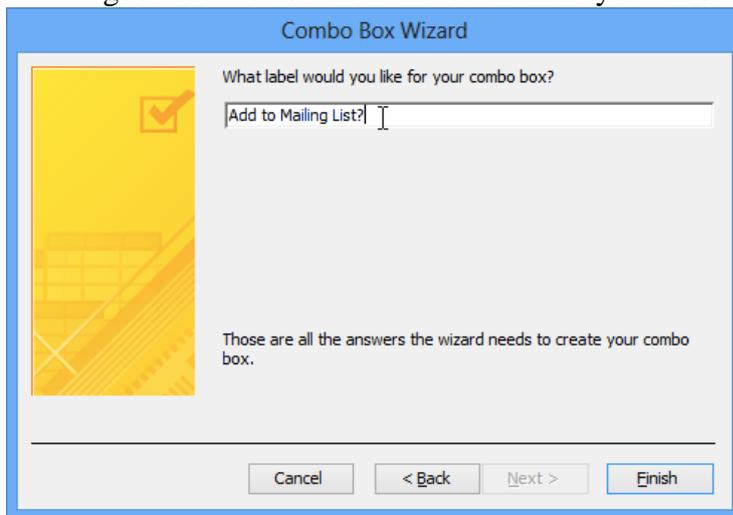
- If necessary, resize the column so all of your text is visible. Once you are satisfied with your list, click Next.



- Select Store that value in this field, then click the drop-down arrow and select the field where you want selections from your combo box to be recorded. After making your selection, click Next.



- Enter the label—or name—that will appear next to your combo box. Generally, it's a good idea to use the name of the field you chose in the previous step.



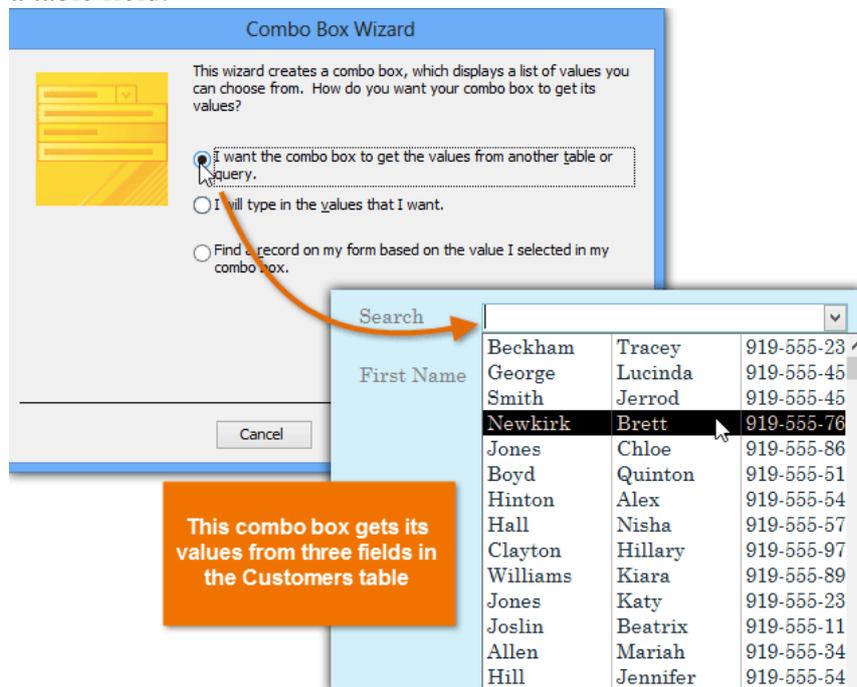
- Click Finish. Your combo box will appear on the form. If you created your combo box to replace an existing field, you should delete the first field. In our example, you might notice that we now have two fields with the same name. These two fields send information to the same place, so we don't need them both. We'll delete the one without the combo box.

Email	<input type="text" value="beck@email.com"/>
Phone Number	<input type="text" value="919-555-2314"/>
City	<input type="text" value="Raleigh"/>
Add to Mailing List?	<input type="text" value="No"/>
Add to Mailing List?	<input type="text" value="No"/>
Notes	<input type="text"/>

- Switch to Form view to test your combo box. Simply click the drop-down arrow and verify that the list contains the correct choices. The combo box can now be used to enter data.

Phone Number	<input type="text" value="919-555-2314"/>
City	<input type="text" value="Raleigh"/>
Add to Mailing List?	<input type="text" value="No"/> <ul style="list-style-type: none"> <li>No</li> <li><b>Yes - Weekly</b></li> <li>Yes - Special Events and Offers</li> </ul>
Notes	<input type="text"/>

If you want to include a drop-down list with a long list of options and don't want to type all of them out, create a combo box and choose the first option in the Combo Box Wizard, I want to get the values from another table or query. This will allow you to create a drop-down list from a table field.

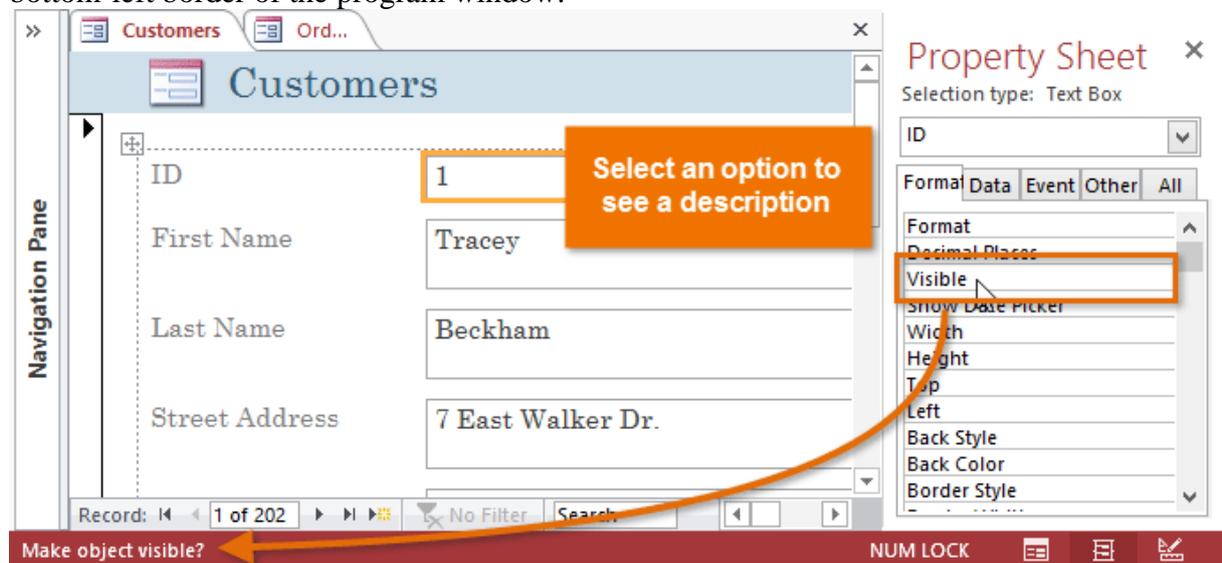


Some users report that Access malfunctions while working with forms. If you have a problem performing any of these tasks in Layout view, try switching to Design view.

## Customizing form settings with the Property Sheet

The Property Sheet is a pane containing detailed information on your form and each of its components. From the Property Sheet, you can make changes to every part of your form, both in terms of function and appearance.

The best way to familiarize yourself with the Property Sheet is to open it and select various options. When you select an option, Access will display a brief description of the option on the bottom-left border of the program window.



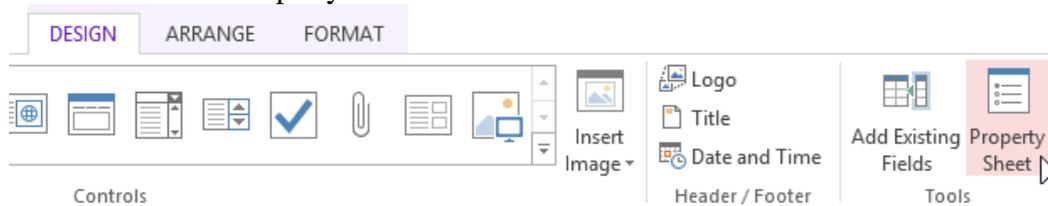
Pay close attention as you modify your form and its fields. It's possible to make subtle changes with the Property Sheet. Because there are so many options, it can sometimes be difficult to remember which one you used to modify each aspect of your form.

### Modifying form settings

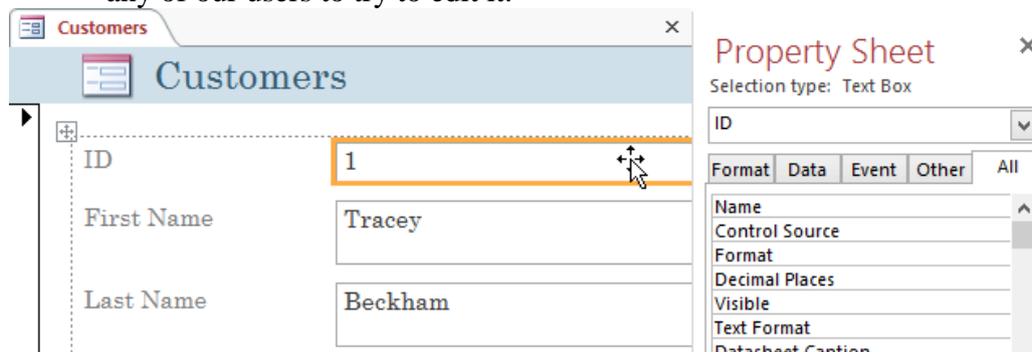
There are far too many options in the Property Sheet to discuss them all in detail. We'll review two useful ones here: hiding fields, and setting fields with dates to automatically fill in the current date. Practicing these procedures should also give you a sense of how to work with other Property Sheet settings.

To hide a field:

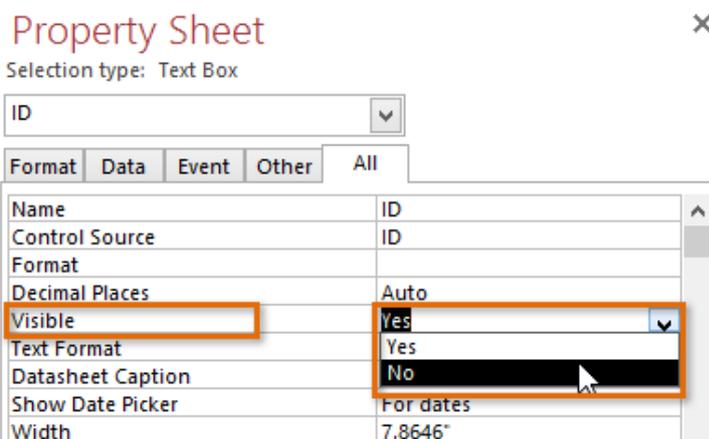
- In either Layout or Design view, select the Design tab, then locate the Tools group. Click the Property Sheet command.



- The Property Sheet will appear in a pane on the right. On the form, select the field you want to hide. In our example, we'll hide the Customer ID field because we don't want any of our users to try to edit it.



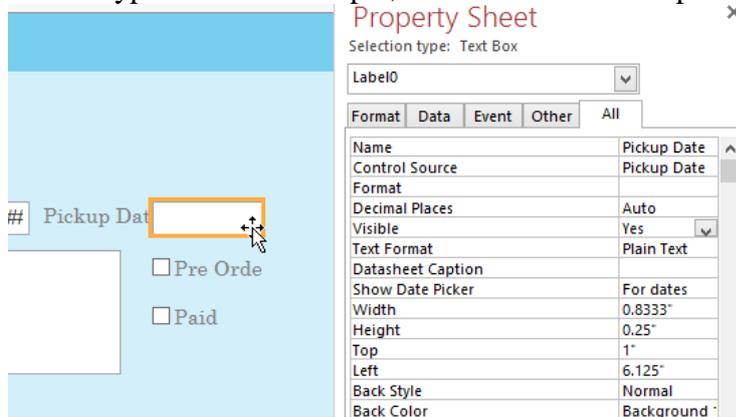
- In the Property Sheet, click the All tab, then locate the Visible option on the fifth row.
- Click the drop-down arrow in the column to the right, then select No.



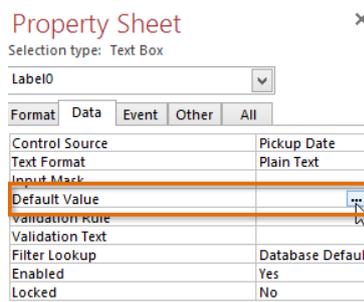
- Switch to Form view to verify that the field is hidden.

To set a field to autofill with the current date:

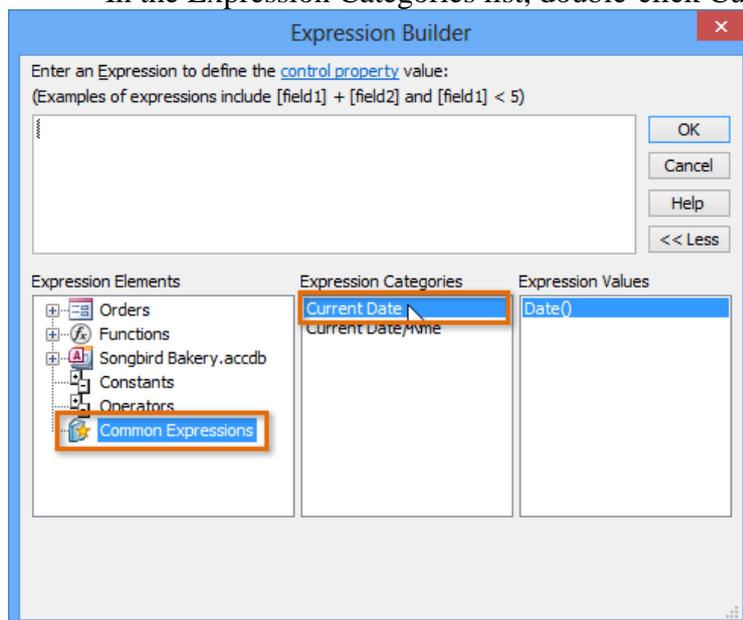
- In either Layout or Design view, select the Design tab, then locate the Tools group. Click the Property Sheet command.
- The Property Sheet will appear in a pane on the right. On the form, select the field you want to automatically fill in the current date. This must be a field with the date data type. For our example, we'll select the Pickup Date field on our Orders form.



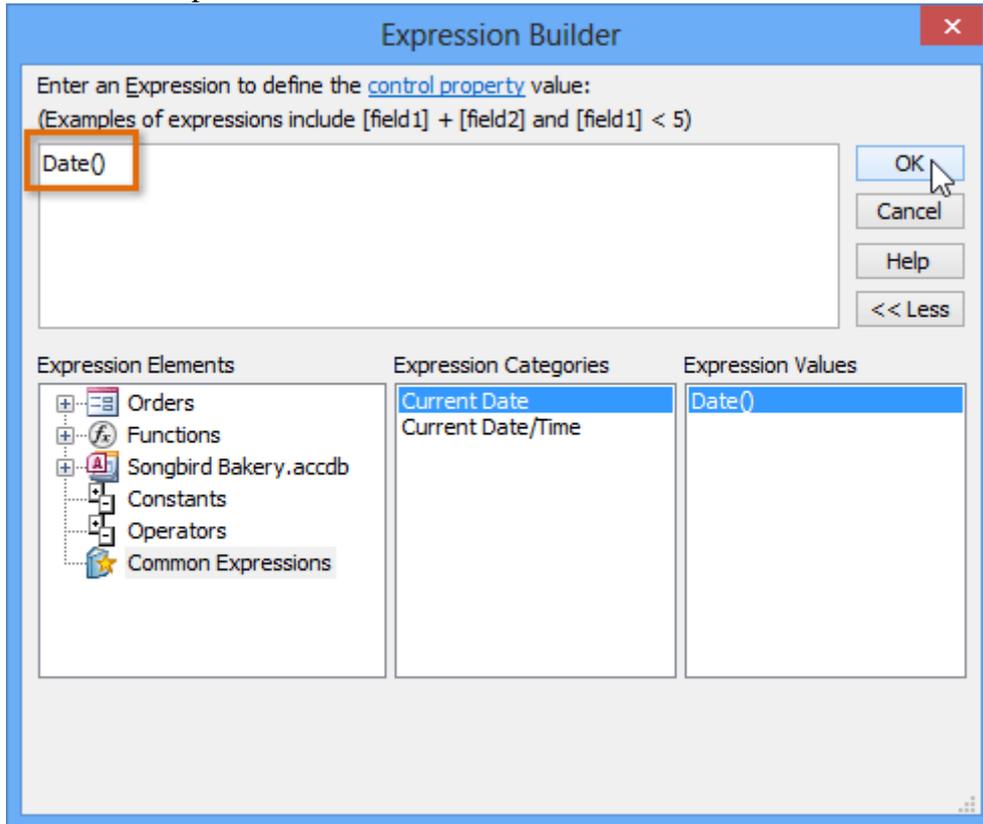
- In the Property Sheet, click the Data tab, then select the Default Value field in the fourth row. Click the Expression Builder button that appears in the column to the right.



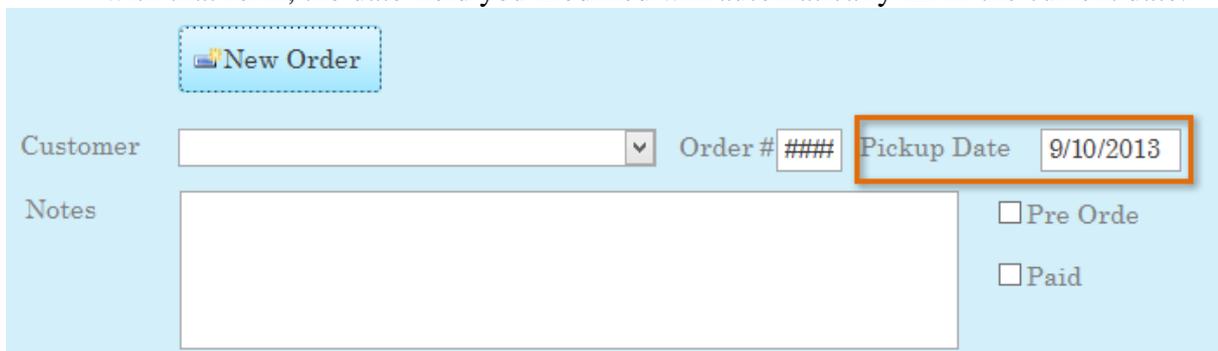
- The Expression Builder dialog box will appear. In the Expression Elements list, click the words Common Expressions.
- In the Expression Categories list, double-click Current Date.



- The expression for Current Date will be added. Click OK.



- Switch to Form view to verify that the expression works. When you create a new record with that form, the date field you modified will automatically fill in the current date.



### Challenge!

1. Open an existing Access sample database.
2. Create a form from the Customers table.
3. Delete the subform.
4. Create a combo box.
  - a. Add the following choices to the combo box:
    - i. Raleigh
    - ii. Durham
    - iii. Hillsborough
    - iv. Cary
    - v. Chapel Hill
    - vi. Garner
    - vii. Charlotte

- b. Store the value in the City field, and label the combo box NC City List. Click Finish when you are done with the Combo Box Wizard.
5. Switch to Form view, and click on the drop-down arrow in the combo box you created. You should see a list of cities.

## Formatting Forms

After creating a form, you might want to modify its appearance. Formatting your forms can help make your database look consistent and professional. Some formatting changes can even make your forms easier to use. With the formatting tools in Access, you can customize your forms to look exactly the way you want.

In this lesson, you will learn how to add command buttons, modify form layouts, add logos and other images, and change form colors and fonts.

Access offers several options that let you make your forms look exactly the way you want. While some of these options—like command buttons—are unique to forms, others may be familiar to you.

### Command buttons

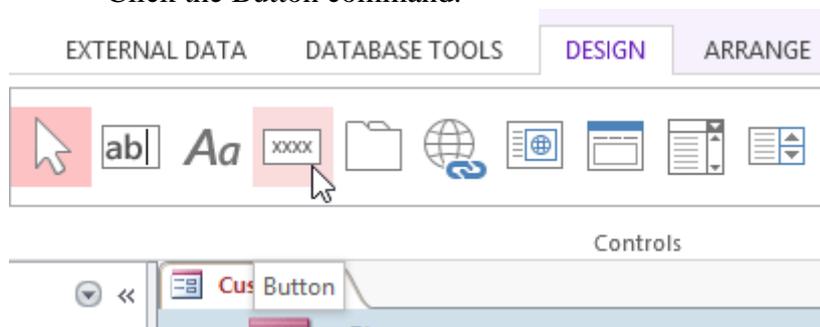
If you want to create a way for users of your form to quickly perform specific actions and tasks, consider adding command buttons. When you create a command button, you specify an action for it to carry out when clicked. By including commands for common tasks right in your form, you're making the form easier to use.

Access offers many different types of command buttons, but they can be divided into a few main categories:

- Record Navigation command buttons, which allow users to move among the records in your database
- Record Operation command buttons, which let users do things like save and print a record
- Form Operation command buttons, which allow users to quickly open or close a form, print the current form, and perform other actions
- Report Operation command buttons, which offer users a quick way to do things like preview or mail a report from the current record

To add a command button to a form:

- In Form Layout view, select the Design tab, then locate the Controls group.
- Click the Button command.

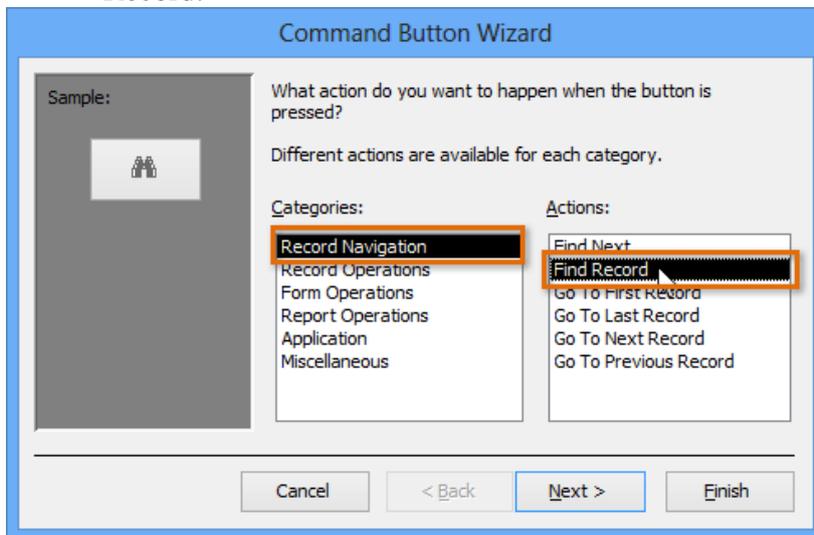


- Choose the desired location for the command button, then click the mouse.

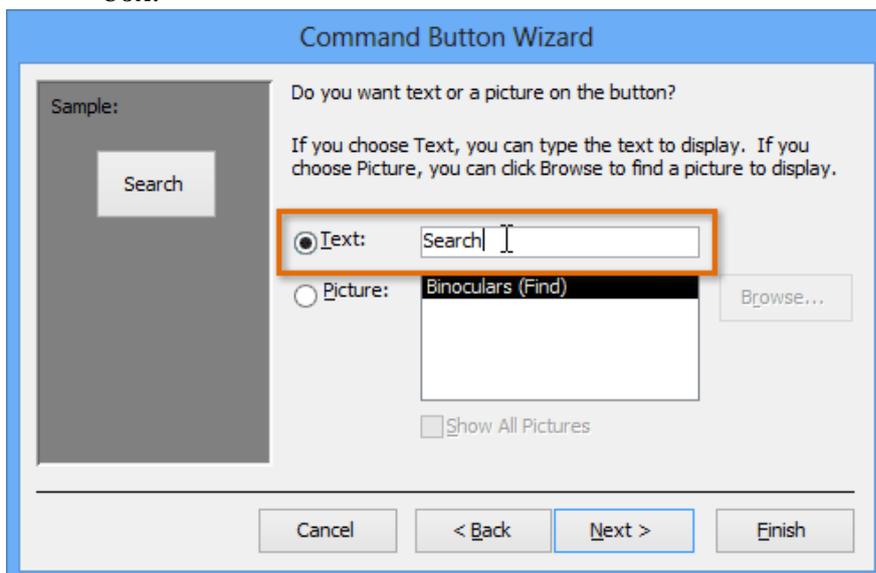
Add to Mailing List?

Other Notes

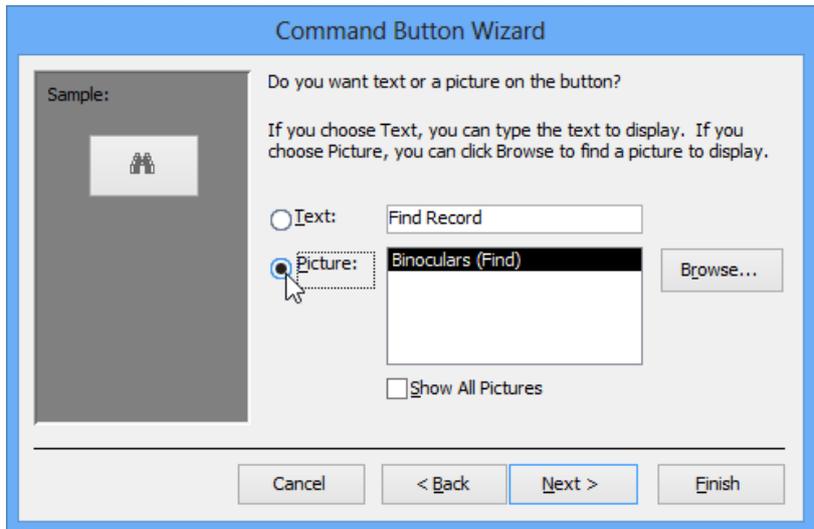
- The Command Button Wizard will appear. In the Categories pane, select the category of button you want to add. We want to find a way to move more quickly to specific records, so we'll choose the Record Navigation category.
- The list in the Actions pane will update to reflect your chosen category. Select the action you want the button to perform, then click Next. In our example, we'll choose Find Record.



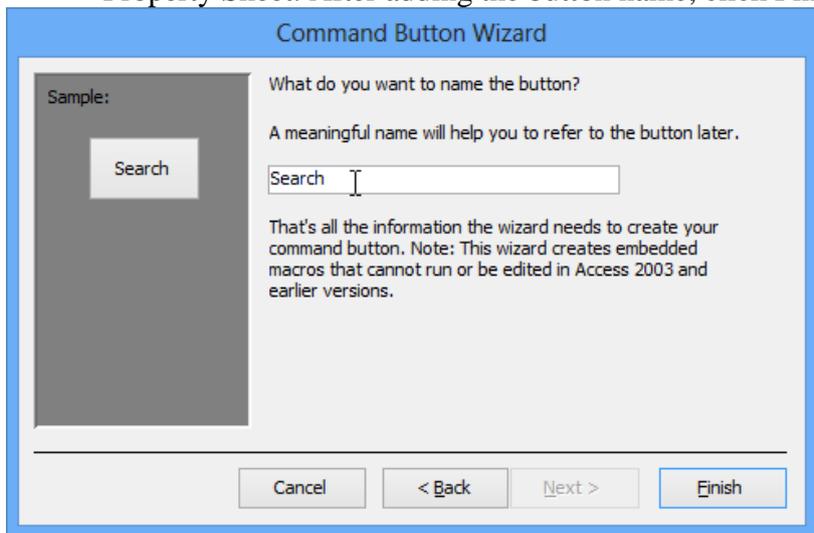
- You can now decide whether you want your button to include text or a picture. A live preview of your button appears on the left.
- To include text, select the Text option, then type the desired word or phrase into the text box.



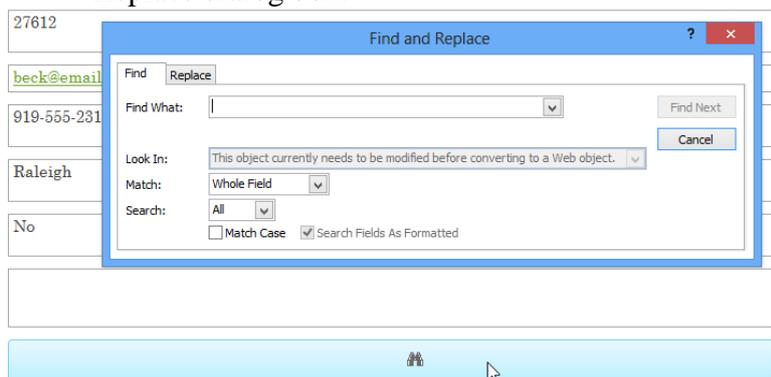
- To include a picture, select the Picture option. You can decide to keep the default picture for that command button or select another picture. Click Show All Pictures to choose from another command button icon or Browse to choose a picture from your computer.



- When you are satisfied with the appearance of your command button, click Next.
- Type a name for the button. This name won't appear on the button, but knowing the name will help you quickly identify the button if you ever want to modify it with the Property Sheet. After adding the button name, click Finish.



- Switch to Form view to test the new button. Our Search button opens the Find and Replace dialog box.



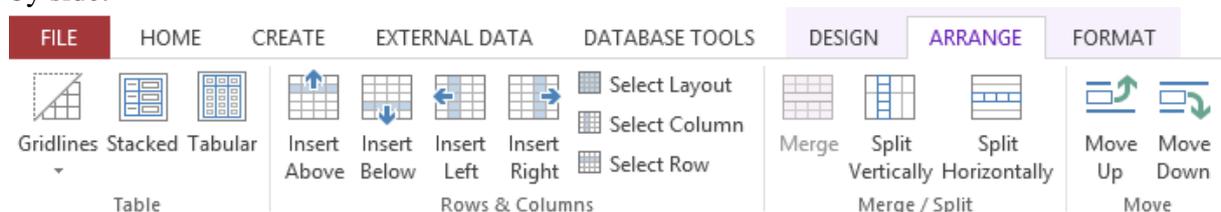
Some users report that Access malfunctions while formatting forms. If you have a problem performing any of these tasks in Layout view, try switching to Design view.

## Modifying form layout

When you create a form, Access arranges the form components in a default layout where the fields are neatly stacked up on top of each other, all exactly the same width. While this layout is functional, you might find that it doesn't best fit your information. For instance, in the form below most of the fields are almost completely empty because the data stored there doesn't take up much room.

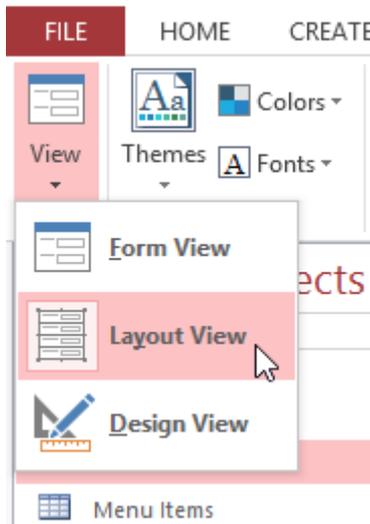
The form would fit the data better if we made the fields and command buttons smaller and even put some of them side by side. However, with the default layout, you won't be able to put two fields next to each other or resize one field or button without resizing all of them. This is because Access lines up form components in rows and columns. When you resize a field, you're really resizing the column that contains it.

To resize and rearrange our fields the way we want, we'll have to modify the form layout. For instance, because the default layout for our form contains only two columns—one for the field labels and another for the fields—we would have to create a new column to put two fields side by side.



To resize form components:

- Switch to Layout view.



- Select the field or button you want to resize, then hover your mouse over the edge. Your cursor will become a double-sided arrow.
- Click and drag the mouse to resize the selected object.

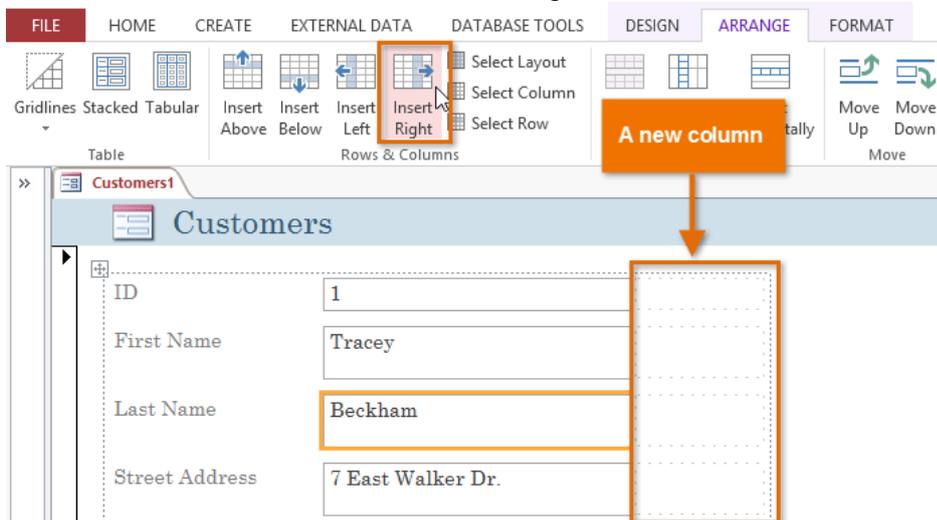
ID	1	
First Name	Tracey	
Last Name	Beckham	
Street Address	7 East Walker Dr.	
State	NC	

- The field or button will be resized, as well as every other item aligned with it.

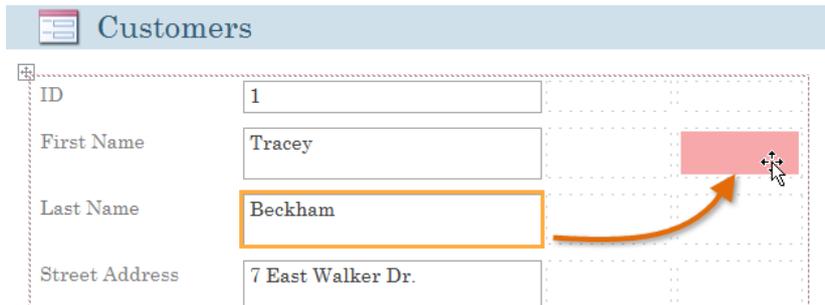
ID	1
First Name	Tracey
Last Name	Beckham
Street Address	7 East Walker Dr.
State	NC
Zip Code	27612

To move form components:

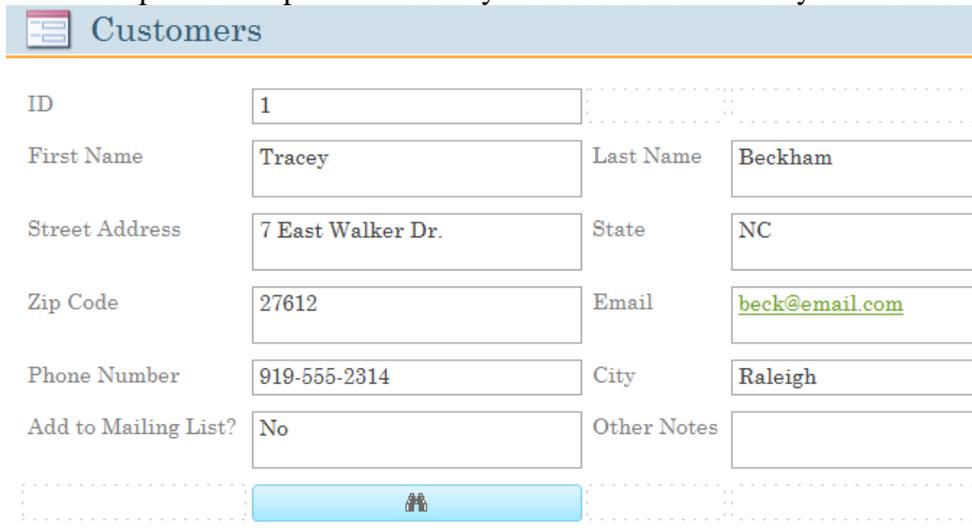
- If necessary, add columns or rows to make room for the field or button you want to move by using the Insert commands in the Rows & Columns group. In our example, we want to move the Last Name field to the right of the First Name field, so we'll have to create two new columns to the right: one for the field label, and one for the field itself. To do this, we'll click the Insert Right command twice.



- Click and drag the field or button to its new location. If you're moving a field, make sure to move the field label as well.



- Repeat the steps above for any other fields or buttons you want to move.



If you want to make a field take up more or less space than one column, you can use the Merge and Split commands. The Merge command combines two or more cells, while the Split command divides a cell.

The screenshot shows a form titled 'Customers' with a search bar and a 'New Customer' button. The form fields are: ID (1), First Name (Tracey), Last Name (Beckham), Street Address (7 East Walker Dr.), State, Zip Code (27612), Email (beck@email.com), Phone Number (919-555-2314), and City (Raleigh). There are two orange callout boxes: one pointing to the State field with the text 'These larger fields are made up of merged cells', and another pointing to the Add to Mailing List field with the text 'These two cells have been split'.

### More formatting options

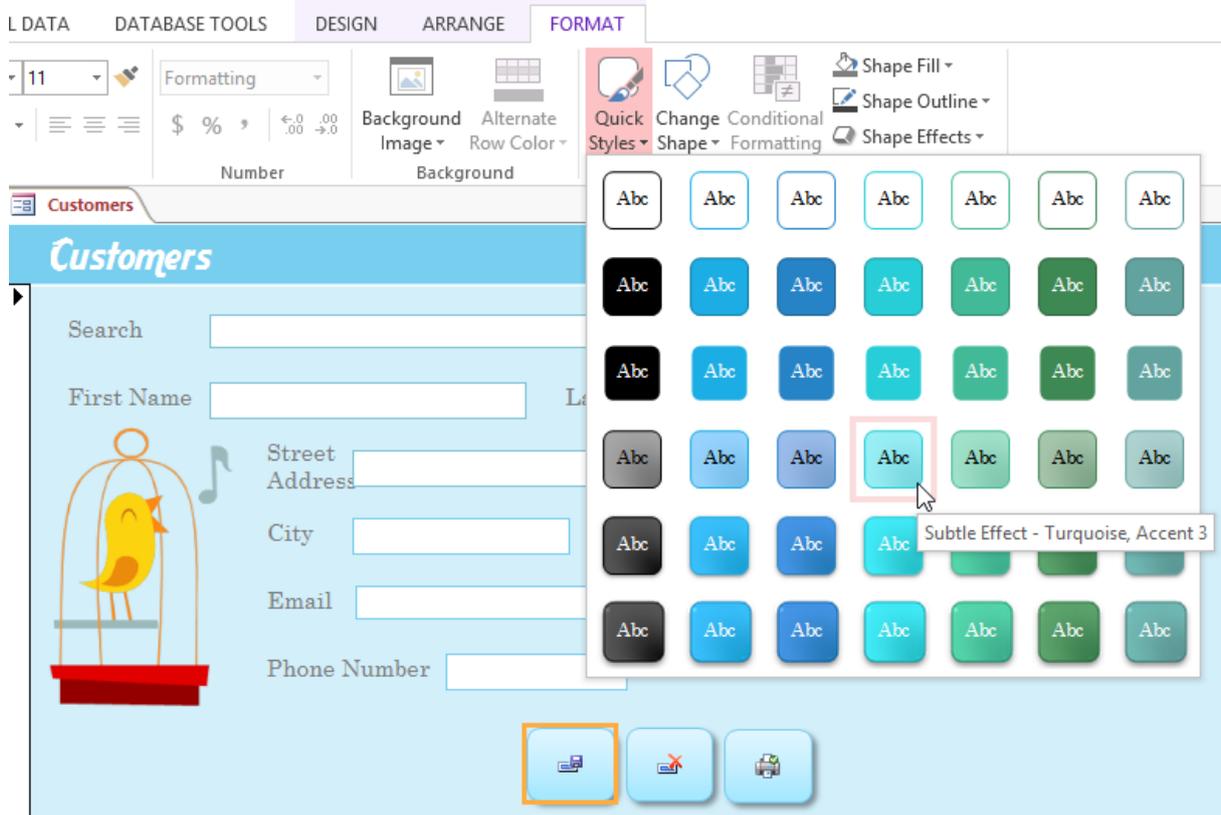
Adding logos and other images to your forms can greatly improve their appearance, as can applying theme colors and fonts. To learn how to add images and theme elements to your forms, review our Advanced Report Options lesson. The procedures are identical.

The screenshot shows a more styled 'Customers' form. It features a search bar, a 'New Record' button, and a 'New Customer' button. The form fields are: First Name (Tracey), Last Name (Beckham), Street Address (7 East Walker Dr.), City (Raleigh), State (NC), Zip Code (27612), Email (beck@email.com), Phone Number (919-555-2314), and Add to Mailing List? (Yes-- Weekly & Events). There is a yellow bird illustration in a cage on the left side of the form.

## Modifying the colors and fonts of form components

To further customize the appearance of your forms, you can apply different colors and fonts to individual fields, buttons, labels, and other form components. Modifying form appearance this way is useful if you want to use a certain color or font scheme in a form but don't want these design elements to apply to your entire database.

For instance, in the form below we modified the font of our form title. We also applied a new fill and border color to the form fields and are doing the same with the command buttons.



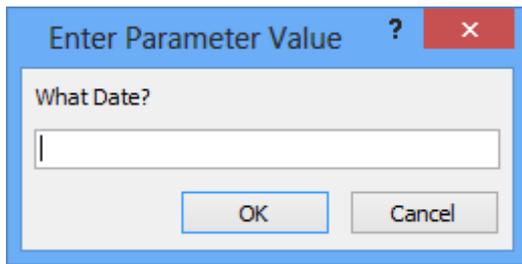
## Challenge!

1. Open an existing Access sample database.
2. Open the Order Items form.
3. Add a command button that creates a new record.
4. Format the newly added command button with the colors and style of your choosing.
5. Change the theme colors and theme fonts.
6. Add a logo.

## Creating a Parameter Query

A parameter query is one of the simplest and most useful queries you can create. Because parameter queries are so simple, they can be easily updated to reflect a new search term. When you open a parameter query, Access will prompt you for a search term and show you query results that reflect your search.

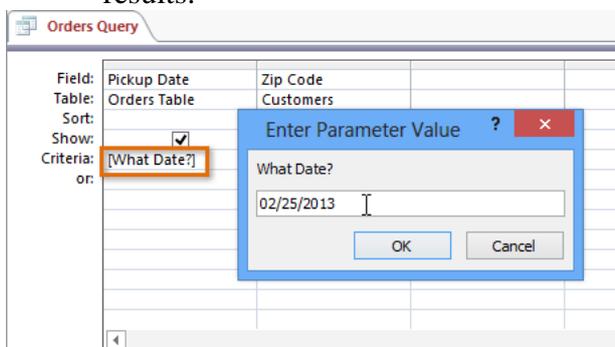
When you're running parameter queries, search terms act as variable criteria, which are query criteria that change each time you run the query. For instance, let's say we own a bakery and want to create a query that will quickly look up orders that were placed on a certain date. We could create a parameter query with variable criteria in the Date field. This way, each time we run the query a dialog box will appear to prompt us to enter the date we'd like our query to search for.



We'll enter the date we want, then Access will run the query using the date we entered as a search term.

To create and run a parameter query:

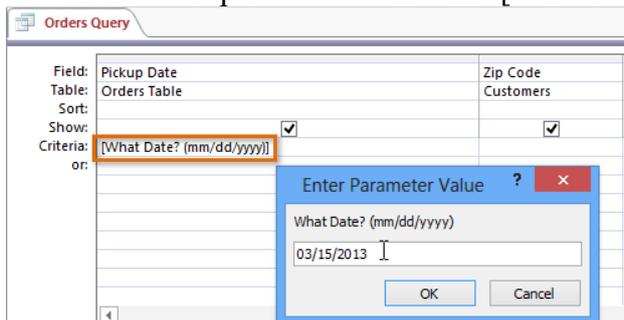
- Create a query as you normally would, modifying the table joins if necessary, selecting the fields to include in your query, and adding any nonvariable criteria to the appropriate fields in the Criteria: row.
- Locate the field or fields where you want the variable criteria to appear, then select the Criteria: row.
- Type the phrase you want to appear in the prompt that will pop up each time you run your query. Make sure to enclose the phrase in brackets [ ]. For example, in our parameter query that searches for orders placed on a certain date, we might type our criteria like this: [What Date?].
- On the Design tab, click the Run command to run your query. A dialog box will appear with the specified prompt. Enter your search term and click OK to view your query results.



You can simply open an existing parameter query to run it.

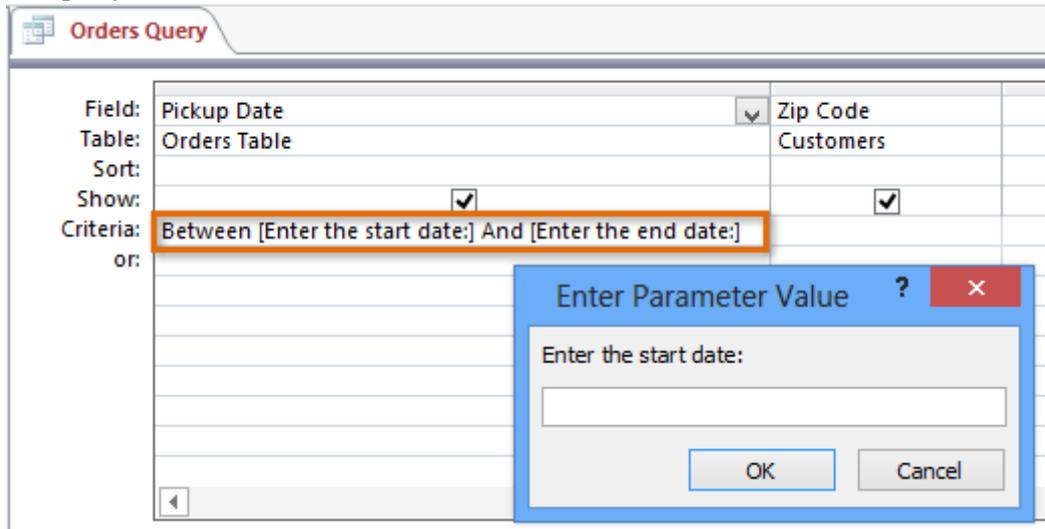
### Tips for writing parameter queries

Ideally, the prompt you create for your query should make it clear what type of information the search term should be, as well as the desired format. For example, to guarantee users enter a search for a date in the format used in our database, we could write the following in the Criteria: row of the Pickup Date field like this: [What Date? (mm/dd/yyyy)] .



The simplest parameter query will give you an exact-match criteria, meaning the query will search for the exact text you enter in the prompt. However, you can turn any type of criteria into a variable criteria. Simply type your prompt text in brackets in the part of the criteria where you would normally put a search term.

For example, in a normal query we could find orders that were placed between two dates by using the criteria Between x AND y and replacing x and y with the first and second dates, respectively. To turn this into a parameter criteria, we would simply replace the x and y with the text we want to appear in the prompt. Our variable criteria might look like this: Between [Enter the start date:] And [Enter the end date:]. These two prompts will appear when you run the query.



## Creating a Find Duplicates Query

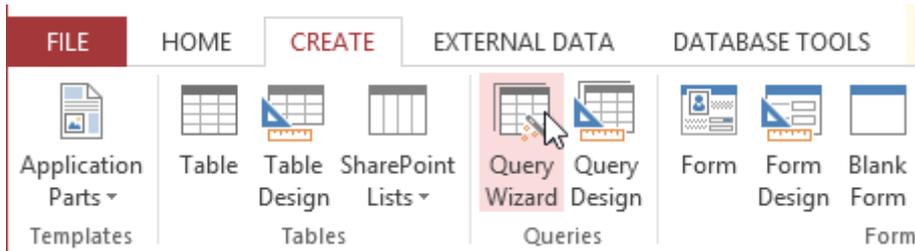
A find duplicates query allows you to search for and identify duplicate records within a table or tables. A duplicate record is a record that refers to the same thing or person as another record. Not all records containing similar information are duplicates. For instance, records of two orders that were placed on different dates but that contained identical items would not be duplicate records. Likewise, not all duplicate records contain completely identical information. For example, two customer records could refer to the same person but include different addresses. The record with the out-of-date address would be the duplicate record.

Why is getting rid of duplicate records so important? Consider the example above. If we had multiple records for one customer, it would be difficult to view an order history for him because the information would be spread across several unlinked records. We might even deliver his order to the wrong address if the person entering the order information selects an outdated record. It's easy to see how having duplicate records can undermine the integrity and usefulness of your database.

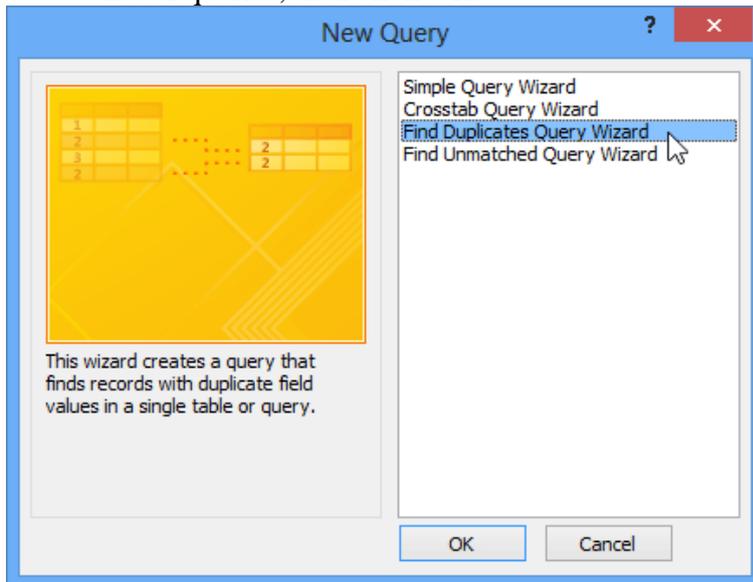
Fortunately, Access makes it easy to search for and locate potential duplicate records. Note that Access won't delete the records for you or help you figure out which one is current—you'll have to do those things for yourself. If you're familiar with the data in your database, though, getting rid of duplicate records will be a manageable task.

To create a find duplicates query:

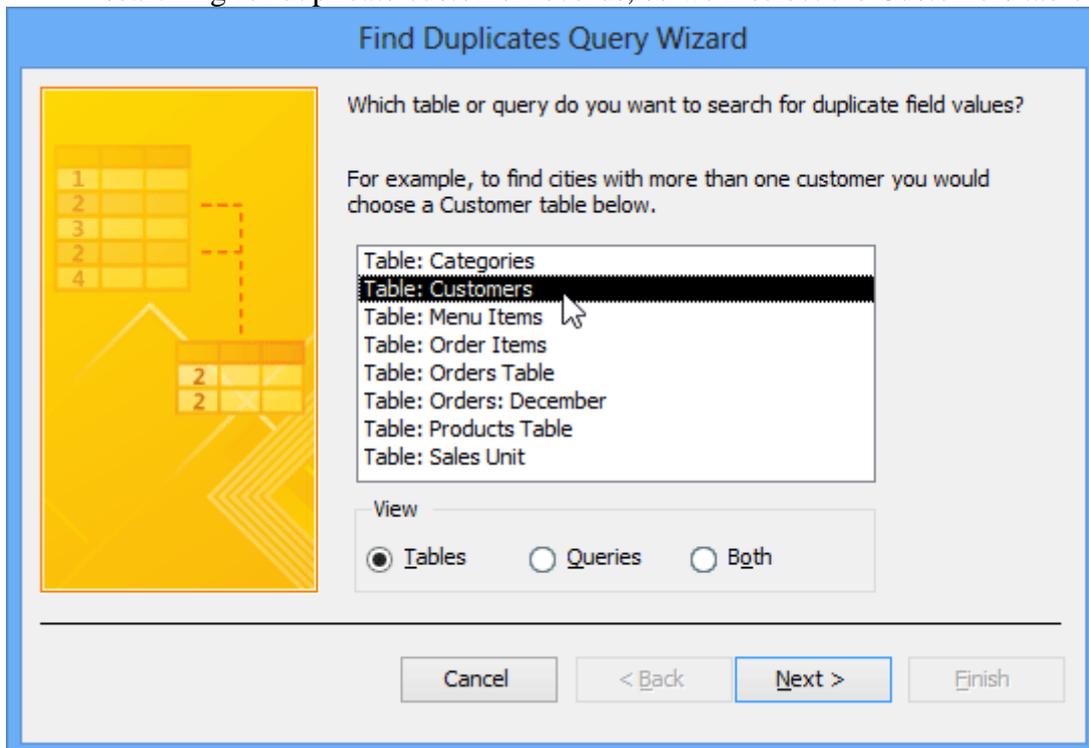
- Select the Create tab on the Ribbon, locate the Queries group, and click the Query Wizard command.



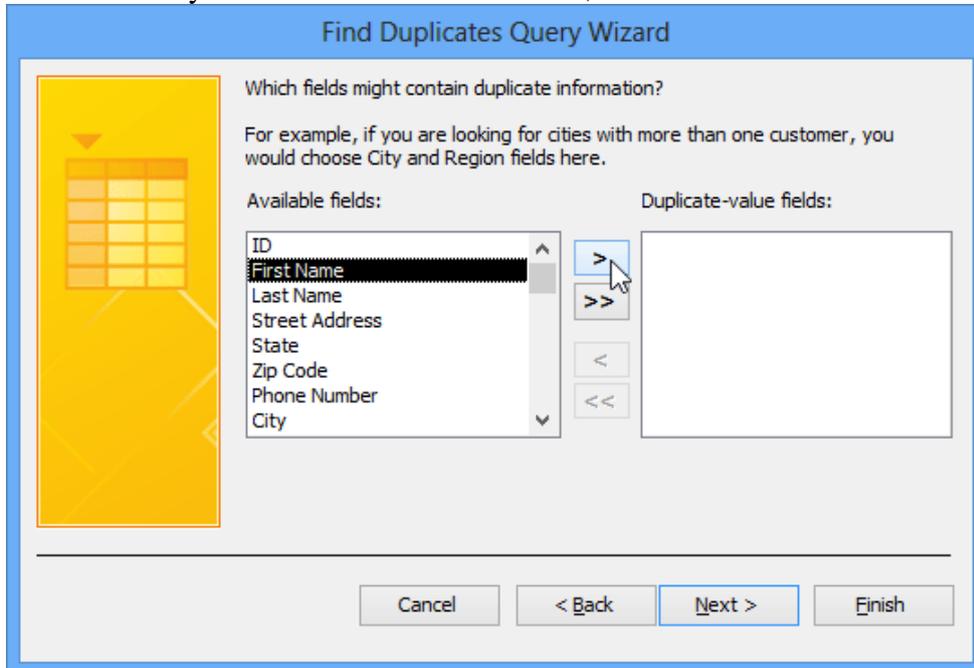
- The New Query dialog box will appear. Select Find Duplicates Query Wizard from the list of queries, then click OK.



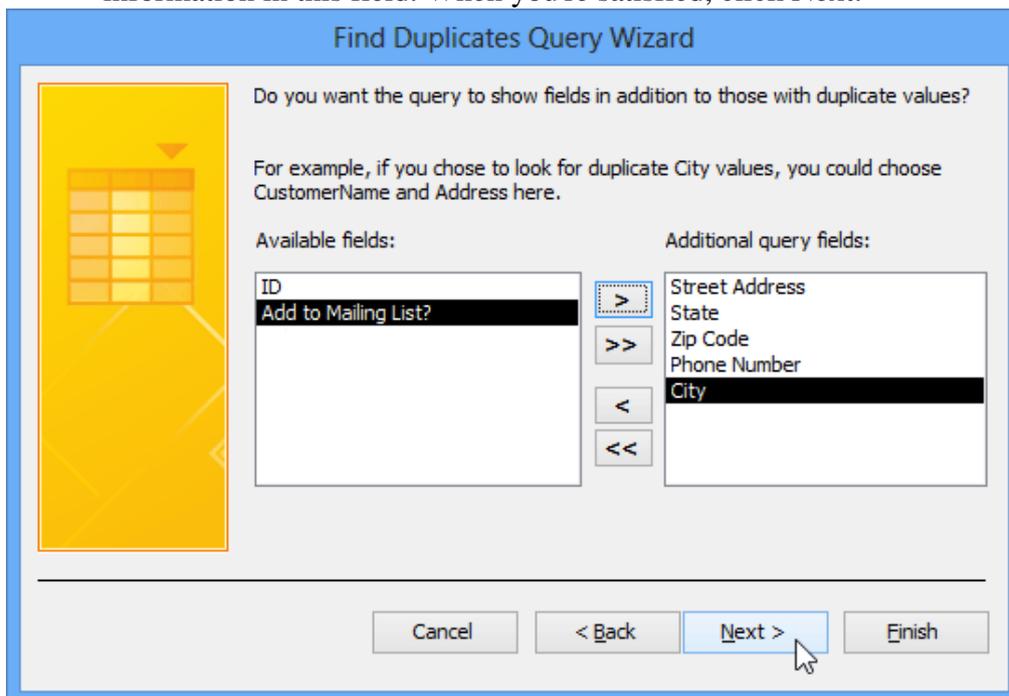
- Select the table you want to search for duplicate records, then click Next. We're searching for duplicate customer records, so we'll select the Customers table.



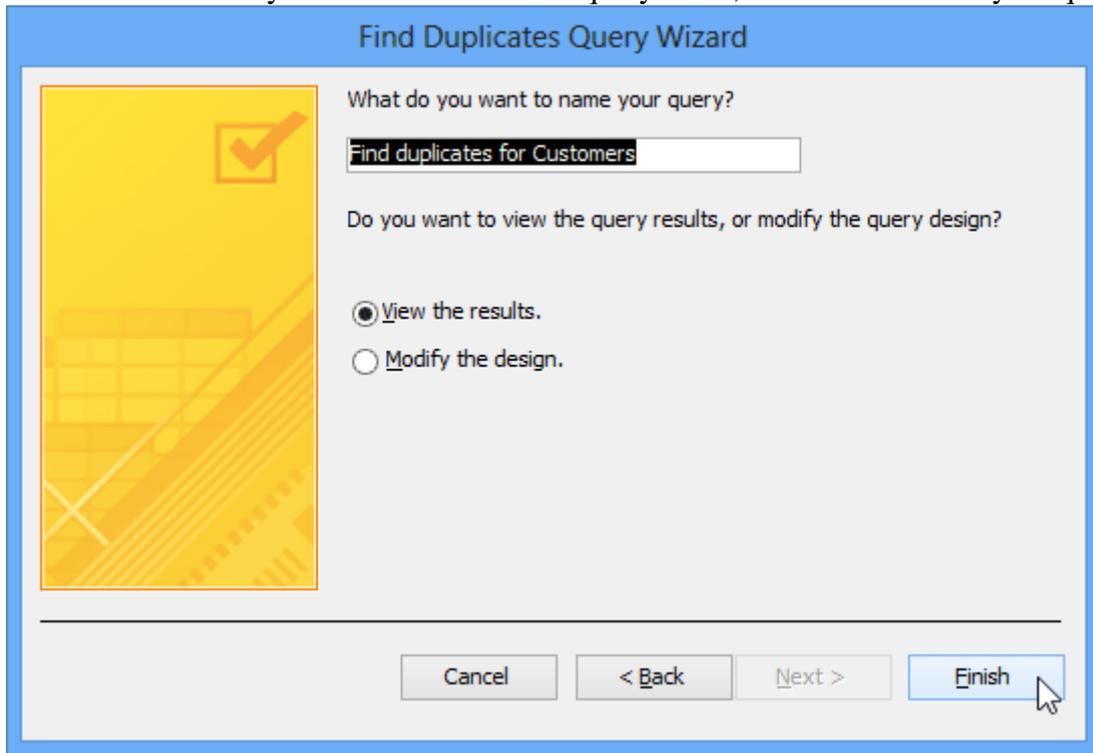
- Choose the fields you want to search for duplicate information by selecting them and then clicking the right arrow button. Only select fields that should not be identical in nonduplicate records. For instance, because we're searching for duplicate customers we'll only select the First Name and Last Name fields because it's unlikely that multiple people with the exact same first and last names would place orders at our bakery.
- When you've added the desired fields, click Next.



- Select additional fields to view in the query results. Choose fields that will help you distinguish between the duplicate records, and choose which one you want to keep. In our example, we'll add all of the fields relating to customer addresses, plus the Phone Number field because records with identical customer names might contain nonidentical information in this field. When you're satisfied, click Next.



- Access will suggest a name for your query, but you can type a different name if you want. When you're satisfied with the query name, click Finish to run your query.



- If Access found any duplicate records in your query, they will be displayed in the query results. Review the records and delete any outdated or incorrect records as needed.

First Name	Last Name	Street Address	State	Zip Code	Phone Number	City
David	Barrett	434 Hill St.	NC	27609	919-555-0662	Raleigh
David	Barrett	430 Hill St.	NC	27609	919-555-0662	Raleigh
Magda	Sremski	544 Wayne St.	NC	27612	919-555-4001	Raleigh
Magda	Sremski	98 Tyler St.	NC	27612	919-555-1024	Raleigh
*						

### Tips for resolving duplicate records

- Save your duplicate records queries, and run them often.
- Investigate potential duplicate records by looking at linked data in other tables. You can do this by searching for these records' record ID numbers in related tables. Is one record linked to mostly old orders while another contains recent ones? The latter is likely to be the current one.
- Once you decide which record to delete, make sure you won't be losing any information you might need. In our example, before we deleted our duplicate record we found all of the orders linked to that record's ID number and replaced them with the ID number of the record we decided to keep.