

MICROSOFT ACCESS



Modifying Tables

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Introduction

- 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.
- You should ensure that your table data is correctly and consistently formatted by setting **validation rules**, **character limits**, and **data types** in your fields.

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.

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Add a new field to an existing table

1. 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.
2. A drop-down menu will appear. Select the desired **data type** for the new field.
3. Type a name for your field, then press the **Enter** key.

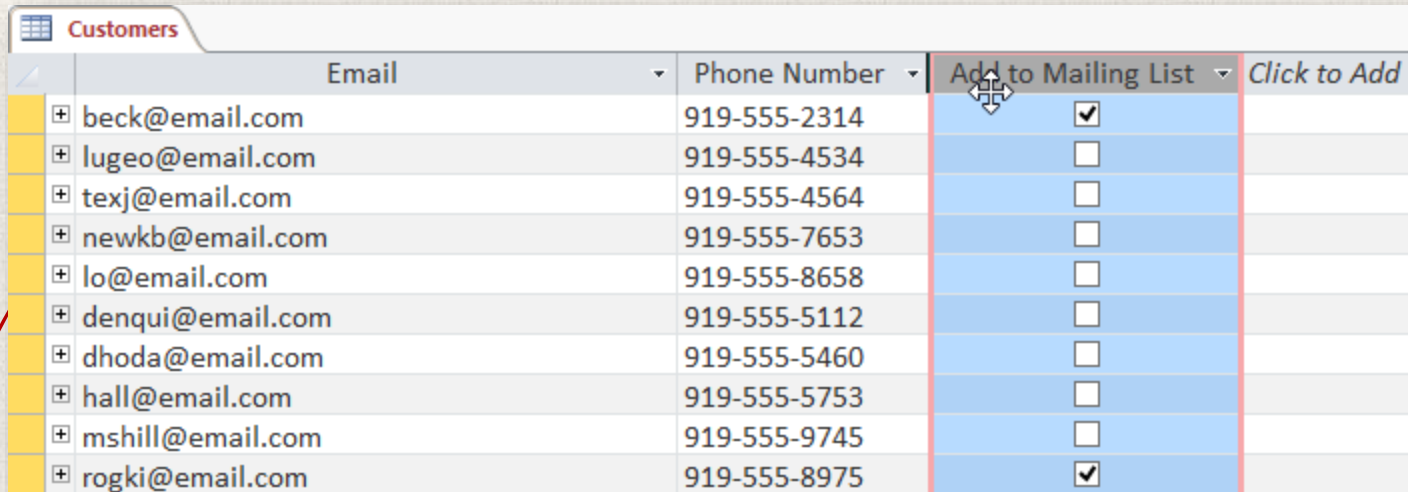
Phone Number	Click to Add
919-555-2314	
919-555-4534	
919-555-4564	
919-555-7653	
919-555-8658	
919-555-5112	
919-555-5460	
919-555-5753	
919-555-9745	
919-555-8975	

Phone Number	Click to Add
919-555-2314	AB Short Text
919-555-4534	12 Number
919-555-4564	Currency
919-555-7653	Date & Time
919-555-8658	<input checked="" type="checkbox"/> Yes/No
919-555-5460	Lookup & Relationship
919-555-5753	Aa Rich Text
919-555-9745	AB Long Text
919-555-8975	Attachment
919-555-2332	Hyperlink
919-555-1123	Calculated Field
919-555-5467	Paste as Fields
919-555-7755	

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"/>	

Move a field

1. 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.



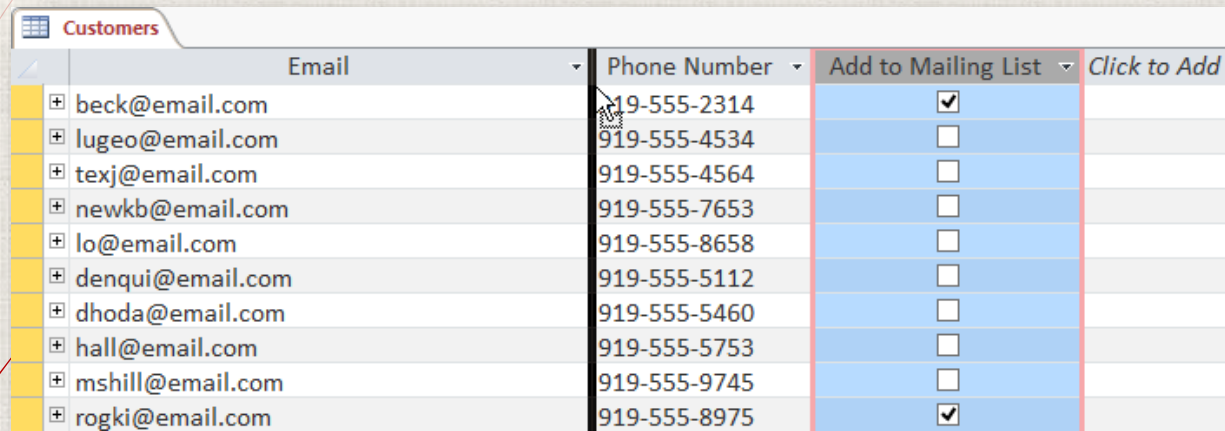
The screenshot shows a table titled "Customers" with the following columns: Email, Phone Number, Add to Mailing List, and Click to Add. The "Add to Mailing List" column contains checkboxes. A mouse cursor is hovering over the bottom border of the "Add to Mailing List" header, which has turned into a four-sided arrow cursor. The table data is as follows:

	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"/>	

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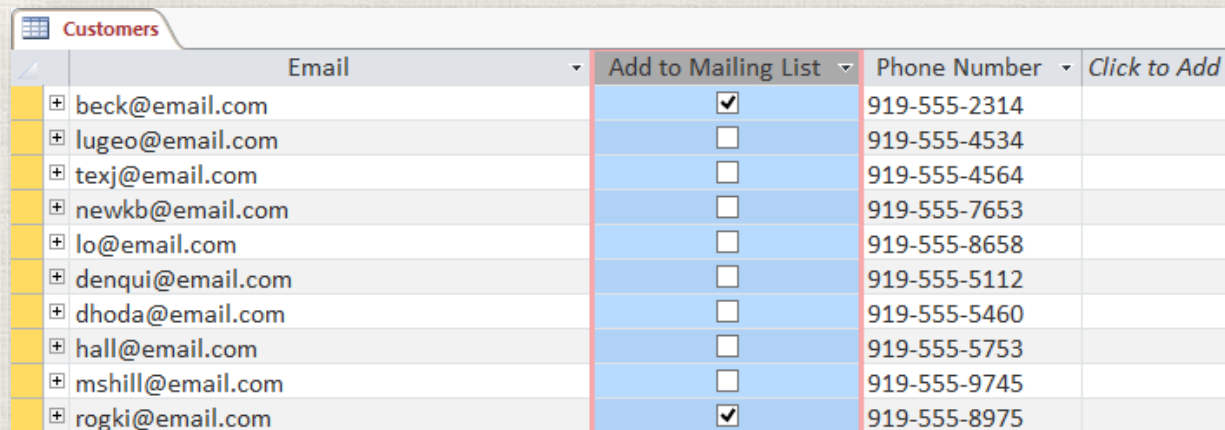
Move a field

2. Click and drag the field to its new location.



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

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



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

Advanced field options

- 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.

Advanced field options

- 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**
 - ❖ **validation rules**

Change the data type for existing fields

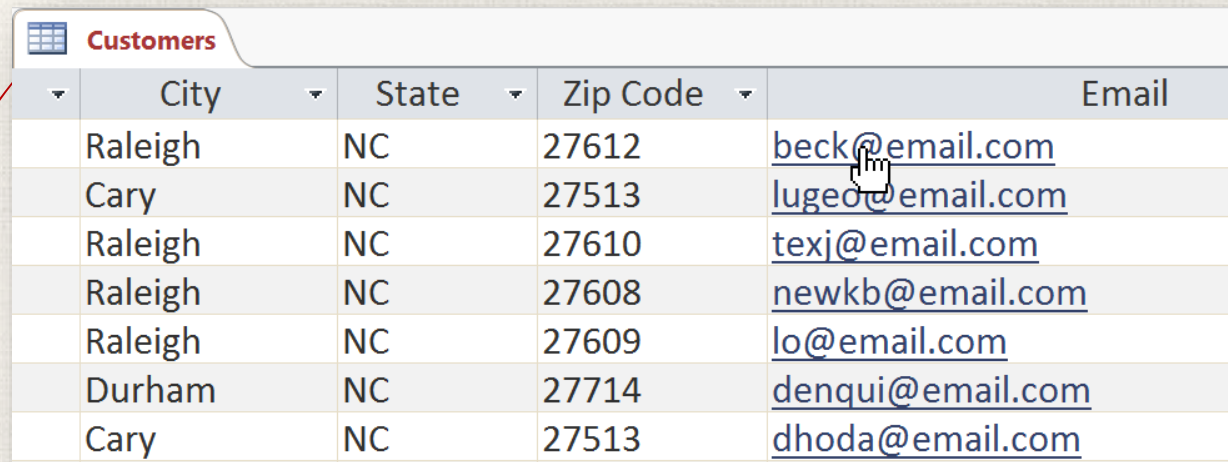
1. Select the field whose data type you want to change.
2. Select the **Fields** tab, then locate the **Formatting** group. Click the **Data Type** drop-down arrow.
3. Select the desired data type.

The screenshot shows the Microsoft Access interface with the **Fields** tab selected. The **Formatting** group is visible, containing the **Data Type** dropdown menu. The dropdown menu is open, showing a list of data types: Long Text (selected), Short Text, Long Text, Number, Date/Time, Currency, Yes/No, OLE Object, Hyperlink, and Attachment. A mouse cursor is pointing at the **Hyperlink** option. Below the dropdown menu, a table is visible with columns for City, State, and Zip Code. The table contains three rows of data:

City	State	Zip Code
High	NC	27612
/	NC	27513
High	NC	27610

Change the data type for existing fields

4. 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.



City	State	Zip Code	Email
Raleigh	NC	27612	beck@email.com
Cary	NC	27513	lugeo@email.com
Raleigh	NC	27610	texj@email.com
Raleigh	NC	27608	newkb@email.com
Raleigh	NC	27609	lo@email.com
Durham	NC	27714	denqui@email.com
Cary	NC	27513	dhoda@email.com

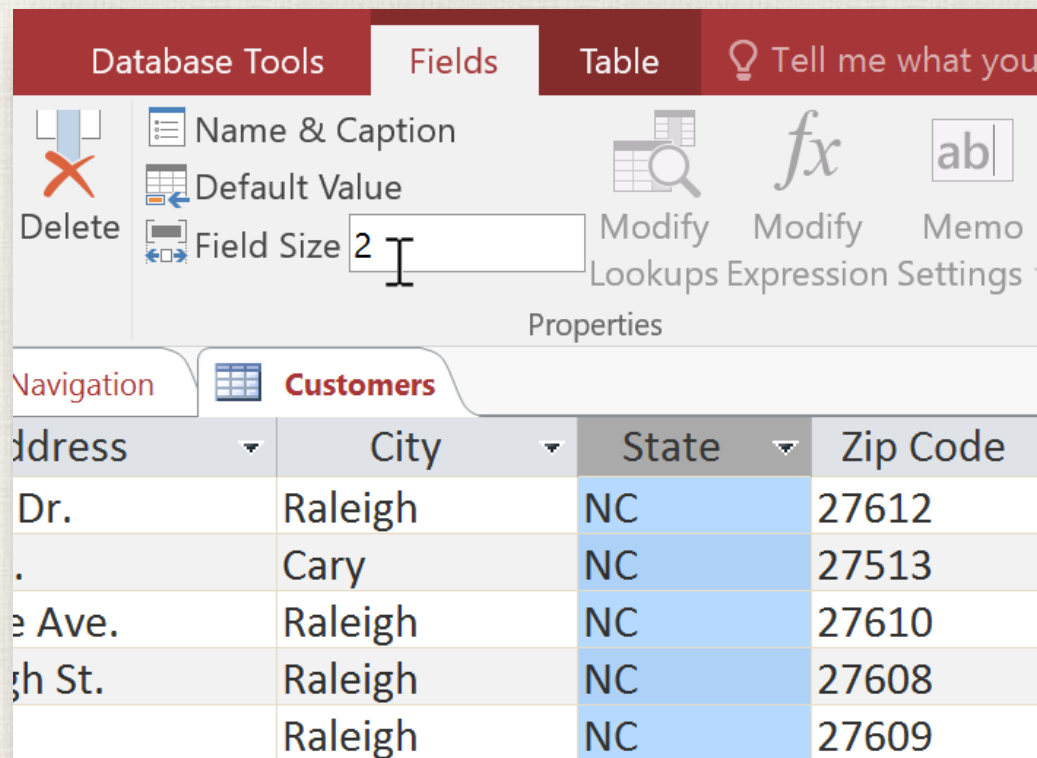
You shouldn't change the field data type unless you are certain your field data is in the correct format for the new data type. Changing a field containing only text to the **Number** type, for instance, will delete all of your field data. This process is often irreversible.

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 next example, 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.

Set a character limit for a field

1. Select the desired field.
2. Click the **Fields** tab, then locate the **Properties** group.
3. In the **Field Size** box, type the maximum number of characters you want to allow in your field.
4. **Save** your table. The character limit for the field will be set.



The screenshot shows the Microsoft Access Database Tools ribbon with the Fields tab selected. The Properties group is active, and the Field Size property is set to 2. Below the ribbon, the Customers table is displayed in a table view.

Address	City	State	Zip Code
Dr.	Raleigh	NC	27612
.	Cary	NC	27513
e Ave.	Raleigh	NC	27610
gh St.	Raleigh	NC	27608
	Raleigh	NC	27609

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 next example, we will apply this 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.

Create a validation rule

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

The screenshot shows the Microsoft Access interface with the 'Fields' tab selected. The ribbon includes 'Table', a search bar, and various tool icons. The 'Field Validation' group is expanded, showing options like 'Required', 'Unique', 'Indexed', and 'Validation'. The 'Validation' drop-down menu is open, displaying the following options:

- 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.

In the background, a table with columns 'City', 'State', 'Zip Code', and 'Email' is visible. The 'State' column is highlighted in blue, indicating it is the selected field for the validation rule.

City	State	Zip Code	Email
High	NC	27612	beck@email.com
y	NC	27513	lugeo@email.com
High	NC	27610	texj@email.com
High	NC	27608	newkb@email.com
High	NC	27609	lo@email.com
ham	NC	27714	denqui@email.com
y	NC	27513	dhoda@email.com
High	NC	27612	hall@email.com
High	NC	27606	mshill@email.com

Create a validation rule

3. 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.

Expression Builder

Enter an Expression to [validate](#) the data in this field:
(Examples of expressions include [field1] + [field2] and [field1] < 5)

"AL" Or "AK" Or "AZ" Or "AR" Or "CO" Or "CA" Or "CT" Or "DE" Or "DC" Or "FL" Or "GA" Or "HI" Or "ID" Or "IL" Or "IN" Or "IA" Or "KS" Or "KY" Or "LA" Or "ME" Or "MD" Or "MA" Or "MI" Or "MN" Or "MS" Or "MO" Or "MT" Or "NE" Or "NV" Or "NH" Or "NJ" Or "NM" Or "NY" Or "NC" Or "ND" Or "OH" Or "OK" Or "OR" Or "OK" Or "PA" Or "RI" Or "SC" Or "SD" Or "TN" Or "TX" Or "VT" Or "UT" Or "VA" Or "WA" Or "WV" Or "WI" Or "WY"

OK
Cancel
Help
<< Less

Expression Elements Expression Categories Expression Values

- Functions
- Constants
- Operators

Create a validation rule

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

The screenshot shows the Microsoft Access interface. The top ribbon is set to 'Fields' and 'Table'. The 'Validation' drop-down menu is open, and the 'Field Validation Message' option is highlighted in pink. The background shows a table with columns 'City', 'State', 'Zip Code', and 'Email'.

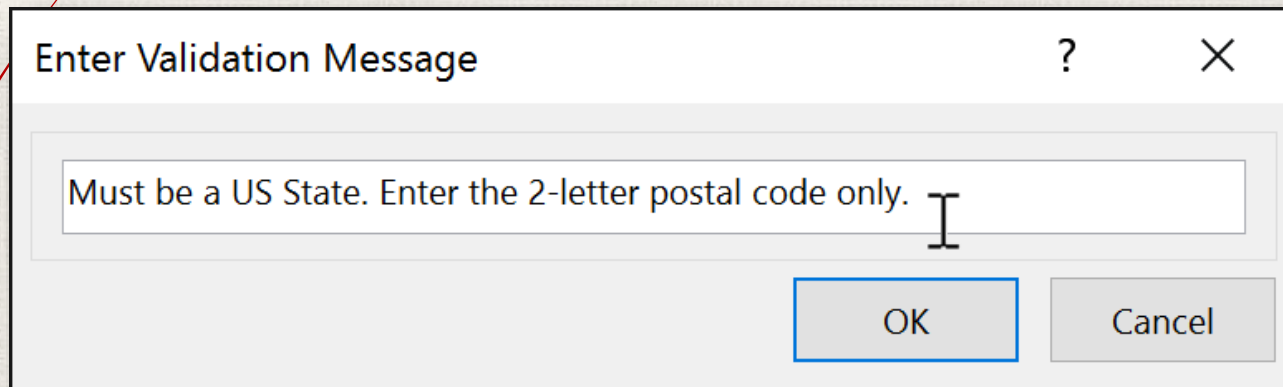
City	State	Zip Code	Email
High	NC	27612	beck@email.com
High	NC	27513	lugeo@email.com
High	NC	27610	texj@email.com
High	NC	27608	newkb@email.com
High	NC	27609	lo@email.com
Ham	NC	27714	denqui@email.com
High	NC	27513	dhoda@email.com
High	NC	27612	hall@email.com
High	NC	27606	mshill@email.com

Validation drop-down menu options:

- Field Validation Rule**: Create an expression that restricts the values that can be entered in the field.
- Field Validation Message** (Selected): 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.

Create a validation rule

6. 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.
7. When you're satisfied with the error message, click **OK**.




Create a validation rule

8. The validation rule is now included in the field. Users will be unable to enter data that violates the rule.

Raleigh	NC	27608	jozbee@email.com
Raleigh	NC		
Durham	NC		
Cary	NC		
Raleigh	NC		
Raleigh	NC		
Durham	NC		
Cary	NC	27513	yjonesk@email.com
Raleigh	Nx	27606	jozbee@email.com
Raleigh	NC	27605	mallen@email.com

Microsoft Access



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

OK Help

Simple validation rules can be written exactly like **query criteria**. The only difference is that query criteria search for data, while an identical validation rule either **permits** or **rejects** data.

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.

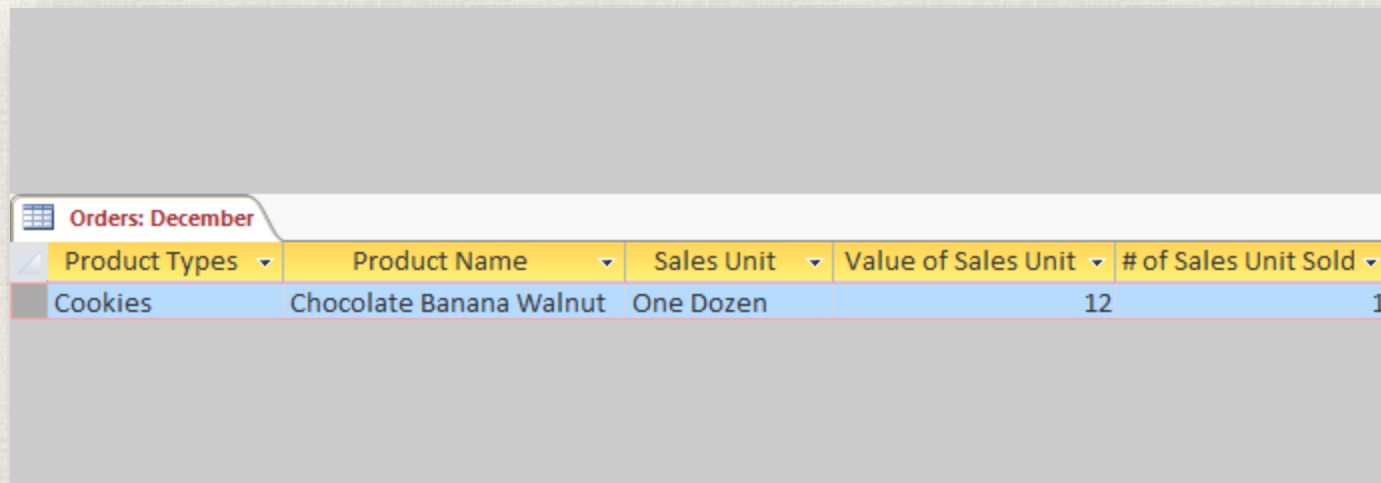
Product	Quantity	"Unit"	Price	Subtotal
German Chocolate	1	Single	\$22.00	\$22.00
German Chocolate	1	Single	\$22.00	\$22.00
Chocolate Banana Walnut	1	One Dozen	\$19.00	\$19.00
Fudge Chocolate	3	Single	\$22.00	\$66.00
Fudge Chocolate	2	Single	\$22.00	\$44.00
Chocolate Chip	2	Single	\$1.50	\$3.00
Chocolate 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	Single	\$2.00	\$2.00
Chocolate Amaretto	2	One Dozen	\$24.00	\$48.00
Chocolate Amaretto	1	One Dozen	\$24.00	\$24.00
Total				\$371.50

Calculated fields

- When you create a **calculated field**, you are adding a new field in which every row contains a calculation involving other numerical fields in that row. To do this, you must enter a **mathematical expression**, which is made up of **field names in your table** and **mathematical symbols**. You don't need to know too much about math or expression building to create a useful calculated field. In fact, you can write robust expressions using only grade-school math. For instance, you could:
 - ❖ Use **+** to find the **sum** of the contents of two fields or to add a constant value (such as **+ 2** or **+ 5**) to a field
 - ❖ Use ***** to **multiply** the contents of two fields or to multiply fields by a constant value
 - ❖ Use **-** to **subtract** one field from another or to subtract a constant value from a field

Calculated fields

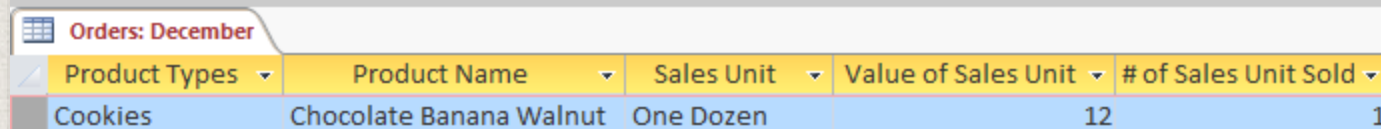
- In our example, we will use a table containing the orders from one month. The table contains items listed by **sales unit**—single, half-dozen, and dozen. One column lets us know the **number sold** of each sales unit. Another lets us know the actual **numerical value** of each of these units. For instance, in the top row you can see that **two dozen** fudge brownies have been sold and that one dozen equals **12** brownies.



Product Types	Product Name	Sales Unit	Value of Sales Unit	# of Sales Unit Sold
Cookies	Chocolate Banana Walnut	One Dozen	12	1

Calculated fields

- To find the **total number** of brownies that have been sold, we'll have to multiply the number of units sold by the numerical value of that unit—here, 2×12 , which equals 24. This was a simple problem, but performing this calculation for each row of the table would be tedious and time consuming. Instead, we can create a calculated field that shows the product of these two fields multiplied together on every row.

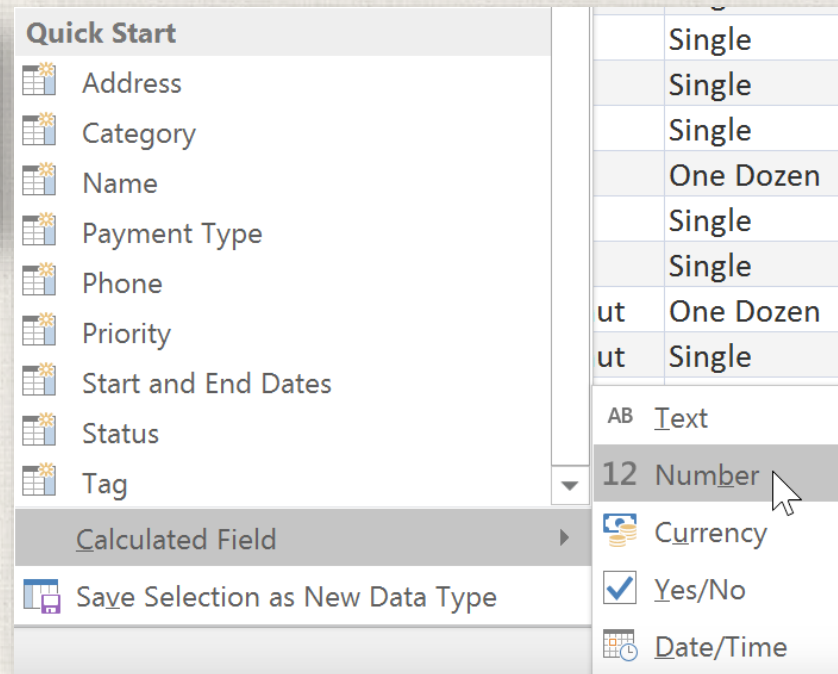
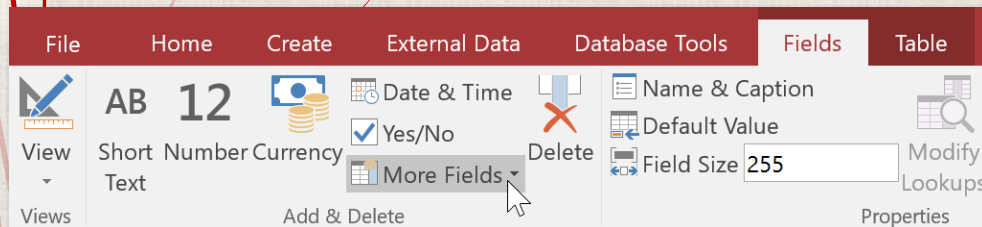


The screenshot shows a table titled "Orders: December" with five columns: Product Types, Product Name, Sales Unit, Value of Sales Unit, and # of Sales Unit Sold. The first row is highlighted in blue and contains the following data: Cookies, Chocolate Banana Walnut, One Dozen, 12, and 1. The # of Sales Unit Sold column represents a calculated field, which is the product of the Value of Sales Unit (12) and the Sales Unit (One Dozen).

Product Types	Product Name	Sales Unit	Value of Sales Unit	# of Sales Unit Sold
Cookies	Chocolate Banana Walnut	One Dozen	12	1

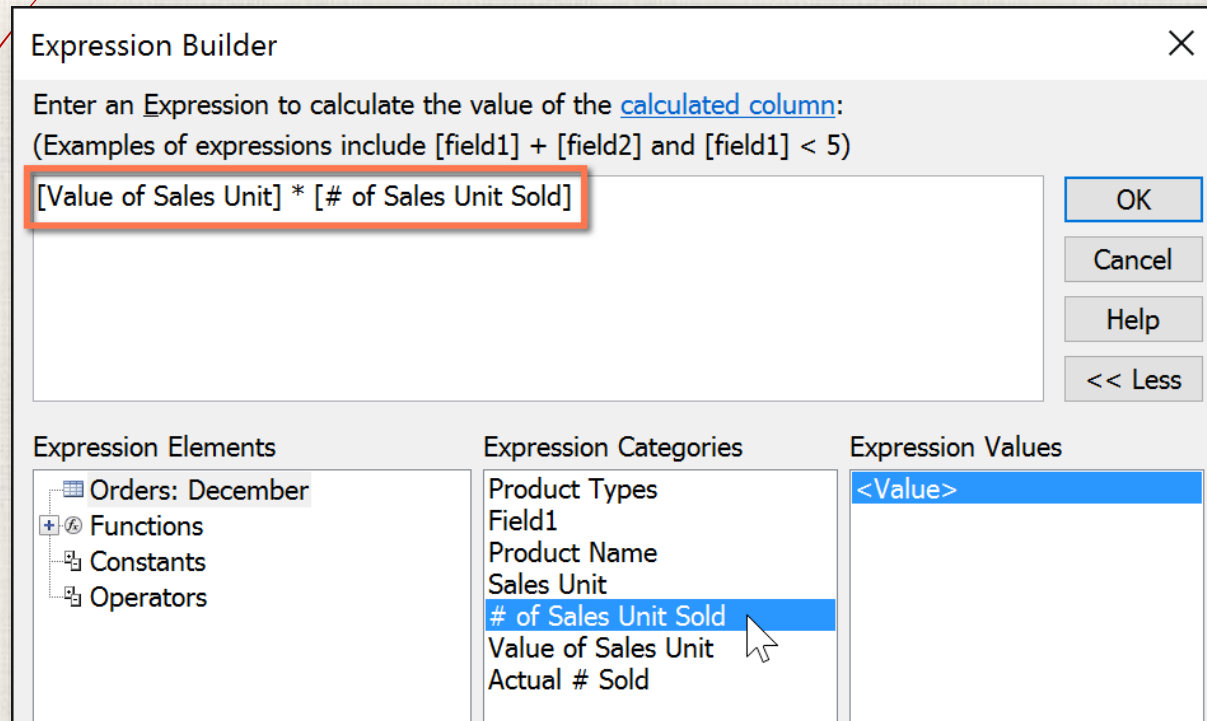
Create a calculated field

1. Select the **Fields** tab, locate the **Add & Delete** group, and click the **More Fields** drop-down command.
2. Hover your mouse over **Calculated Field** and select the desired data type. We want our calculation to be a number, so we'll select **Number**.



Create a calculated field

- Build your expression. To select fields to include in your expression, double-click the field in the **Expression Categories** box. Remember to include mathematical operators like the + or - signs. Because we want to **multiply** our two fields, we'll put the multiplication symbol (*) between them.



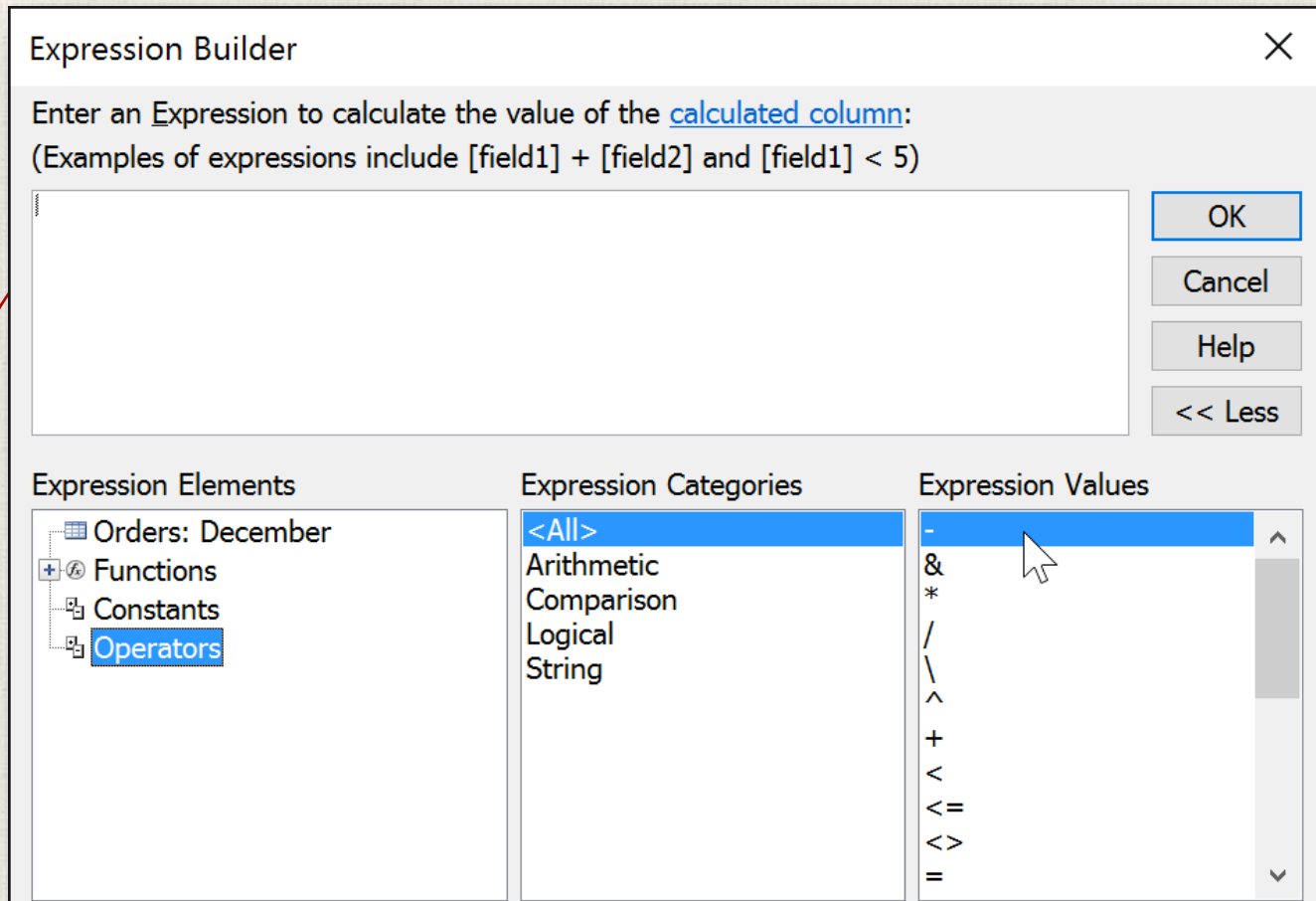
Create a calculated field

4. Click **OK**. The calculated field will be added to your table. If you want, you can now sort or filter it.

Sales Unit ▾	Value of Sales Unit ▾	# of Sales Unit Sold ▾	Actual # Sold ▾
One Dozen	12	2	24
Single	1	4	4
Single	1	5	5
Single	1	3	3
Single	1	8	8
Single	1	5	5
One Dozen	12	1	12
Single	1	12	12
One Dozen	12	1	12
Single	1	1	1
Single	1	3	3
One Dozen	12	3	36
One Dozen	12	6	72
One Dozen	12	1	12
Single	1	8	8
Single	1	18	18
One Dozen	12	3	36

Create a calculated field

- ❖ For more examples of mathematical expressions that can be used to create calculated fields, review the **arithmetic** expressions in the **Expression Builder** dialog box.



Totals rows

- The **totals row** adds up an entire column of numbers, just like in a ledger or on a receipt. The resulting sum appears in a special row at the bottom of your table.
- For our example, we'll add a totals row to our calculated field. This will show us the total number of items sold.

Create a totals row

4. Select the function you want to perform on the field data. In our example, we'll choose **Sum** to add all of the values in the calculated field.

Pies		1 Coconut Cream	Single	None
Pies		5 French Silk	Single	Sum
Pies		4 Key Lime	Single	Average
Pies		3 Peanut Butter Chocolate	Single	Count
Pies		10 Pecan	Single	Maximum
Pies		9 Pumpkin	Single	Minimum
Pies		3 Sweet Potato	Single	Standard Deviation
*				Variance
	Total			▼

5. The totals row will appear.

Pies		9 Pumpkin	Single	9	9
Pies		3 Sweet Potato	Single	3	3
*					
	Total			▼	1289

Practice

- Open **practice database**.
- Open the **Products Table** and change the **data type** for the description field to **Long Text**.
- **Open** the **Customers Table** and add a new field that uses the **Short Text** data type. Name the new field **Credit Card**.
- Add the following **Field Validation Rule** to the Credit Card field: **"VS" Or "MC" Or "AMX"**.
- Set a **field validation message** for the same field. It should say **Enter a valid Credit Card Type: Must be VS, MC, or AMX**.
- **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.



THE END
THE END