SUBJECT / GRADE	Computer Applications Technology Grade 12	
TERM 1	Week 6	
TOPIC	Database: Calculations in reports and queries	
AIM OF LESSON	At the end of the lesson the learners must be able to do the following: ○ Reports: – calculations per group ○ Queries: – Use calculated fields – Create a summary query ○ Data validation	
SOURCES	***Paper sources***	***Digital resources***
	Gr. 12 DBE Practical Textbook: p. 164-198 *(Use school issued textbook for the same content)*	*Links on the WCED ePortal or the links below: Data Files* *The e-resources below has the actual URL to the websites*
INTRODUCTION	In grade 11, you were already introduced to database queries. In the previous lesson you were introduced to reports. In this lesson we will learn how to do calculations in reports and queries.	

CONCEPTS AND SKILLS

Grouping in a report:

Open the **Spec_Spes** database. We are going to use the **Survey_Recording** table. We are going to create a report and do a grouping according to the **Type** field. The fields we are going to use are **Type, ID, Protected, Population**.

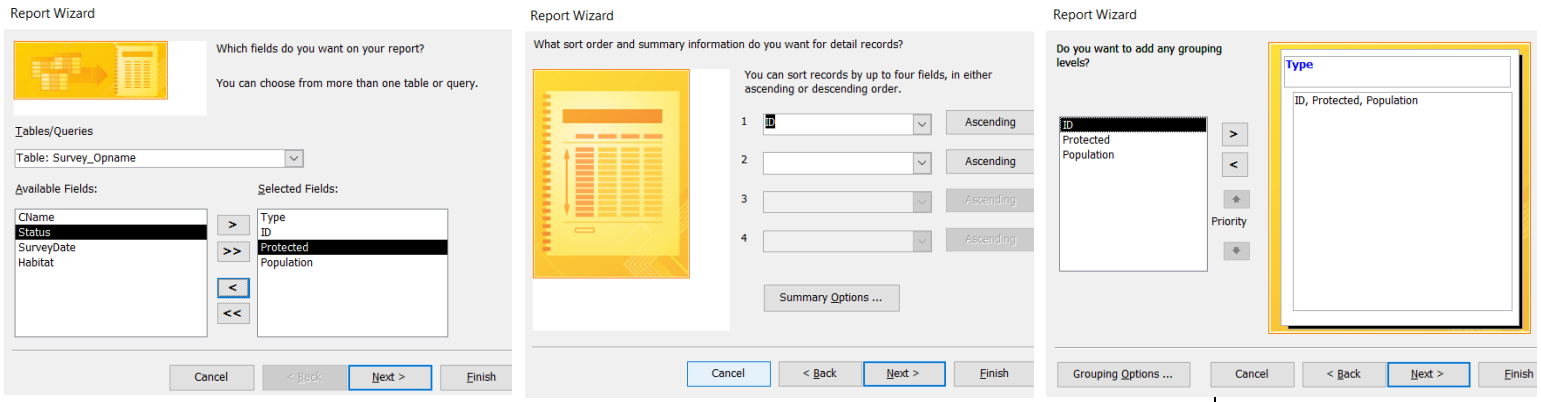
Type	ID	CName	Status	Protected	SurveyDate	Population	Habitat
Bird	BirAi56	Bachman's sparrow	SC	Yes	2012/02/14	1922	open longleaf pine forests, old fields [breeding season only]
Bird	BirHa57	Bald eagle	T	Yes	2012/12/31	1121	mature forests near large bodies of water (for nesting); lakes an
Bird	BirLa41	Loggerhead shrike	SC	No	2012/08/19	1339	fields and pastures [breeding season only]
Bird	BirPh76	Double-crested cormorant	SR	Yes	2014/05/16	256	lakes with scattered trees for nesting [breeding sites only]
Bird	BirPi33	Red-cockaded woodpecker	E	No	2013/12/06	338	mature open pine forests, mainly in longleaf pine [breeding evide
Fish	FisAm84	Roanoke bass	SR	Yes	2012/02/02	1141	large flowing streams and rivers with rocks, logs, roots, cover str
Fish	FisEt10	Carolina darter - Eastern Piedmont population	SC	No	2012/04/19	1241	slow-flowing shallow areas in rocky creeks and small rivers
Fish	FisMo32	Carolina redhorse	T	No	2014/10/03	278	large rocky streams and rivers with gravel shoals
Fish	FisNo17	Cape Fear shiner	E	No	2013/05/31	978	large rocky streams and rivers with Podostemum and Justicia
Insect	InsCa67	Carolina ladle crayfish	SR	Yes	2012/08/19	802	small perennial streams and springs (endemic to North Carolina)
Insect	InsCh76	A mayfly	SR	No	2012/09/01	411	large flowing streams and rivers, sandy to rocky
Insect	InsGo22	Rapids clubtail	SR	No	2012/07/01	1067	large flowing streams and rivers with cobble and boulder
Insect	InsGo37		SR	No	2013/03/26	1776	large flowing streams and rivers with cobble and boulder
Insect	InsGo78	Spine-crowned clubtail	SR	Yes	2014/07/24	1319	large flowing streams and rivers, sandy to rocky
Insect	InsNe40	Septima's clubtail	SR	No	2013/04/12	1692	large flowing streams and rivers with cobble and boulder

CAN YOU…

Do grouping in a report?

create a formula in the group footer?

We use the Report Wizard and follow the steps.



Click **Finish** and the report will be generated.

Survey_Opname

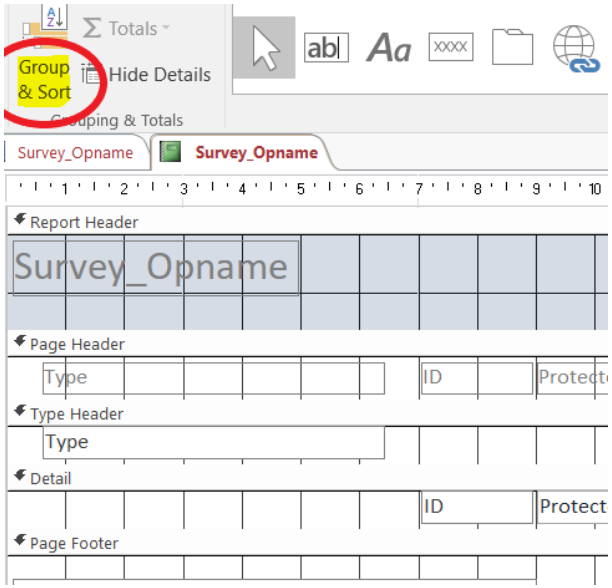
Type	ID	Protected	Populati
Bird			
	BirAi56	Yes	19
	BirHa57	Yes	11
	BirLa41	No	13
	BirPh76	Yes	2
	BirPi33	No	3
Fish			
	FisAm84	Yes	11
	FisEt10	No	12
	FisMo32	No	2
	FisNo17	No	9
Insect			
	InsCa67	Yes	8
	InsCh76	No	4
	InsGo22	No	10
	InsGo37	No	17
	InsGo78	Yes	13
	InsNe40	No	16

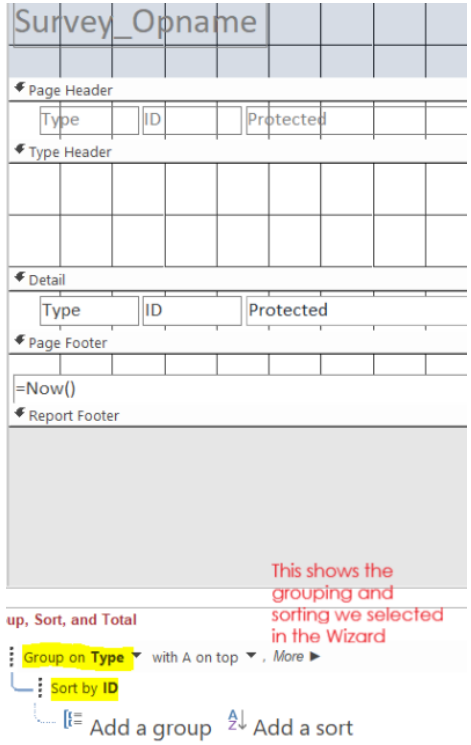
We want to know what the population of each type of species is. We are going to do the calculation at the bottom of each type of species. For that we need the **Group Footer**. (This can also be done in the **Group Header**.)

Go to **Design View** of the Report and activate the **Group Footer**.

Click on the **Group & Sort** Icon.

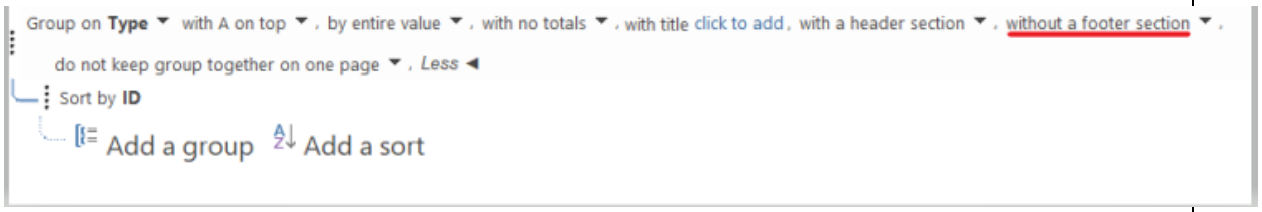
At the bottom of the report **Group, Sort and Total** will now appear.





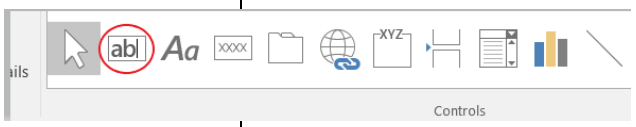
Click on **More**.

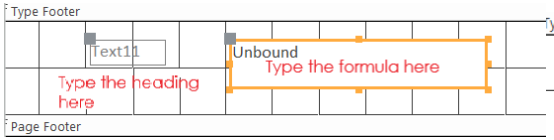
Click on the down arrow next to **without a footer section** and select **with a footer section.**

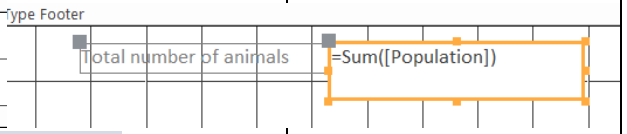


The **Type footer** appears and we can now put a formula in it to do the calculation.

Click the **Text box** icon and place the Text box in the **Type Footer**. Access is now going to do the calculation on the records in the group. The placement of the Text box icon is very important. If you are going to put it in the report **Header** or **Footer**, Access will do the calculation on all the records.







Survey_Opname

Type	ID	Protected	Population
Bird			
	BirAi56	Yes	1922
	BirHa57	Yes	1121
	BirLa41	No	1339
	BirPh76	Yes	256
	BirPi33	No	338
		Total number of animals	4976
Fish			
	FisAm84	Yes	1141
	FisEt10	No	1241

Queries:

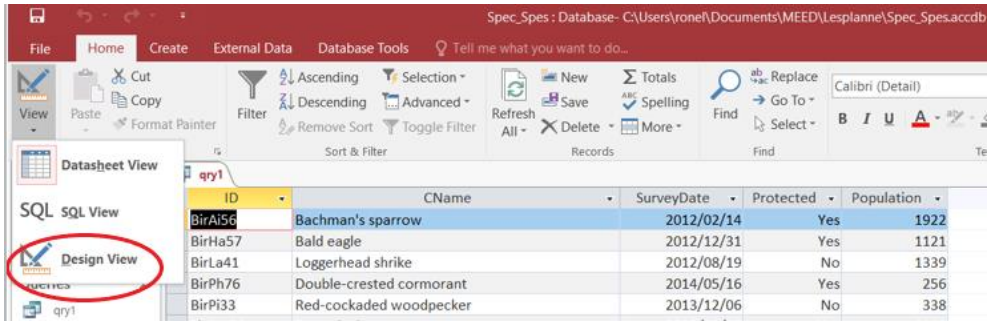
The query function helps the user to obtain specific records for a specific field or result. One of the ways this is achieved is, by using calculated fields as well as operators to filter the data. This not only increases the accuracy of the query, but also allows the user to generate reports that are much more specific.

A variety of operators can be used in a Query to create criteria for extracting specific data from a database (Table). (>; <;> =; = <; =; <>; AND; NOT; BETWEEN and LIKE).
"Wildcards" are characters we can use if we know only a part of the text we are looking for. A question mark(?) represents one character and a star (*) represents many characters.

Open the **Spec_Spes** database. We are going to use the queries **qr1** and **qr2.**

1. Queries with a calculated field.

Open the query **qr1** and go to **Design View**.



We are going to grow the population by 10% for all the species that are protected and whose survey date (**SurveyDate**) was between 1 January 2013 and 31 December 2014. We are also going to round the formula.

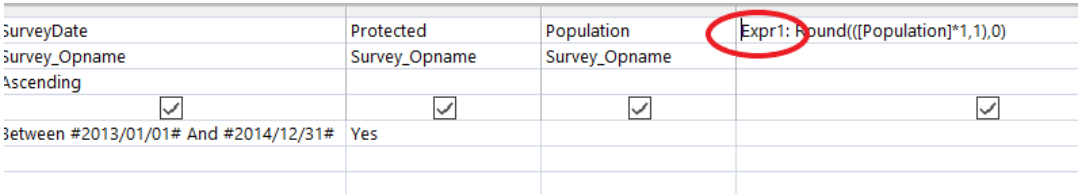
Field:	ID	CName	SurveyDate	Protected	Population
Table:	Survey_Opname	Survey_Opname	Survey_Opname	Survey_Opname	Survey_Opname
Sort:					
Show:	☑	☑	☑	☑	☑
Criteria:			Between #2013/01/01# And #2014/12/31#	Yes	
or:					
			The begin and end date	Protected species	

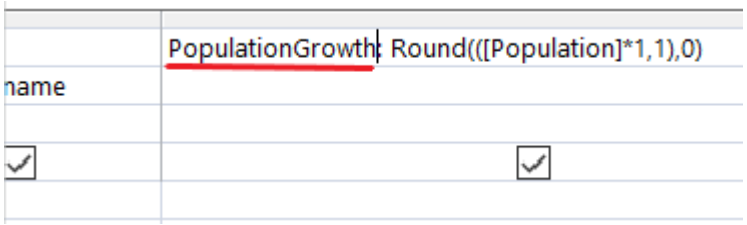
CAN YOU:
Create a query with a calculated field.

Create a summary query with **Totals**

We start the formula with = **round (([Population] * 1.1), 0)**.

Expr1: will automatically appear as a field name. We can only replace it with our heading **PopulationGrowth.**





Our calculated query is complete.

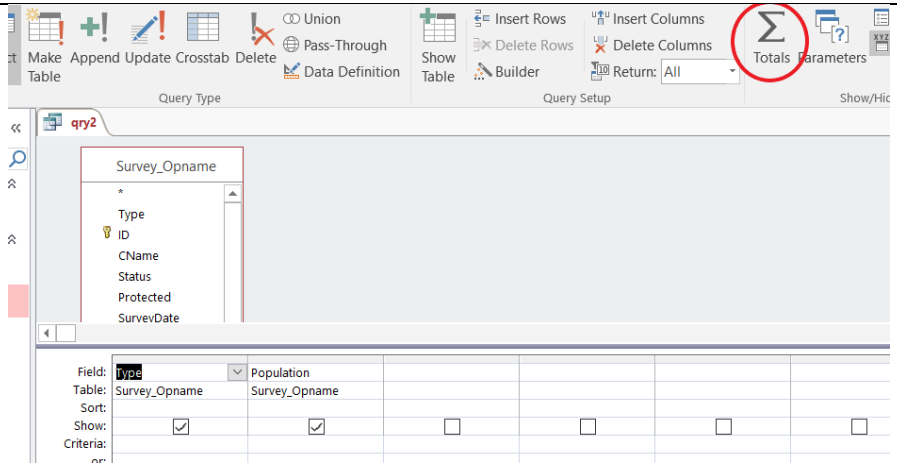
ID	CName	SurveyDate	Protected	Population	PopulationGrowth
PlaPt92	Harperella	2013/05/24	Yes	738	812
PlaCo38	Piedmont horsebalm	2013/06/25	Yes	668	735
MolSt82	Creeper	2013/07/09	Yes	254	279
PlaSc46	Veined skullcap	2013/08/16	Yes	1370	1507
PlaTh55	Appalachian golden-banner	2013/09/13	Yes	30	33
PlaLi27	Bog spicebush	2014/03/17	Yes	1601	1761
PlaIs17	Viginia quillwort	2014/05/02	Yes	7	8
BirPh76	Double-crested cormorant	2014/05/16	Yes	256	282
InsGo78	Spine-crowned clubtail	2014/07/24	Yes	1319	1451
PlaBa33	Thin-pod white wild indigo	2014/10/02	Yes	969	1066

2. <u>Summary Query</u>

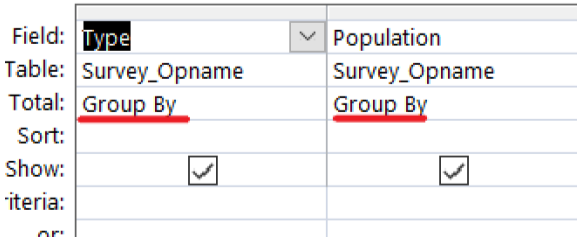
Open the query **qr2** and go to **Design View.**

We want to determine how many of each species there are. Total number of **Birds**, **Fish**, **Insects**, etc.

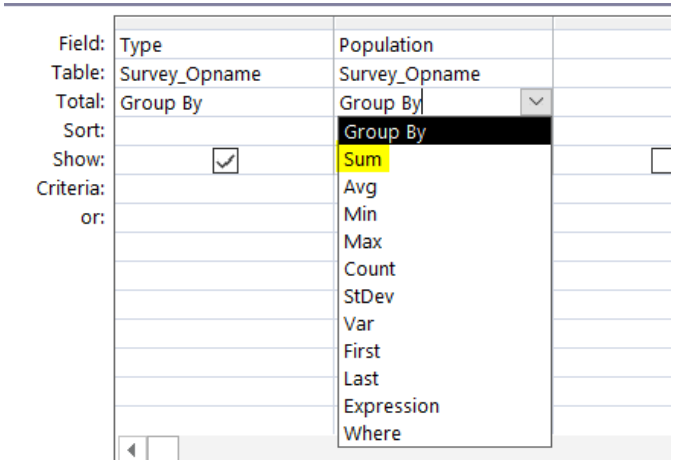
Click the **Totals** Icon.



The following appears:



We want to group by **Type** and add the **Population**. So we will use **Sum**.



If we now go to the **Datasheet View,** we have the summary.

qry2

Type	SumOfPopulation
Bird	4976
Fish	3638
Insect	7067
Mollusk	10884
Plant	16378
Reptile	1793

Techniques to test the validity of data:

Here are some techniques you have already learned:

- Assign a data type to a field (eg **Number**, **Text**, etc.)
- By setting field sizes. (**Field size**)
- Set up input masks. (**Input mask**)
- To set a default value. (**Default**)
- To set a validation rule in a table. (**Field Validation Rule** and **Field Validation Text**)
- Use the **Lookup Wizard** to create one of the following:
    - Combo Box
    - List Box.

Other techniques are:

- **Record Validation Rule.** Let you specify a rule that all records must adhere to.
- **Validation Rule** in a form. Allows you to apply a validation rule to a control such as a **Text Box**. It restricts data in the same way as a **Field Validation Rule**.

Record Validation Rule:

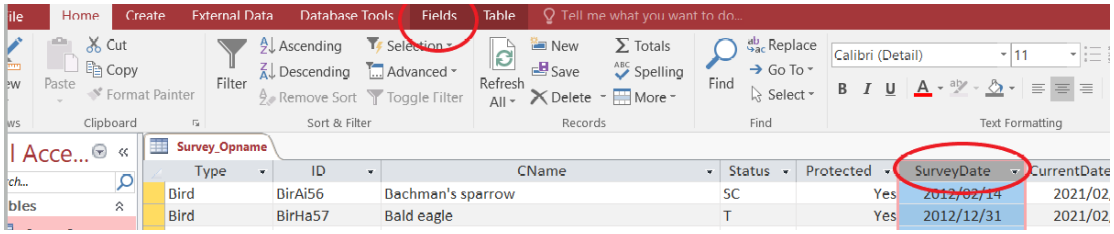
Open the table in the **Spec_Spes** database. We are going to restrict the **SurveyDate** field so that it cannot be after the **CurrentDate**. Select the **SurveyDate** column and click on the **Fields** tab.

CAN YOU…

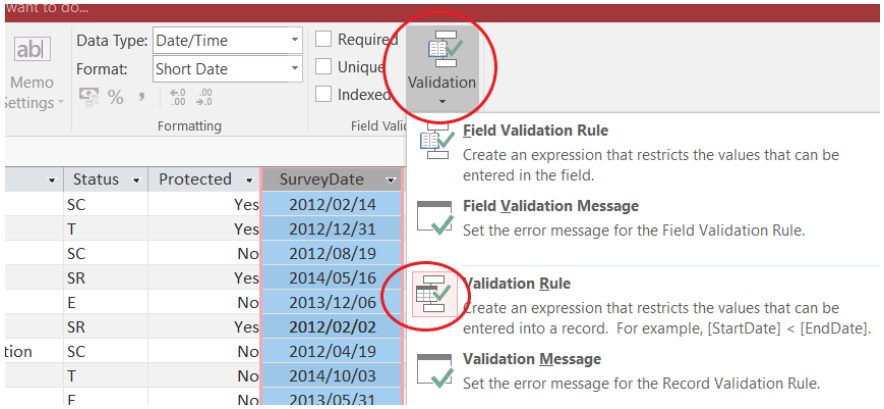
apply different validation rules in a table?

create a validation rule for a record?

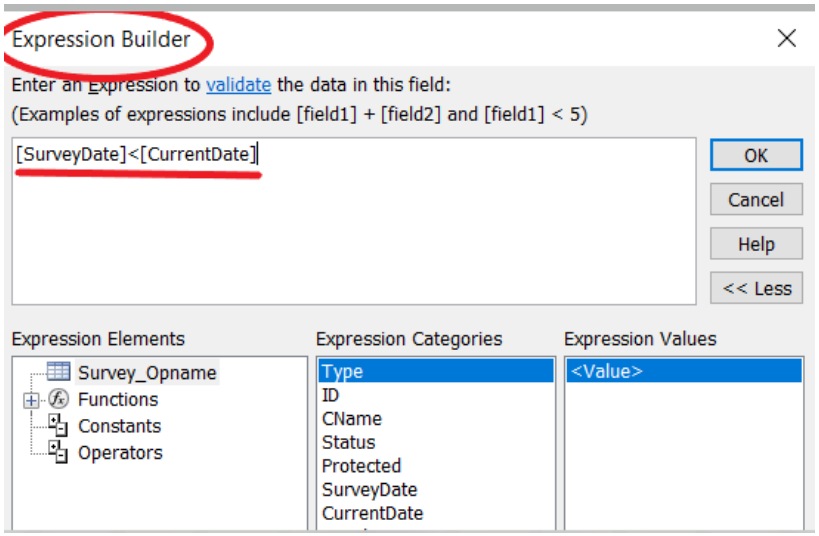
create a validation rule in a form?



Then click on **Validation**. We are going to set up a **Validation Rule** using an expression.



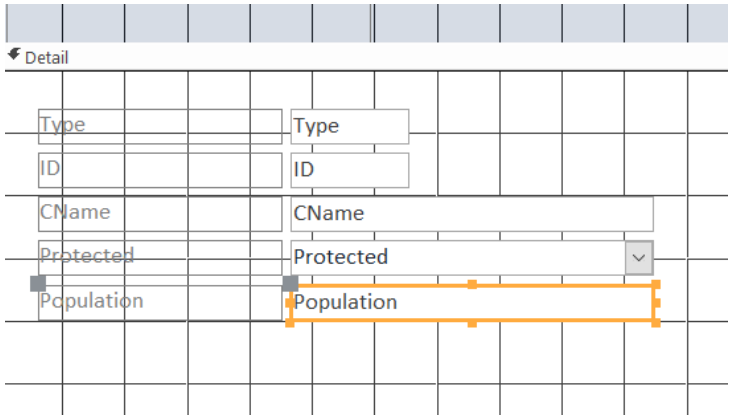
The **Expression Builder** opens and we enter the formula.



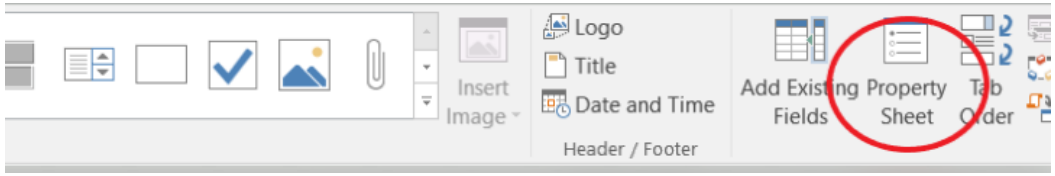
Validation Rule in a form:

Open the form **Frm** and go to **Design view**. We are going to apply a validation rule on the **Population**. No value less than 1 may be entered.

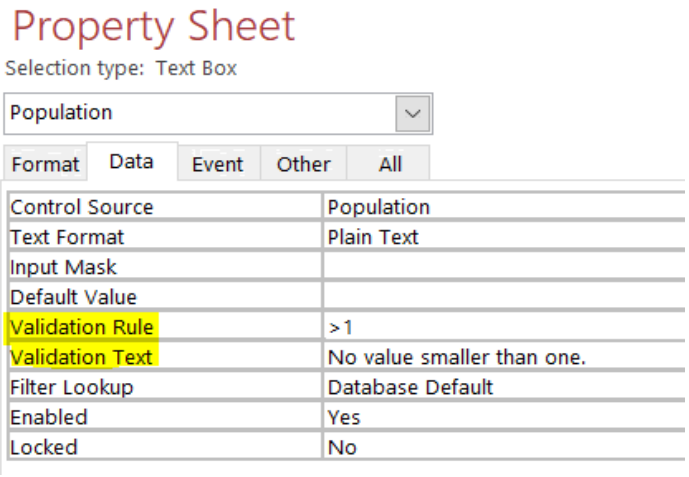
Click on the **Population** field.



Click **Property Sheet**.



Now enter the validation rule and text.



ACTIVITIES / ASSESSMENT

Activity: (DBE / Feb. – Mar. 2017)

Open the **5DAM** database.

1.1 Open the qry5_2 query.

- Add the **Town** field and **Capacity** field.
- Add criteria to display the names, provinces and towns of all the dams in Limpopo and North West of which the capacity is more than 50,000.

Save and close the **qry5_2** query.

1.2 Create a query named **qry5_3** based on the Dam table to look like the one below.

PLEASE NOTE:

- The **Avg Of Capacity** field uses the **Capacity** field.
- Only the data for Free State and North West should appear.

Province	Avg Of Capacity
Free State	826914
North west	109436

Save and close the **qry5_3** query.

1.3 Open the **qry5_4** query.

Show only the names and towns of the dams which have data for the surface of the dam and which were completed between 1 January 1990 and 31 December 2000 (inclusive).

Save and close the **qry5_4** query.

1.4 Open the **qry5_5** query.

- Create and display a calculated field named **Volume** to calculate the volume of water currently in each pond.
- The calculation for the volume of the dam is Surface * Height * 0.3.
- Format this field to display ONE decimal place.

Save and close the **qry5_5** query.

	1.5 Open the **frm5_6** form. • Insert a hyperlink as follows: ○ Place the hyperlink next to the **Province** label on the form. ○ The hyperlink links to the **Province** table in this database. **CLUE:** The hyperlink is one of the controls on the Design tab. • Insert a validation rule that will determine that the capacity cannot be less than 50. Also provide an appropriate validation text. Save and close the **frm5_6** form. 1.6 Open the **rpt5_7** report based on the **Dam** table. • Remove the **Illustration** label AND the field. • Group the report by **Province** field and sort it by **Town** field. • Use a function to determine how many dams there are in each province. • Use a function to determine the average capacity of the dams in each province. Round off the answer to the nearest whole number. • Use a function to determine the largest capacity of all the dams in the report. Save and close the **rpt5_7** report.
CONSOLIDATION	*You should now be able to master reports in Microsoft Access by making use of either the wizard or the design methods.*
VALUES	*Encourage accurate use of formulas.* *Use problem-solving techniques.* *Promote analytical and logical thinking.*
E-RESOURCES	Data Files: https://wcedeportal.co.za/eresource/192356 DBE Textbook: https://wcedeportal.co.za/eresource/88106