Example from Allott <u>Biology for the IB Diploma</u>: To test whether there was any difference in the size of lichens growing on the top and side of a stone wall, some data were collected. The diameters of a random sample of ten lichens on the top of the wall and ten growing on the side were measured and a *t*-test was used to find out if there was a significant difference.

Surface	Dian	Diameter of lichen (mm)											
Тор	22	10	24	45	9	26	5	34	10	13			
Side	22	12	23	13	7	13	5	24	3	10			

- 1. Enter the data into two columns in excel.
- 2. Highlight the empty cell below the second column.
- 3. Click on the f_x button and choose ttest. (you might need to scroll through the list of functions)
- 4. Array 1 refers to the location of the first column of data. Highlight the data from A1 to A10 and the box will fill in.
- 5. Click in the array 2 box. Highlight the data from B1 to B10.
- 6. The number of tails is two if you are testing whether there is a significant difference in means whereas a one-tailed test is whether you are testing the hypothesis that the one mean is greater than the other. Both could apply in this case. We choose the two-tailed test.
- 7. For type we are assuming equal variance in the two samples, so choose type'2'.
- 8. A 'p' value of .176 indicates that the difference in means is not statistically significant.



N	1icros	oft Exce	2									
Eil	e <u>E</u> d	it <u>V</u> iev	v <u>I</u> nsert	F <u>o</u> rmat	<u>T</u> ools	<u>D</u> ata	<u>W</u> indow	<u>H</u> elp	Ado <u>b</u> e PDF			
D	P	. 6	6	∂ , ∛	¥ 🗈	8.	M 10	v Cil v	🤹 Σ -	A↓ Z↓ Z↓ A↓	1	🛃 100% 🕞
爸		<u>b</u> 2	6	0 4	2 14	Reply w	ith <u>C</u> hange	s E <u>n</u> d	Review 🖕			
7		5			Functio	n Arau	ments					
	TTES	r	- ×	🐔 =TTE	TTEST		inches.					
	B	ook1	_		11251	Arr	ay1 A1:A	10			<u>×</u>	= {22;10;24
		A		В		Arr	ay2				k	= array
	1		22	22		1	Tails					= number
	2		101	12		т	ype				ĸ	= number
	4		45	13			, ,					-
	5		9	7	Return	s the pr	obability as	sociated	with a Studer	nt's t-Tes	t.	=
	6		26	13								
	7		- 51	5								
	9		101	24		Arr	ay1 is the	first data	a set.			
	10		13	10								
	11		A1:#	A10)	Formul	a result	-					
	12				Help or	n this fur	nction					ок
	13											

le	Edit	<u>V</u> iew	Insert	Format	<u>T</u> ools	<u>D</u> ata <u>W</u>	indow	Help	Ado <u>b</u> e PI	F					
1	÷ 8	68		a 🖤	አ 🖻	B • 🚿	s -	r Cil v	- 🚱 Σ	- ∆↓	Z↓	1	100%	~	2.
	ta ta	20	6	0.00	2 W	Reply with (_hange:	s E <u>n</u> o	d Review						
1		•		<u>с</u> тт	CT (A 4	440 D4 D	40.0.0	,							
-	TTEST	•	XV	<u>⊼</u> = ∏ t	ST(A1:	A10,B1:B	10,2,2)						_	
Г	🖾 Rool	c1	_		Functio	n Argume	nts								[
l.		Δ	F	3	TTECT										
lł	1	2	2	22								-	r		
Ił	2	10	1	12	•	Array		10				-	= {22;10	;24;4	5;9;26;
ll	3	24	4	23		Array2	2 B1:B1	10				<u>×</u> .	= {22;12	;23;1	3;7;13;
II	4	45	5	13		Tails	5 2						= 2		
	5	9	3	7		Τνρε	• 2					.	= 2		
Ш	6	28	5	13			-]=						-		
Ш	7	6	5	5							_		= 0.1767	5528	4
Ш	8	34	4	24	Return	s the probal	bility as	sociated	d with a Stu	ident's t	:-Test.				
Ш	9	10]	3											
Ш	10	13	1	10		Type	e is the	kind of t	-test: paire	ed = 1. I	two-s	ample e	oual varian	ice	
Ш	10		510,2	-2			(homo	scedast	ic) = 2, tw	o-sample	e une	qual var	iance = 3.		
Ił	12														
Ił	14				Formul	a result =		0.176	755284						
Ił	15				Help on	this functio	n						ОК	1	Cance
1B	16													- 1	