How to do the sign test.

Step 1 – collect data (example below)

participant	Score 1	Score 2
P1	4	5
P2	8	10
P3	3	8
P4	6	2
P5	8	7
P6	9	4
P7	6	6
P8	3	8
P9	8	7
P10	9	9
P11	2	8
P12	4	6

Step 2 – Take away the second value from the first for each participant. This will leave you with a positive or negative value or 0. although shown here, you don't need the actual value, just the sign

participant	Score 1	Score 2	Workings	difference	sign
P1	4	5	4 – 5 =	-1	-
P2	8	10	8 – 10 =	-2	-
P3	3	8	3 – 8 =	-5	-
P4	6	2	6 – 2 =	+4	+
P5	8	7	8 – 7 =	+1	+
P6	9	4	9 – 4 =	+5	+
P7	6	6	6 – 6 =	0	0
P8	3	8	3 – 8 =	-5	-
P9	8	7	8 – 7 =	+1	+
P10	9	9	9 – 9 =	0	0
P11	2	8	2 – 8 =	-6	-
P12	4	6	4 – 6 =	-2	-

Step 3 – you now need to find out how many + and –that you have

+ = 4 - = 6

Step 4 – the lowest value or either + or – is your calculated S score

S = 4

Step 5 – you now have to find your critical value. First find the value of N

N is the number of participants where there is a difference. Discount all 0s

N = 12 – 2 = 10 (there are 12 participants in total but only 10 of them have a sign)

Chose the level of significance for a two-tailed test at .05 and N = 10 to get the critical value (why you do this will become clear in year 2)

Critical value = 1

	level of significance for a two-tailed test				
N	.20	.10	.05	.02	.01
4	0				
5	0	0			
6	0	0	0		
7	1	0	0	0	
8	1	1	0	0	0
9	2	1	1	0	0
10	2	1	1	0	0
11	2	2	1	1	0
12	3	2	2	1	1
13	3	3	2	1	1

Step 6 – for a sign test, the calculated value must be less than or equal to the critical value for the result to be significant. Is this the case?

No. The calculated value of 4 is greater than the critical value of 1, therefore we must reject the experimental hypothesis at p = 0.05 for a two-tailed test.

Your turn. You have a non-directional hypothesis meaning it is a two-tailed test of significance (Year 2 work) and you want to support your experimental hypothesis with a 0.05 level of significance or more. In other words, you will only accept your experimental hypothesis if you are at least 95% confident that the results are not due to chance.

Your experimental hypothesis is. There will be a difference in people's recall of one-syllable words if they take the test in the same room as they learned the words, or if they take the test in a different room to where they learned the words.

participant	Score 1 (same room)	Score 2 (diff room)	difference	sign
P1	7	8		
P2	5	9		
P3	3	5		
P4	9	9		
P5	9	6		
P6	3	7		
P7	5	5		
P8	7	8		
P9	3	7		
P10	5	8		
P11	7	10		
P12	3	9		
P13	5	6		
P14	2	3		
P15	7	9		

Step 1 – work out the difference

Step 2 – record the sign of each difference

Step 3 – take the smallest number of signs as your calculated S score

Step 4 – work out N (number of participants minus number of 0s)

Calculated S score = _____

N = 15 - _____ = _____

	level of significance for a two-tailed test				
N	.20	.10	.05	.02	.01
4	0				
5	0	0			
6	0	0	0		
7	1	0	0	0	
8	1	1	0	0	0
9	2	1	1	0	0
10	2	1	1	0	0
11	2	2	1	1	0
12	3	2	2	1	1
13	3	3	2	1	1

Step 5 – now work out your critical value for a two-tailed test at a significance level of 0.05 with N = _____ Critical Value = _____

Step 6 – your calculated value must be equal to or less than the critical value. Is this the case?

Calculated S = _____ critical value = _____

I can <u>support/reject</u> the experimental hypothesis

Step 7 - Delete the appropriate words to make your conclusion

Because the calculated value of S is <u>less than/greater than</u> the critical value at p = 0.05 and N = <u>15/13</u> for a two tailed test, we can be at least 95% confident that the results are not due to chance so will <u>support/reject</u> the experimental hypothesis: there is <u>a/no</u> difference in people's recall of one-syllable words if they take the test in the same room as they learned the words, or if they take the test in a different room to where they learned the words.

Further work: Do it again on this data

X	4	5	3	8	6	1	3	7	2	9	8	1
Y	5	5	7	9	9	3	7	9	2	5	9	2