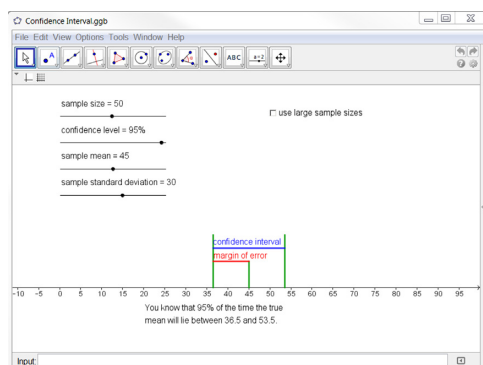


There is a connection between the sample size and confidence interval for a particular confidence level. The Confidence Interval applet will allow you to explore the relationships further.

Open the Confidence Interval applet and use it to answer the following:



- How does the confidence interval change when the sample size is increased? Decreased?
- Which affects the confidence interval more, changing the sample size from 10 to 20 or from 90 to 100?
- How are the confidence level and confidence interval related?
- Many studies use a sample size of near 1000 and a confidence level of 95%. If a sample size of 100 was used instead, what confidence level must be used to give the same size of confidence interval?



## Practice Run

1. Three separate companies conducted similar surveys related to internet use.

	Company A	Company B	Company C
Sample size	756	1020	904

Assuming all other factors were similar, which company do you expect had

- a. the smallest margin of error?
- b. the smallest confidence interval?

2. Three separate companies conducted similar surveys related to food preference.

	Company D	Company E	Company F
Confidence Level	19 out of 20	9 out of 10	49 out of 50

Assuming all other factors were similar, which company do you expect had

a. the smallest margin of error?

b. the smallest confidence interval?

3. Three separate companies conducted similar surveys related to vacation activity.

	Company G	Company H	Company I
Confidence Level	90%	95%	98%
Margin of error	4.2%	4.9%	5.8%

Explain why it is difficult to compare the claims of the companies.



Compare your answers.

1. Three separate companies conducted similar surveys related to internet use.

	Company A	Company B	Company C
Sample size	756	1020	904

Assuming all other factors were similar, which company do you expect had

a. the smallest margin of error?

Company B should have had the smallest margin of error because they used the largest sample.

- b. the smallest confidence interval?

Company B should also have had the smallest confidence interval because they used the largest sample.

2. Three separate companies conducted similar surveys related to food preference.

	Company D	Company E	Company F
Confidence Level	19 out of 20	9 out of 10	49 out of 50

Assuming all other factors were similar, which company do you expect had

- a. the smallest margin of error?

Company E should have had the smallest margin of error because they used the lowest confidence level.

- b. the smallest confidence interval?

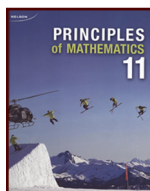
Company E should have had the smallest confidence interval because they used the lowest confidence level.

3. Three separate companies conducted similar surveys related to vacation activity.

	Company G	Company H	Company I
Confidence Level	90%	95%	98%
Margin of error	4.2%	4.9%	5.8%

Explain why it is difficult to compare the claims of the companies.

Company G had the smallest confidence interval, but you are less sure the true value would fit within this interval because of the lower confidence level. Company I had the largest confidence interval, however, the true value is more likely to have fallen within that interval because a higher confidence level was used.



For further information about confidence intervals see pp. 295 – 301 of *Principles of Mathematics 11*.

Typically, when interpreting data, there is a trade-off between having a small confidence interval and a high confidence level. In other words, you can tighten the confidence interval, but you will be less sure the true value will fall within it. For example, companies G, H, and I from the previous *Practice Run* were all produced using the same data.

Increasing the sample size will allow you to reduce the size of the confidence interval while keeping a high confidence level, which is one reason why having a sufficiently large sample size for a study is important.

The sample size, margin of error, and confidence level are three pieces of information that are usually given when survey data is reported. This information explains how sure the researcher is of their claim(s). A good study will have a large sample size, a high confidence level, and a low margin of error. A claim that does not fit these criteria or a report that does not give this information should cause you to question the findings.