

Seeing Red VI

Teacher's Notes

In this final activity of the “Seeing Red” series, students are asked to make a specific recommendation to the school’s librarian regarding the number of white and red security tags that should be purchased. Students are not told how to arrive at a recommendation, but are prompted to think about how margin of error figures into their recommendation.

There is no one correct answer here. If a recommendation is based on the class estimate, students should acknowledge that it is merely an estimate and that it is unlikely that the estimate is exactly equal to the true proportion of red books. Computing a confidence interval estimate and then using the upper endpoint of the confidence interval or using the estimate plus one or two times the margin of error to determine how many white tags to order are both reasonable approaches. Students might also choose to use the librarian's claimed value as the basis for making a recommendation, but this would only be reasonable if they failed to reject this value when they carried out the hypothesis test in Seeing Red V.

Unless you have a very large class, when students compute the margin of error they will find that it is greater than 0.01. The last part of this activity asks students to consider how large a sample would need to have been taken in order to produce an estimate with a margin of error of 0.01. It would be reasonable for students to use the class estimate of the proportion in the computation of required sample size. A more conservative approach would be to use $p = 0.5$ in the sample size calculations. In that case, the required sample size could be determined by solving an equation like

$1.96\sqrt{\frac{(0.5)(0.5)}{n}} = 0.01$ for n . (Note that we assumed a 95% confidence level.) This

would be a good place to point out that very large sample sizes are usually needed in order to obtain precise estimates of population proportions.