

15.8 (a) The least-squares regression line is $\hat{y} = 0.12049 + 0.008569x$, where y = the proportion of perch killed and x = the number of perch. The fact that the slope is positive tells us that as the number of perch increases, the proportion being killed by bass also increases. (b) The regression standard error is $s = 0.1886$, which estimates the standard deviation σ . (c) *Who?* The individuals are kelp perch. *What?* The response variable is the proportion of perch killed and the explanatory variable is the number of perch available (or in the pen); both variables are quantitative. *Why?* The researcher was interested in examining the relationship between predators and available prey. *When, where, how, and by whom?* Todd Anderson published the data obtained from the ocean floor off the coast of southern California in 2001. *Graphs:* The scatterplot provided clearly shows that the proportion of perch killed increases as the number of perch increases. *Numerical Summaries* The mean proportions of perch killed are 0.175, 0.283, 0.425, and 0.646, in order from smallest to largest number of perch available. *Model* The least-squares regression model is provided in part (a). *Interpretation* The data clearly support the predator-prey principle provided. (Students will soon learn how to formally test this hypothesis.) (d) Using $df = 16 - 2 = 14$ and $t^* = 2.145$, a 95% confidence interval for β is $0.008569 \pm 2.145 \times 0.002456 = (0.0033, 0.0138)$. We are 95% confident that the proportion of perch killed increases on average between 0.0033 and 0.0138 for each additional perch added to the pen.

15.9 The regression equation is $\hat{y} = 560.65 - 3.0771x$, where y = calories and x = time. The scatterplot with regression line (below) shows that the longer a child remains at the table, the fewer calories he or she will consume. The conditions for inference are satisfied. Using $df = 18$ and $t^* = 2.101$, a 95% confidence interval for β is $-3.0771 \pm 2.101 \times 0.8498 = (-4.8625, -1.2917)$. With 95% confidence, we estimate that for every extra minute a child sits at the table, he or she will consume an average of between 1.29 and 4.86 calories less during lunch.