

**CHAPTER**  
**7** **Project**  
**Every Second Counts**

**Activity 1: Just a Second!** *Use with Lesson 7-2*

**For the problems below, write each answer in scientific notation.**

1. How many seconds are in a year? in a leap year?

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2. How many seconds are there until you graduate from high school?

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3. There are  $10^9$  nanoseconds in a second. How many nanoseconds are in a year?  
in a leap year?

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4. How many nanoseconds are there until you graduate from high school?

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**Use your research skills to answer the following questions. Write each answer in scientific notation.**

5. How many seconds has your school been open?

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6. How many seconds have passed since your state acquired statehood?

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7. How many seconds have passed since Johann Gutenberg invented the printing press?

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8. How many seconds have passed since women won the right to vote?

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9. How many seconds have passed since Alexander Fleming discovered penicillin?

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**CHAPTER 7 Project**  
**7 Every Second Counts** continued

**Activity 2: Whoa, Stop!** Use with Lesson 7-5

The stopping distance  $s$  of a vehicle is the reaction distance  $r$  plus the braking distance  $b$ . The reaction distance is the distance that the vehicle travels from the time the driver decides to stop until he or she applies the brakes. The braking distance is the distance the vehicle travels once the brake is applied until it reaches a complete stop. Both distances are influenced by the speed of the vehicle.

- $s = r + b$
- $r = 1.47vt$ , where  $v$  = speed (mi/h) and  $t$  = reaction time (s).
- $b = 1.075\frac{v^2}{a}$ , where  $v$  = speed (mi/h) and  $a$  = deceleration rate (ft/s<sup>2</sup>).

1. Transportation departments typically use a reaction time  $t$  of 2.5 seconds and a deceleration rate  $a$  of 11.2 ft/s<sup>2</sup>. Rewrite the reaction distance expression and the braking distance expression using these values. Round to the nearest thousandth.

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2. Now write an expression to find the stopping distance.

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3. Evaluate your expressions from Problems 1 and 2 to complete this table. Round to the nearest tenth.

Speed $v$ (mi/h)	Reaction Distance $r$ (ft)	Braking Distance $b$ (ft)	Stopping Distance $s$ (ft)
20			
25			
30			
35			
40			
45			
50			
55			
60			

4. Suppose a skid mark is left from the time the brake is applied to the time the vehicle stops. Explain how to use the skid mark to determine how fast the vehicle was going.

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5. What impact would doubling the reaction time  $t$  have on the reaction distance?

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