

## FIGURE 6

### The Physics of Car Crashes: Web-Exploration Activity

Visit the websites of the Insurance Institute for Highway Safety (IIHS) and the National Highway Traffic Safety Administration (NHTSA) to discover how well various vehicles rank in their crashworthiness tests and answer the questions below. Be persistent in your exploration; both organizations update their information regularly so you may need to use their search functions to supplement the steps below.

#### Part I: Clarification of terms

1. Go to the IIHS website, [www.iihs.org](http://www.iihs.org)
2. Click on Vehicle Ratings
  - a. What is required for a car to be an IIHS *TOP SAFETY PICK*?
  - b. Define crashworthiness.
  - c. Find the Search box at the bottom of the page. Define the following terms: safety cage and crumple zone.

#### Part II: Comparing and contrasting experimental designs and results

3. Return to the Vehicle Rating page.
  - a. Scroll down to “40-mph frontal offset crash tests are good assessments of vehicles' structural design.” Click on “Test details and ratings criteria” and “Crash test verification program”
  - b. Watch both videos located on the right side of the page:
    - i. Video: Frontal offset test demo
    - ii. Video: Frontal crash test verification
  - c. Scroll down the page and then explain why tests results can be compared only among vehicles of similar size.
4. Return to the Vehicle Rating page.
  - a. Using the pull-down menu for “Ratings grouped by vehicle type/size” on the right side of the screen, locate the IIHS crash-test results of two different cars of the same type/size (one of which you either drive or ride in frequently) and compare their crash ratings to each other.
  - b. Report the crash ratings for both cars (Good, Acceptable, Marginal, Poor) in the Frontal offset, Side impact, and Rollover tests.
5. Go to the NHTSA website, <http://www.safercar.gov>
6. Click on Search 5-Star Safety Ratings
  - a. What does a 5-star safety rating mean?
  - b. Find and click on: Get more information about NHTSA's 5 Star Safety Ratings – [CLICK HERE](#)
  - c. Summarize the answer to Frequently Asked Question #10 - *What is the difference between a full frontal rating and an offset crash rating? Does NHTSA do both?*
  - d. Choose another of the Frequently Asked Questions and summarize the answer.
7. Return to the 5-Star Safety Rating page

- a. Pull down on the appropriate buttons to select Class, Year, Make, Model of one the vehicles you investigated at the IIHS site.
  - b. Report the crash ratings (How many stars did it receive?) for Frontal Crash – Driver and Passenger, Side Crash – Front Seat and Rear Seat, and Rollover tests.
8. Compared crash test results for the same vehicle from both sites and analyze reasons for any differences in the two different sets of crash test results.

Part III: Application and synthesis of data to form opinions and draw conclusions

9. Go back to the IIHS homepage.
  - a. Click on Research & stats at the top of the page.
  - b. In the column on the right, find By topic:
  - c. Scroll down to find and click on Teenagers.
  - d. Click on the most recent year for Fatality Facts: Teenagers
  - e. Review the statistics and create a data table summarizing motor vehicle crash deaths among 13-19 year-olds by gender for the past four years.
10. Go back to the Teenagers Research page (if needed, repeat Question 9 a-c).
  - a. Scroll down Q&As and to click on Teenagers: general.
  - b. Read a few questions and answers.
  - c. Write a final paragraph describing your thoughts on proposed or implemented state legislation to reduce teen driving fatalities (i.e. increasing minimum age for licensing from 16 to 18, mandatory seat belt laws for teenagers, graduated licensing programs, speed and tracking devices attached to teenagers' vehicles). Quote three statistics from the IIHS site to support your opinions.