

Road Safety for kids



Products included in this or any other module are used only as examples.





Road Safety for Kids:

During this module you will have opportunities to practice accessing new information about school bus transportation so you can complete the research questions in the presentation.



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- Technicians are welcome to use this for a local technical update.
- Presentation good only for 1 year. Please go to www.safekidswebinars.org for the latest version.
- The event organizer is welcome to submit the session for pre-approval of CEUs.
- **It is recommended that each attendee have a copy of this print out.**
- This information may be used to **lead a discussion**. It is expected that it will be a category 1 In-Person session.
- Please be sure there is a meeting organizer who provides proof of attendance to all attendees (include date, topic and times) and keeps a sign-in sheet.
- Because you are discussing the materials, there is no test for the CEUs.
- Please schedule at least 1 hour to review and discuss this material. To calculate CEUs:
 - 1 hour to 1 hour 15 minutes = 1 CEU
 - 1 hour 15 minutes to 1 hr 45 hours = 1.5 CEUs
 - 1 hour 45 minutes to 2 hours 15 minutes = 2 CEUs

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CEU Preapproval Application: In–Person (Category 1)

This is optional.

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Do not submit multiple forms for the same event. Sessions may be submitted for review one time only.

TYPE or PRINT USING AN INK PEN

Contact name: _____

Daytime phone number: _____ Email address: _____

Fax number: _____

Mailing Address: _____

Meeting name: School Bus Technical Update from SafeKidsWebinars.org (11/1/2011)

Target audience: _____

Date of meeting: _____

How will proof of attendance be provided to attendees? _____

Complete an information page for each session and submit to FAX (202) 393-2072 or email to kchausmer@safekids.org.

Form should be received at least 14 days before the update. Requests will be reviewed and a response provided within 3 business days by email.

Partners

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If you have computer access, during the module you will have opportunities to practice accessing new information about school bus transportation so you can complete the research questions in the presentation.

In this module you will learn about:

- Bus types
- Approved child restraints
- School bus crashworthiness
- Evacuation plans

Objectives

- Explain the protection provided for occupants by compartmentalization
- Identify 3 types of child restraints appropriate for use in school buses
- Identify 2 websites that provide instruction on correct use of a Cam Wrap

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Important Notice

- Sponsoring organizations do not endorse or support products included in any modules.
- Products included in this or any other module are used only as examples.
- Examples do not represent all products on the market.
- Check manufacturer websites for more products, explanations and details.

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Manufacturer sites

- Check manufacturer Web sites for more products, explanations and details.
- Go to <http://www.cpsboard.org/childmanu.htm> for a list of current CR manufacturers.

School Bus Transportation

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- School Bus Transportation
- School buses are the safest way to get kids to and from school.
- Buses provide 8.8 billion student trips annually.
- Every school day, 440,000 yellow buses transport more than 24 million kids to and from school and school-related activities.
- Most injuries occur when kids get on or off the bus, not from bus crashes.
- Between 1990 and 2000, an average of 6 children died as school bus passengers each year.
- Frontal crashes account for about two passenger deaths each year.
- Most states require the use of school buses to transport children to and from school and school related events.
- School buses come in a variety of sizes and shapes.
- School buses always have red and yellow flashing lights, a stop arm, reinforced body/cage, a protected gas tank and are yellow.

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Nonconforming Transportation

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Some schools do not use school buses to transport children to activities. Instead, they use non-conforming transportation.

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What is nonconforming transportation?

- Federal regulations do not prohibit the use of vans by schools, but require any van (with a capacity of more than 10) sold or leased for use as a school bus to meet the safety standards applicable to school buses.
- Federal regulations apply only to the manufacture and sale/lease of new vehicles.
- Each State prescribes its own regulations that apply to the use of any vehicle that is used to transport students.
- Nonconforming vehicles can be used to transport students to activities.
- Use of nonconforming vehicles for school transportation:
www.nhtsa.dot.gov/people/injury/buses/pub/noncom.hmp.html

Multifunction School Activity Bus (MFSAB)

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- Same design as a school bus without the stop arm and eight-way flashing lights
- Does not have to be painted school bus yellow.
- Can be used to transport students to activities, but not students to and from school and home.

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Four Types of School Buses

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A



B



C



D



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Type A School Bus



Constructed utilizing a cutaway front-section vehicle with a left side driver's door.

Two Type A classifications:

- Type A1, with a GVWR of 10,000 pounds or less
- Seat belts required in every seating position.

Type A2, with a GVWR greater than 10,000 pounds

- Seat belts ARE NOT required in every seating position.

GVWR = gross vehicle weight rating

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Type B School Bus

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- Constructed utilizing a stripped chassis.
- Entrance door is located behind the front wheels.

Type B includes two classifications:

- Type B1, with a GVWR of 10,000 pounds or less
- Seat belts required in every seating position.

Type B2, with a GVWR greater than 10,000 pounds

- Seat belts are NOT required in every seating position.
- Types A and B differ by vehicle design.



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Type C School Bus

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Constructed utilizing a chassis with a hood and front fender assembly.

Entrance door is located behind the front wheels

Type “C” school bus

- Maximum capacity is generally 80 passengers – Always check with the bus manufacturer for actual limits.
- 28,500 pound GWVR
- Seat belts are NOT required at the factory



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Type D School Bus

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- Constructed utilizing a stripped chassis
- Entrance door is located ahead of the front wheels
- Also known as “Transit style” or “Forward control vehicle”

Type “D” school bus

- Maximum capacity is generally 90 passengers – Always check with the bus manufacturer for actual limits.
- Capacity is figured at 150 pounds per person
- 36,200 pound GVWR
- Seat belts are NOT required



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What is the first question you should ask when selecting a vehicle for transporting preschoolers?

Find it now:

- www.nhtsa.gov/people/injury/buses/choosing_schoolbus/pre-school-bus_03.html#know

Did you find it?

A school bus that will carry pre-school age children needs different features and equipment than a school bus that will transport only elementary and secondary school students.

So the first step in purchasing the correct school bus is *to identify who will be transported in the vehicle, both now and in the future.*

The school bus is a highly regulated vehicle

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Must meet many Federal Motor Vehicle Safety Standards (FMVSSs).

Some of the FMVSS Construction Regulations that provide passenger protection in a crash include:

- FMVSS 208 – Occupant Crash Protection
- FMVSS 209 – Seat Belt Assembly
- FMVSS 210 - Seat Belt Assembly Anchorages
- FMVSS 220 – Rollover Protection
- FMVSS 221 - Body Joint Strength
- FMVSS 222 – Passenger Seating and Crash Protection
- FMVSS 225 - LATCH
- FMVSS 131 – Pedestrian Safety Devices



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How did they do that?

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Thomas Built stacked bus ad demonstrated real life cage integrity and strength.

School bus cages are very strong. The steel cage body construction held up so well under the 18,000 lb load, that all windows and doors still opened without binding.

Buses were stacked for over three hours while photos and measurements were taken. The cage held the bus together.

For safety's sake, the slackened lift cables remained attached to the bus.

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- Large buses >10,000 pounds
 - Compartmentalization required
 - Seat belts are optional
 - If there are seat belts, know your students.
 - Lap belts appropriate for harnessed car seats
 - Shoulder belts may not be available for older students
- Check with bus manufacturer to determine if seat belt retrofit is permitted
- Lower anchors are optional on large buses
- Tether anchors not required in school buses

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- Type A and B small buses <10,000 pounds
 - Lap belts are required
 - Advocates prefer lap-shoulder belts
 - If there are belts, know your students.
 - Lap belts appropriate for harnessed seats
 - Shoulder belts are required for boosters

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- Safety belts are required on small school buses because they are closer in size and weight to passenger cars, light trucks and vans. They do not provide the same protection as the heavier school buses
 - Lower anchors required in at least 2 seating positions
-
- Tether anchors not required in school buses

- **Can manufacturers put lower anchors in more than two seating positions in small buses? Yes or No**

Find it now:

www.nhtsa.gov/people/injury/buses/choosing_schoolbus/pre-school-bus_05.html

Did you find it?

The correct answer is **YES**.

- After 9/2002, lower anchors are optional for all seating positions in both large and small buses.
- “School bus manufacturers may offer the system as an option for all seating positions in both small and large school buses.”

- Tested using a frontal impact of a **Type C** school bus into a rigid barrier.
- 30 MPH was chosen to ensure that sufficient energy would affect the occupants and evaluate compartmentalization.
30 mph impact into a solid barrier =
 - two vehicles of similar size crashing at approximately 60 MPH
 - This severe crash pulse simulates most real world crashes.
- This extreme crash raised the bar for evaluating methods for occupant protection.

Read the report:

<http://www.nhtsa.gov/Research/Crashworthiness/School+Bus+Crashworthiness+Research>

- The body of the bus is mounted to the frame rails of the chassis by a series of clips or clamps.
- This non-rigid mounting feature allowed the bus body to slide forward approximately 36 inches during impact.
- This dissipation of impact energy over a long time duration acted to reduce the interior contact speeds and resulting acceleration levels on the vehicle's occupants.

- Compartmentalization is the restraint strategy currently used in large school buses greater than 10,000 pounds.
- During crash tests, the dummy slides forward on the bench seat, remaining in an upright position until the knees of the dummy strike the seat back in front of it. At this point the upper torso begins to rotate forward and downward. The dummies head strikes the seat back, pushing the head backward which bends the neck.

Typical Compartmentalization

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- Seat belts can only be installed on an FMVSS 210 compliant school bus seat.
- The non-210 seat is not structurally reinforced and seat belts cannot be used on these seats.
- If retrofitting seat belts, do so only when following bus manufacturer's instructions, using approved parts.

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Lap-belt ready seat (note diagonal support and other supporting structure in seat)



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Large Buses: FMVSS 210 seat vs. Non-210 seat



Note: The frame is structurally reinforced with specific areas designated on the seat frame for seat belts.

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Large buses: Non-210 seat



Seat that is not "lap belt ready"

Note: The frame is not structurally reinforced for seat belts.

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Research Question

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To add lap belts to a large school bus, is it necessary to have seats that are reinforced and designed for use with lap belts? YES or NO

Find it now

www.nhtsa.dot.gov/people/injury/buses/choosing_school_bus/pre-school-bus_09.html

Products included in this or any other module are used only as examples.

Did you find it?

The correct answer is YES.

- To add lap belts to a large school bus it is necessary to have seats that are reinforced and designed for use with lap belts. These seats, called “lap-belt-ready” seats, are the only seats capable of being retrofitted properly with lap belts. If there is any chance you may need to add an anchorage system to your school bus seats in the future, you should prepare now by ordering “lap-belt-ready” seats.

- **To assist Head Start and other child care programs, the Dept. of Health and Human Services offers user-friendly resources regarding the Federal requirements and regulations governing transportation.**

- Click on the link below to go to Head Start's Transportation page
- Click on the second bullet entitled "A Lack of Restraint".

Find it now:

http://eclkc.ohs.acf.hhs.gov/hslc/resources/Transportation/Transportation%20PathFinder_1/Scenarios

- Go to

<http://eclkc.ohs.acf.hhs.gov/hslc/Program%20Design%20and%20Management/Transportation/Transportation%20PathFinder?Act=home>

- Click on the second bullet entitled "A Lack of Restraint".

What is Ahmad's issue?

- A. Incorrect restraint type
- B. Incorrect seat orientation (facing rear)
- C. Ahmad does not ride in car seat
- D. Ahmad does not stay in his car seat

Did you find it?

- D: Ahmad does not stay in his car seat
- At the bus stop, Ahmad is buckled into his Child Safety Restraint System by the bus monitor. As soon as the monitor leaves him to tend to other children, Ahmad unbuckles his restraint. Each time this is discovered, he is again securely buckled back into his restraint system. This test of wills continues with Ahmad's refusal to stay buckled and in his seat.

- Click on the link below to browse to Head Start's Transportation page
<http://eclkc.ohs.acf.hhs.gov/hslc/resources/Transportation/Safety>
- Review the Policies and Drills. Is there one that is most helpful for you?

Research Question

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- Go to the Head Start's Performance Standards page
<http://eclkc.ohs.acf.hhs.gov/hslc/Head%20Start%20Program/Program%20Design%20and%20Management/Head%20Start%20Requirements/Head%20Start%20Requirements>
- On that web page search for CHILD RESTRAINT SYSTEMS.

What is the Head Start regulation number specific to child restraint systems?

- A. 45 CFR 1310.10
- B. 45 CFR 1310.11
- C. 45 CFR 1310.12
- D. 45 CFR 1310.13

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The correct answer is: 45 CFR 1310.11

- **45 CFR 1310.11** -- Child Restraint Systems
- **45 CFR 1310.11(a)** -- Effective June 21, 2004, each agency providing transportation services must ensure that each vehicle used to transport children receiving such services is equipped for use of height- and weight-appropriate child safety restraint systems.
- **45 CFR 1310.11(b)** -- The responsible HHS official may approve a request to extend the effective date under paragraph (a) of this section to not later than January 20, 2006, if:
 - **45 CFR 1310.11(b)(1)** -- Notification is received by March 1, 2004 that such a request to the responsible HHS official will be forthcoming; and
 - **45 CFR 1310.11(b)(2)** -- The request for an extension is submitted by April 1, 2004 with information documenting that an extension through the period requested (but not later than January 20, 2006) would be in the best interest of the children served by the Head Start or Early Head Start programs, as set out in guidance provided by HHS.

- A standard child restraint with a harness can be correctly installed using lower anchors or seat belts
- Booster seats that require a lap and shoulder belt cannot be used on bus seats with lap only seat belts
- Some special needs seats use a cam wrap to secure the CR.

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3 Types of School Bus Restraint Options

1. **Integrated**
2. **Cam wrap**
3. **Conventional**
 - **Please note these are only examples.** This list is not exhaustive.
 - Products shown in this presentation do not represent all available products/resources.
 - As a certified technician, check manufacturer web sites for more seats and details. >> <http://www.cpsboard.org/childmanu.htm>

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Example: C.E. White Integrated Seat

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Integrated seat belt
No weight limit for seat belts.



Integrated child restraint
For children 20-60 pound weight limit for internal harness.

Manufacturer Web site: <http://www.cewhite.com/>

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Example: SafeGuard Integrated Seat

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- Harness for children 22 to 85 lbs.
- Folds away when not in use
- Note presence of lap and shoulder seat belt
- Manufacturer Web site:
<http://www.safeguardseat.com/industries/school-transportation/bus-seating/integrated-child-seat/>



SafeGuard Integrated Child Seat

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- Built onto the CR and do not require a seat belt on the bus
- Wrap around the school bus seat back to secure the CR
- When using a Cam wrap, the bus seat behind must have a restrained occupant or not be used at all.
- Cam wraps come with restraint; **CR manufacturer provided**

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Cam Wrap Warning Label

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Tag required by NHTSA on all new cam wraps.

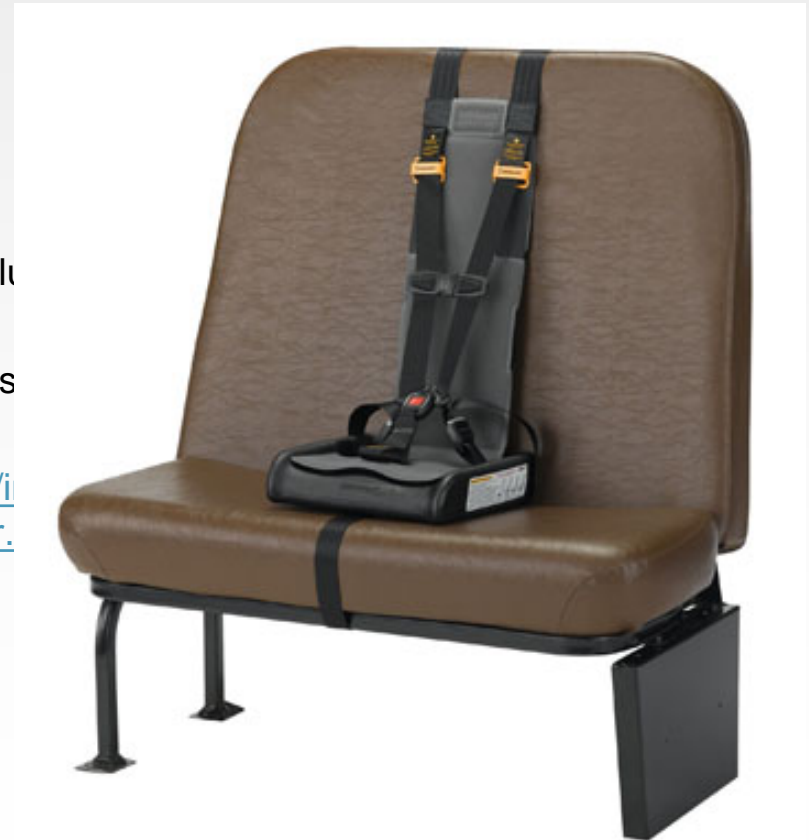
When using a Cam wrap, the bus seat behind must have a restrained occupant or not be used at all.

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Example: SafeGuard STAR

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- 5-point restraint
- Cam wrap equipped/required.
- Three sizes: 25-65 pounds, STAR Plus
Special Needs: 25-105 pounds.
- Fits all high and low back school bus
- Manufacturer Web
site: <http://www.safeguardseat.com/transportation/add-on-restraints/star>.
- Site provides installation videos



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Example: ProTech Cam Wrap

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- Cam wrap required
- Pro Tech II
 - 20 – 65 pounds,
 - maximum waist size 22.5" and up to 47" tall
- Pro Tech III
 - 20 - 90 pounds
 - maximum waist size 30.5"
 - maximum 51" tall
- Manufacturer Web site: <http://www.ewss.org/gpage4.html>

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Example: EZ On Pro

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- Adjustable Vests
- Non Adjustable Vests
- Multiple sizes: 20 – 168 pounds
- Manufacturer Web site: www.ezonpro.com



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What is the upper weight limit for an EZ ON Vest?

- A. 58
- B. 90
- C. 115
- D. 168

Find it now:

<http://www.ezonpro.com/>

Did you find it?

The correct answer is: 168

- It meets FMVSS 209/302.
- It has been crash tested at 30mph (50 kph) at 20 g's on a school bus seat.
- It meets FMVSS 213.

- Some newer buses have factory installed lap or lap-shoulder belts
- Conventional seats or vests may be used



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Example: Safe Traffic Systems

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- Lap belt: Requires top tether to wheelchair or vehicle approved anchor point
- When using the vest with a lap shoulder belt a tether is not necessary
- Large: 50 – 80 pounds
- Small: 30 – 60 pounds
- Manufacturer Web site: www.safetrafficsystem.com

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- **What does Safe Traffic Systems call their energy management tether?**
 - A. Deformable multilayered clip
 - B. Tether anchor manager
 - C. Tether energy anchor manager (TEAM)
 - D. Force management clip

Find it now: <http://www.safetrafficsystem.com/>

The correct answer is: Deforming multi-layered clip



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- For more information on transporting children with special health care needs, visit the following sites:
- www.preventinjury.org
- <http://aappolicy.aappublications.org/cgi/content/full/pediatrics;104/4/988>

Seat Belts on School Buses?

- NHTSA has completed several research studies.
- Researchers concluded that belts on buses were neither recommended nor discouraged.

- View the NHTSA report:

<http://www.nhtsa.gov/Research/Crashworthiness/School+Bus+Crashworthiness+Research>

- American students are nearly ____ times safer riding in a school bus than with their own parents and guardians in cars.
 - A. Five
 - B. Eight
 - C. Ten
 - D. Twenty-three

Find it now:

<http://www.nhtsa.gov/Research/Crashworthiness/School+Bus+Crashworthiness+Research>

Did you find it?

- **The correct answer is: B. Eight**
- American students are nearly eight times safer riding in a school bus than with their own parents and guardians in cars. The fatality rate for school buses is only 0.2 fatalities per 100 million vehicle miles traveled (VMT) compared to 1.5 fatalities per 100 million VMT for cars

- In 2002, NHTSA has concluded that lap belts appear to have little, if any, benefit in reducing serious-to-fatal injuries in severe frontal crashes.
 - TRUE
 - FALSE

Find it now:

<http://www.nhtsa.gov/Research/Crashworthiness/School+Bus+Crashworthiness+Research>

Did you find it?

- The correct answer is **TRUE**.
- An analysis of test data by the National Highway Traffic Safety Administration (NHTSA) has concluded that lap belts appear to have little, if any, benefit in reducing serious-to-fatal injuries in severe frontal crashes.
- On the contrary, lap belts could increase the incidence of serious neck injuries and possibly abdominal injury among young passengers in severe frontal crashes.
- Any increased risks associated with the use of lap belts in small school buses are more than offset by preventing ejections.

- According to the NHTSA 2002 study, lap shoulder belts on buses can not be misused.
 - TRUE
 - FALSE

Find it now:

<http://www.nhtsa.gov/Research/Crashworthiness/School+Bus+Crashworthiness+Research>

- The correct answer is **False**.
- The use of the combination lap/shoulder belts could provide some benefit, unless misused.
- Lap/shoulder belts can be misused and NHTSA's testing showed that serious neck injury and perhaps abdominal injury could result when lap/shoulder belts are misused.
- Other considerations, such as increased capital costs, reduced seating capacities, and other unintended consequences associated with lap/shoulder belts could result in more children seeking alternative means of traveling to and from school.

- Go to <http://www-nrd.nhtsa.dot.gov/Pubs/810813.PDF>
PDF document-Requires [Adobe Acrobat](#)
- View/Print out the 2006 SCHOOL TRANSPORTATION-RELATED
CRASHES Traffic Safety Fact Sheet

You will need this fact sheet for the next research question.

According to this study, which age group under 19 years had the most pedestrian fatalities?

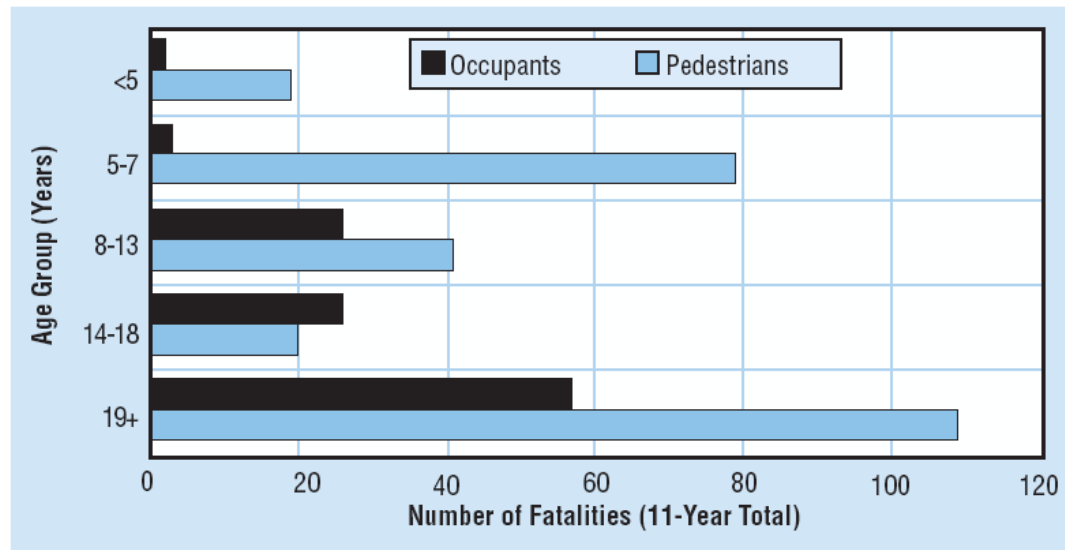
- A. Under 5 years old
- B. 5-7 years old
- C. 8-13 years old
- D. 14-18 years old

Find the answer:

<http://www-nrd.nhtsa.dot.gov/Pubs/810813.PDF>

Figure 1

Total Occupant and Pedestrian Fatalities in School Transportation-Related Crashes, by Age Group, 1996-2006



Note: Occupant fatalities shown are for occupants of school buses and non-school buses used as school buses.

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- **Never** place child safety restraint systems (CRs) in rows with an emergency exit door or window
 - may block the evacuation of passengers.
- A belt cutter for the driver is essential for emergency evacuations when seat belts or tie downs are used.
- Have an emergency plan for **each** child on the bus.

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- Evacuation drills should be as real as possible without damaging any equipment.
- Practice with real children, child restraints, wheelchair tie downs, etc.
- Practice both evacuation options
 - **Option 1:** remove child from the restraint and exit
 - **Option 2:** remove the restraint with the child in the seat and exit

- **School District / Contractor**
 - Purchases child restraints
 - Registers child restraints
 - Installs child restraints
 - Maintains child restraints
 - Stores the child restraints

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Proper Maintenance Includes:

- Register each CR with manufacturer
- Check for recalls and make corrections
- Maintain an inventory system with manufacturer contact information, model number and date of manufacturer
- Provide proper storage and regular review of storage site
- Regularly assure seat is in good working order
- Dispose of properly when necessary

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- Staff trained on proper use and installation of CR in variety of seating positions.
- Regular technical updates for bus staff
- CR instruction manuals readily available
- CR is adjusted for each individual child for each use

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- NHTSA developed an eight hour CPS course on how to properly restrain children on school buses.
- Open to anyone, not just techs.
- For more information, contact your NHTSA Regional office.

Thank you for your interest in proper occupant protection on school buses.



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