## Teachers Guide for Elementary Classes



Stairway Manufacturers' Association Stair Safety Program

## Teachers Guide for Elementary Classes Table of Contents

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## Introduction to Teacher's Guide for SMA Student Stair Safety Program

## Dear Educators:

Preprimary thru Elementary age children and our elderly are within the two demographics with the highest incidence of stairway related injuries, most of which happen in the home. The Stairway Manufacturers' Association members are professional stairbuilders and stair part manufacturers dedicated to reducing stairway accidents through building code reform and education of the industry and the public. This program is part of that effort and presents an opportunity, which you as educators can compliment and reinforce, as our children develop habits essential to life safety. Learning these important lessons will enable them to "Use Stairs Safely" within the built environment and to transfer their knowledge to others by example.

This program has been developed by a team of elementary educators and stair professionals and has been classroom tested. We invite your comments and critique to help us improve the program and to learn of the needs of our students and school systems. To contact us simply email SMA@stairways.org .

You will find additional information related to stairways and the industry at www.stairways.org .
What is the SMA Student Stair Safety Program?

- This is a program designed for students that can be customized for students of any age to introduce them to the basics of stair safety.
- The curriculum includes downloadable graphics, lesson plans, coloring/activity book, basic mathematic materials and introduction to stair codes.

Why spend classroom time focusing on stairs and stair safety?

- According to the Home Safety Council's national report on home injuries, the State of Home Safety in America ${ }^{\text {TM }}$ (2004), falls accounted for nearly one-third of all unintentional home injury deaths each year. Falls from stairs and steps were the second leading cause of death due to falls.
- Research has shown that the largest percentage of the falls that result in serious injury are not the result of faulty stair design regulated by building code but rather stairs that are in poor condition or unsafe stair usage that we might significantly affect through education.
- Not only do stairs present a significant safety risk, but they also present a hands-on learning opportunity for students of all ages to be involved in learning measuring and mathematics.

When should you introduce stair information into the curriculum?

- National Building Safety Week is the second week of May. Spending a day discussing stair safety could be combined with other areas of building safety, such as fire awareness.
- For pre-school or kindergarten students, stair safety can be introduced when discussing other topics starting with the letter "S."
- For older students, stair safety can be included in a cross-curriculum study, combined with lessons in fractions, basic geometry, introduction of the metric system, or practical design of stairs.


# SMA Student Stair Safety Program Elementary Level 

Time: 30 minutes Materials:

- Downloadable graphics from SMA website
- Copies of SMA Student Stair Safety Program Activity Guide, one per student.
- Downloadable SMA Safety Kit, one per student.
- Wipe board/large newsprint pad and pen

Learning Objectives:

- Students will be able to demonstrate and/or identify the following safe stair behavior: holding the handrail, not playing on or near stairs, and walking slowly on the stairs.
- Students will be able to identify the following unsafe stair situations: unlit stairs and cluttered stairs; stairs that are not code compliant.

Procedures:
Introduction:
Ask, by a show of hands, the students how many students have stairs in their homes. Ask if any of them have ever fallen down the stairs. Invite them to share some experiences about falling down the stairs, or share an experience of your own. Brainstorm a list of reasons that a person may fall on the stairs and write these ideas on the board.

## Lesson:

Ask the students to look for two general categories into which these causes can be grouped: either they are unsafe behaviors or unsafe structures. What would examples of these be? Go through the list again and classify each item on the brainstormed list as either an unsafe behavior or an unsafe structure. Can any item be classified as both?

Distribute the SMA Student Program Activity guide. Using the final page as a reference point, discuss the points of safe stair usage. Ask the students why these are the safe ways to use the stairs. Ideas of possible answers are:

Clear the path - if the stairs are cluttered, the risk of falling is greater
Light the way-if you can't see where you are going, it is easier to trip or miss a step
Hold the rail-using the handrail will help to stop a fall if you do trip and eliminate to reach and grab the rail when in the event of a fall.
Do not play-running or chasing on or near stairs can cause falls, climbing or leaning on guards may result in falls through or over a guard.
Keep your hands free-if you are carrying too much up or down the stairs, you can not use the handrail, and you can't see where you are going
Take your time-hurrying on the stairs, or taking two stairs at a time, leads to more fall opportunities.
Use stairs safely- developing all the safe habits taught above help us to use stairs safely all the time.

## Wrap Up:

Ask students who previously shared stories about falling down the stairs if they think they would be safer now.

Optional Supplemental Activities:

- Contact a local stair builder and ask them to visit your class to discuss his trade and help with your inspections. The SMA can help you contact a local stair builder.
- Find pictures of various architectural stairs and discuss how they are the same and different. Discuss what might make some safer than others.
- Have students draw a picture of a stair including the parts defined in the stair vocabulary or find and identify the parts of the stairs in their activity books.
- Use the SMA Safety Kit and discuss results in class. The results can be used to create different kinds of charts and integrated into mathematics and geometry lessons.
- Correlate use of the metric system to enhance understanding imperial and metric equivalents through real applications. See the SMA Visual interpretation for all metric equivalents stated in the code.
- Tour your school and entrances evaluating stairs on the premises and discuss how many of the safety requirements taught are essential to ramps as well. Discuss the need for safe ramps for persons that may not be able to use stairs.
- Using the SMA Visual Interpretation discuss other aspects of the code being used to assure the safety of people using stairs.
- Discuss with students how especially in crowded situations, changing classes, exiting for recess, subways, and public areas and in emergencies such as fire drills their safe use of stairs will prevent injury and is important to the safety and well being everyone.

Glossary of Stair Vocabulary: (Listed in order of understanding, essential terms highlighted)
Building Code - Rules used to make sure that buildings are safe to use and live in.
Square - A tool with a square corner used by stairbuilders and carpenters.
Tread - The horizontal part of a stair upon which the foot is placed
Winder - A tread with nonparallel edges
Riser - The vertical component of a step filling the space between the treads
Nosing -The leading edge of the tread
Stair - 1. A step or change in elevation of one riser height, 2. A unit segment of a flight, consisting of a riser and a tread

Step - 1. A change in elevation of one riser height to a floor or landing without a tread, 2. A unit segment of a flight consisting of a riser and a tread

Flight - An uninterrupted series of stairs or steps from one landing to the next
Landing - The space at the top and bottom of a flight at a floor level or between flights to provide clear approach, a place to turn, or provide a resting place.

Stairway - One or more flights of stairs, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another

Handrail - A sloped or horizontal rail intended for grasping by the hand as an assist for; guidance, support, pulling, or arresting a fall

Rail - A sloped or horizontal member of a balustrade
Baluster - A vertical member used to limit the size of openings within a balustrade and provide support to the top of a balustrade or guard system

Post or Newel - A vertical support member of a guard or balustrade system that connects the balustrade/guard to the stair or floor

Balustrade - A system of rails, posts, balusters, or other ornamental components used to separate two areas

Guard - A system of rails, posts, balusters, or other ornamental components used to minimize falls from elevated walking surfaces and the sides of stairs
*Highlighted terms are emphasized in student materials.

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# SMA Stair Safety Inspection Activities 

Materials:
Cardboard
4 inch circle
4-3/8 inch circle
12 inch rulers
Tape measure
Plumb bob (optional)
SMA Visual Interpretation
Make and Distribute the SMA Safety Kit Materials as needed for the activity options below. The activities are interactive and will allow students to examine stairs in their own home with help from parents, and/or can be used in school to determine how safe the stairs they use are and help to understand the need for caution.

Ask students what they think of when they hear the word "code." Allow for several answers, such as secret codes, or a code of conduct, or the "Pirate Code." Explain that people who build buildings have codes which are like rules that they need to follow in order to make buildings safe. There are many kinds of building codes that make buildings safe for the occupants. Students and teachers are occupants that must be safe in school buildings. You might discuss how workers in offices and factories, patients and caretakers in hospitals and families in homes need safe buildings. Some of those codes make stairs safer for us to use.

Codes are always changing, as building professionals learn more about how to make buildings better and safer. When a house is built, it must meet the code that is in place at that time. If your house or school is older, the code might have been different than it is now. That doesn't mean older buildings and stairs are bad, but it might mean that you need to think about safer ways to use them. You can use the SMA Safety Kit to test your stairs to see if they meet today's building safety code.

Warning: These activities are safe for children that have the ability to traverse stairways safely. However none of these activities should be done without adult supervision. Small children can be undetected by persons using stairs especially adults carrying an object in front of them or might be using a cell phone. Children should be further instructed to perform these tests at or on the lowest portion of the stairway.

## Activity 1:

Balustrades or Guards, as called in the code are found on stairs and at the edge of elevated walking surfaces to minimize the possibility of accidental falls. Codes have been improved to prevent fall through accidents but many older structures may have wider openings that are not safe for smaller children. Older high rise apartment balconies and elevated decks are notable problems. Understanding this can prevent many accidents.

It will be easier to test if the circles and square are applied to card board. Circle A is 4" in diameter and will be used to test the openings in horizontal Guards at the edge of a floor as found along a balcony. The code states a 4 inch sphere/ball shall not pass through the guard. Use the cutout as if it were a sphere (not on edge, see picture 44 from SMA VI 2009) to test if it fits through any openings in the horizontal guard.

Circle B is $43 / 8$ " in diameter. This circle should not pass through any opening in the guard on the side of a stair. (See photo 45 below from the SMA VI 2009)

If the openings do not allow the circles to pass through when held correctly, the guard will prevent small children from falling through even those who cannot walk yet and are still crawling. If the openings are larger it is especially important to understand the need to use caution.


Students will measure the floor guard height as shown in the photo 44 to determine if it meets the minimum required height of 36 inches and to check for furniture that children might unwarily use as an assist to climb. Students should be taught never to climb, lean, sit, slide, or even play in proximity to a guard not only for there safety but the likelihood of dropping an object onto someone below will be prevented. In particular teaching others not to lean on guards is something they can easily do and understand.

Activity 2: Using the square from the student activity kit stand it on edge with the long side on the tread of a stair as shown in the activity kit. Mark the top of the upper tread and the nose of the lower tread on the cardboard. The mark on the vertical edge will be used to measure the riser height and the mark on the horizontal edge will be used to measure the tread depth.

Move the square to different treads on the stair placing it on each tread in the same orientation. Find the smallest and largest riser height and tread depth by comparison. The largest and smallest riser heights are required by code to be within $3 / 8$ inch. The tread depths are also required to be within $3 / 8$ inch. Mark the smallest and largest dimensions on the cardboard as before. Please note that winder or "pie" shape treads have different code requirements for tread depth. Be sure to use rectangular shaped treads for this activity. However the riser height requirement is not affected and applies to all steps regardless of the shape of the tread.

The square can now be used at the desk. Using a ruler the student can measure between the largest and smallest mark or count the spaces in between. They can also determine the riser height and tread depth.

If the riser height is equal to or less than $73 / 4$ inches in homes ( 7 inches in public buildings) the riser height complies with code. If the Tread depth is equal to or greater than 10 inches in homes (11 inches in public buildings) the tread depth complies with code. If the variance between the largest and smallest of riser heights and tread depths are within $3 / 8$ inch the steps comply with the code for uniformity. If risers are too tall or treads too narrow, or if they are not uniform, students should be taught to be extra careful when walking up and down to prevent falls.

Activity 3: In homes the top of some guards on stairs can serve as a handrail. Handrails provide for support and balance while using stairs, unlike guards which aid in preventing falls off the edge of a stair or elevated surface. Some handrails are attached to walls. Students should inspect to be sure required handrails are
 actually available for users of the stair. Handrails are required on at least one side of the stair in homes and on both sides in schools and public buildings. Handrails should begin at or before the start of the stair and extend to or beyond the top step.

If your handrail is attached to the wall, use their square to measure the distance between the wall and the side of the handrail next to the wall. This distance should be at least $1 \frac{1}{2}$ inches to allow enough finger room to grasp the handrail. There should be nothing to obstruct the finger room along the entire length of the handrail.

Students can use their square to measure from the wall to the side of the handrail farthest away from the wall. This distance should be no more than $4 \frac{1}{2}$ inches. If the handrail projects too far into the stairway it could limit the width needed to walk and use the stairway.

Activity 4: Unlike guards, which aid in preventing falls from an elevated surface, the handrail must be at a height that is within reach. In homes the top of a guard can also serve as a handrail if at the required height. The code requires handrails to be within 34 to 38 inches measured vertically (plumb) above a line connecting the front of the steps. (See photo 24)

Since the handrail is on an angle students are instructed to be sure the measuring device is held vertically. At school the use of a plumb bob, weighted string, or a level will help to obtain good results. Placing the end of the measuring tape at the position shown in photo 24 will eliminate drawing the lower line or using a straight edge to as drawn in the photo. Hanging a "plum bob" to align with the nosing and using tape to mark the point on the rail will allow you to easily measure in the correct location.

Activity 5: Have students complete the questionnaire and discuss the results in class. Relate the results to the students' and their families' safe use of stairs.

Dear Family,
We are starting our study on stair safety. Did you know that research shows that a large amount of falls that result in serious injury are not caused by faulty stairs, but due to unsafe use of stairs? This is a program designed for students and families to learn the basics of stair safety and keep our homes safe. Students will learn stair vocabulary and the rules of stair safety. For more information about stairs or stair safety, please visit the Stairway Manufacturers' Association website at: http://www.stairways.org/.

Here are some suggested activities to complete together:
$>$ Help your child complete the Stair Safety Checklist.
$>$ Learn the Stair Safety Song
$>$ Take a walk and look at the different types of stairs in your neighborhood.
$>$ Find pictures of stairs in magazines, newspapers, or books.
$>$ Create a plan for your family to follow stair safety rules.


Literature about Stairs:
On the Stairs by Julia Hofstrand Larios - Read this book and then discuss how the characters can be safe on the stairs.


## SMA Student Stair Safety Kit

Welcome to the exciting process of testing your stairs to see how safe they are! First, remember if your stairs "fail" any of these tests it does not mean that you can't use your stairs. There are easy ways to make your stairs safer! Using this Stair Safety Kit will teach you how to be safer in your home, and you can teach the rest of your family. Bring the information back to school and share it with the rest of your class.

## Before you start:

- Study the stair vocabulary words in bold. They are in your glossary.
- Tell your a grownup in your family you need their help to test your stair.


## Do not try to test your stair by yourself.

Activity 1: Cut out the circles in your stair safety kit. You can glue or tape them to cardboard to make them easier to use. Circle A should not fit thru any opening in a guard at the edge of a floor to meet the building code. Circle B should not fit through any opening in a guard on a stair. Be sure you hold the circle as shown in the picture when testing your guards.

If you have a guard at the edge of a floor you can measure the height from the floor to the top of the guard. It should be at least 36 inches above the floor to meet the building code. You can also check to be sure there is no furniture near the guard that small children might climb and then fall over the guard. You should never climb or play near a guard to prevent falls over the guard or through it.

What do I do if guards do not meet the code? If your circle can pass thru any openings when held correctly it means that, small children can either fall through or get stuck in the openings, so be very careful with small children, especially ones who are crawling on the floor! You should never climb or lean or try to sit on a guard. If your guards are too low everyone even adults should be extra careful.

Activity 2: Cut out the measuring tool in your kit. Stairbuilders call this a square. You can glue or tape it to cardboard to make it easier to use when testing. Be sure to hold it in place as shown in the picture. With help from an adult hold your square on the tread and measure the riser height and tread depth just like in the picture. With help from an adult, check the first three riser heights and tread depths. Mark the largest and smallest on the square with a pencil. If they are very close to the same size that means they are uniform and easier to walk on because they all feel the same. To meet the building code the distance between the smallest to the largest measurements you made should not be farther apart than three of the small marks on your square. Three mark is a fraction of an inch called three eighths or $3 / 8$ inch. Do this for both the riser height and the tread depth. You can also measure the distance between the marks you made on your square at your desk with a ruler.

Look at where the marks are on your square. The largest riser should not be more than $73 / 4$ inches and the smallest tread should not be less than 10 inches to meet the building code.

## SMA Student Stair Safety Kit

What do I do it my stairs don't meet the building code? The building code is always changing as experts learn more about building safety. If your steps are too tall or too narrow, or if they are not uniform, your house may have been built when the code was different. You will need to be extra careful when you are walking up and down so you don't fall. Always make sure everyone, especially other children and elderly people, hold the handrail when using the stairs.

Activity 3: Sometimes handrails are on the top of a guard or they may be attached to a wall. If your handrail is attached to the wall ask an adult to help you use a ruler or your square to measure the distance between the wall and the side of the handrail next to the wall. This distance should be at least $1 \frac{1}{2}$ inches to allow enough finger room to grasp the handrail. Test to make sure you have room for your fingers the full length of the handrail. Now measure from the wall to the side of the handrail farthest away from the wall, this distance should be no more than $4 \frac{1}{2}$ inches to allow enough space for people to use the stairway.

Whether or not your handrail is attached to the wall you should also check to be sure your handrail starts at the beginning of the stair at both the top and bottom of each flight of stairs in your stairway. If your handrail passes all these tests it will meet today's building code.

What do I do if my handrail does not meet the building code? If your handrail is too close to the wall, you can purchase wall mount brackets from most hardware stores and reposition your handrail in a safer position on the wall. If this is not possible, be very careful when using the stairs, and always use the handrail. If your hand is already on the handrail, you won't have to reach out and grab for it if you are falling!

Activity 4: With an adult holding a yardstick or a tape measure you can test to see if the handrail is at a height between 34 inches and 38 inches as required by the building code. Put one end of the measuring tape at the tip of the nosing of the tread. You must be sure to hold the tape measure or yardstick vertical, straight up and read the measurement at the top of the handrail. (When something is exactly vertical stairbuilders say it is "plumb").

What should I do if my handrail is too high or too low? If your handrail is attached to a wall it could be unfastened and attached at the correct height. If it is at the top of a guard you may be able to add another handrail on the opposite side of the stair. Most stairs have only one handrail. For this reason the building code uses a height that works for grownups and most children. If you are not a grownup and your handrail is low it might be just right for you. You can discuss what is best with the grownups in your home. Just remember to always use the handrail and be sure that an adult knows if you cannot reach it.

Activity 5: Now you can answer the questions on your Stair Safety Survey. Share your answers with everyone in your home and take it back to school to discuss in class.

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Tread - The horizontal part of a stair upon which the foot is placed
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*Highlighted terms are emphasized in the stair safety kit instructions.


Using the SMA Stair Safety Kit, follow the directions for each activity and record the results of your Stair Survey below.


Activity 4: Handrail Height
Handrail Height
Meets Code $\qquad$ Does Not Meet Code $\qquad$

## Other Stair Safety Questions

Is there a light switch at the top and bottom of your stairs? Yes $\qquad$ No $\qquad$
Are your stairs in good repair? (No loose boards, nails sticking out or broken edges to cause a fall)

Yes $\qquad$ No $\qquad$
If you have carpeting on your stairs, is it fastened securely with no lose edges?

Yes $\qquad$ No $\qquad$
Are your stairs clear to walk and free of all clutter?
Yes $\qquad$ No $\qquad$
Do you have throw rugs at the top or bottom of the stairs? $\qquad$ No $\qquad$




NOTES:

