



## MIST Project Components .....



### Participants:

Wellesley High School: Laurie Haig, Craig Brown

Webster/Bartlett High School: Ryan Renaud, Michael Harpin

Brighton High School: David Kamishlian

**Title:** Stadium Handicap Re-design.

### Project Overview:

Proposal for stadium bleacher update /redesign to accommodate 2 wheelchair access and full viewing of event for both the "home" and "visitor" sides.

This project has a year long time frame. As students encounter the necessary math, another portion of the project may be completed.

### Background Resources/Research:

- ~ Current stadium condition ... picture and written overview of condition and accessibility.
- ~ Possibly field trip to actual location of work.
- ~ Access Massachusetts State Accessibility Laws/Requirements  
[State requirements for wheelchairs](#)
- ~ Local permitting requirements ... make a call to town permitting department.
- ~ Local building code concerning structures ie: ramps, decks, public seating.
- ~ Borrowing wheelchair from school nurse to experience different existing ramps.
- ~ Existing designs, different materials that could be used, tradeoffs that could be made.

### Mathematics Needed:

Measurement skills  
Budgeting /Accounting  
Basic Computation & Algebra  
Geometry

### Related /Secondary Areas:

Research: Local /State Laws  
Writing Skills ... Argumentative, Informative  
Diagram/CAD  
Presentation Skills ... Ability to demonstrate knowledge

### What student group is responsible for

Definition of the work (the problem that they will solve)  
(this could be a new ramp, reconfiguration of the bleachers, new bleachers etc)  
Research that was done

### **Expectations of Students:**

Students will research, design and create a proposal directed to the Town to better/update the existing stadium seating to accommodate 2 wheelchairs and 2 visitors for each as well as ensuring full visibility of the event/field.

This proposal is to be in line with existing state/local laws concerning such accessibility. It should also consider the ability of the wheelchair bound person to optimally view the field event.

### **Final Product thoughts include:**

Written Proposal presenting the need for this redesign.

Picture of existing bleachers.

List of resources used and written summary of how the information from the research affects the project. Describe the decisions made for design, cost, maintenance, durability or longevity.

Detailed list of procedures, time frames and needed materials

Proposed budget.

Technical Illustration containing specific measurements of design

Artistic illustration depicting completed redesign

Oral Presentation of the project (a group of staff members to serve as a panel/Town Committee for these presentations)

Resource List.



***Think:*** What do you think the "problem" with this "accommodation" could/would be?  
(Hint: Put yourself in a wheelchair)





Extensions/Unit Approach: These additions could be used to adapt this project for classes of lower or higher levels.

### Unit approach

#### **Day 1**

Materials - tape measure and recording materials (ipad, laptop or paper and pencil)

**Class Activity** - walk to the bleachers and measure the dimensions

- length, width, depth of the bleachers
- How high is the first row of bleachers off the ground?
- How high is each consecutive row of bleachers off the ground?
- Find the distance between the rows that act as the walk ways up the bleachers
- How many walk ways are there going up the bleachers?

- How many entrances/exits are there?

### Homework 1

Think about the measurements and other information you recorded in class. What importance or value do these factors have to the bleachers and the purpose that they serve?

Your answer should be neat, and should be written in clear, concise coherent sentences. At least three to five sentences. Remember that this is the first assignment of the unit. It will be used and referred back to throughout the unit. If you don't put effort in now, it will come back to create more difficulties later.

### Day 2

Materials - measurements from day 1 activity, ruler

Class Activity - create a drawing to scale of the bleachers. Your scale should be clearly written in the lower right hand corner of the paper.

### Homework 2

Complete the scaled drawing of the bleachers

### Day 3

Materials - Day 2 activity/HW

Class Activity - hand in your scaled drawings to your teacher

Your teacher will randomly hand out the drawings to students making sure that no one student has their own drawing.

Each student will check the scale in the lower right hand corner and check the drawing for accuracy.

Do not write on the drawing, make notes on a separate piece of paper so that the owner can make any necessary corrections.

Day 3 Homework - Analyze the drawing you made. If you were someone who was physically disabled, do you think that the current bleachers accommodate your needs so that you are able to watch a football game comfortably? If no, explain how the bleachers could be improved. Your answer should be neat, and should be written in clear, concise, coherent sentences. At least three to five sentences. Remember that this assignment will be used and referred back to throughout the unit. If you don't put effort in now, it will come back to create more difficulties later.

### Day 4

Materials - HW 3

Class Activity - In a group discuss your homework. Do you agree/disagree?

Each group will present what they discussed to the class.

If need be, review the issues we think need to be addressed.

- The location of the handicapped area: too small and too low in the bleachers. Should also be centered in order for the audience using it to be able to view the event better
- The size of this area as well as the need for benches so that the physically disabled can sit with someone that is not disabled.

#### HW 4

#1: Access Massachusetts State Accessibility Laws/Requirements

#1a: Determine the local permitting requirements ... make a call to town permitting department. (Class should pick one student to do this to avoid having the town answer the same question several times. The class should be conscious of the personal and communication skills required when selecting the student. If need be also remind them of the respect and appreciation necessary for the the task)

#2: Determine the local building code concerning structures ie: ramps, decks, public seating.

#2a: Request (politely ask the nurse if your class can borrow the wheelchair during class on Day 5. Again one person should make the call or write the email explaining the project. The class could pick it up on the way out to the bleachers during next class and will return it on the way back up to class \*in the exact same condition - if it needs to be wiped down it will be prior to dropping it back off with the nurse\*). Again communication and personal skills are required for this part of the assignment.

#### Day 5

Materials - wheelchair from nurse, measuring tape

Class Activity - Borrowing wheelchair from school nurse to experience existing ramp along with checking out the visibility from the current location of the handicapped seating.

While outside at the bleachers, note the material used for the current bleachers. Is it the best for the job or could different materials be used?

HW 5 - research 3 other possible materials that could be used. Can you find a cost per unit of each of the materials? Your answer should be neat, and should be written in clear, concise, coherent sentences. At least three to five sentences.

Remember that this assignment will be used and referred back to throughout the unit. If you don't put effort in now, it will come back to create more difficulties later.

If you prefer a table, feel free to fill in the one below instead of writing sentences.

Material	unit (i.e foot, yard, meter)	cost
Current:		
Alternative 1:		
Alternative 2:		

## Day 6

**Materials** - worksheet provided, protractor, & ruler

**Class Activity** - using a protractor, measure each angle that appears on the sheet  
(Each angle should measure 30 degrees)

- What do you notice about the angles?
- Using a ruler, measure each side of the angle (do this for each angle so you are actually measuring 6 sides)
- Now create a right triangle in each of the diagram. That is, draw a vertical line connecting the sides of each angle.
- Now measure this vertical side for each triangle.

## Extensions:

Whole area of concessions, what would you sell, how would you price what you sell, supporting supplies and structures, other factors such as how concessions might be cooked, kept cold or warm.