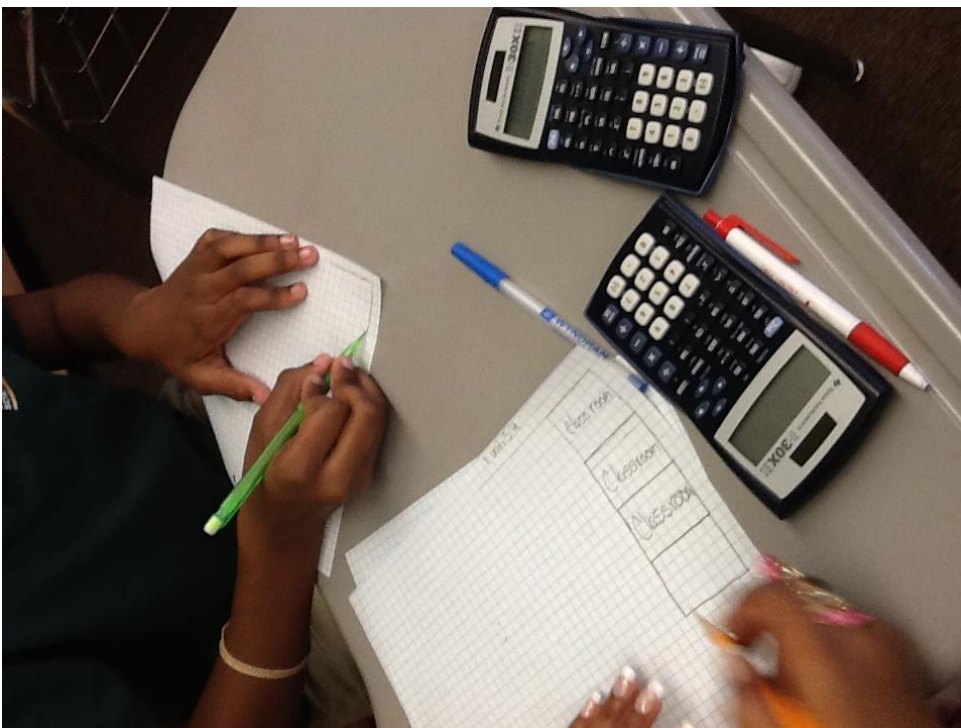## Scale Factor – Lab and Project

The students are introduced to the topic of scale factor through notes, graphic organizers and a map activity. Once a foundation has been achieved, the students break into groups of 3 and begin a guided lab on creating a floor plan for a new school. Students are motivated to complete this because they will enjoy creating an interior design for a new school to their own specifications. We begin by taking measurements of the classrooms, hallways, restrooms and stairwells. Students do this on a guided lab with spots to fill in the measurements. Students then determine the number of classrooms necessary for the school, inclusive of music, art, computers, foreign language, gymnasium/auditorium and cafeteria for roughly 400 students from Kindergarten to Grade 8. Students have to place restrooms, janitor's closets, administration offices, stairwells and hallways in their floor plans. Students also must decide if they want to have just one level for their school building, or multiple levels. Students can also place extras, such as a swimming pool or weight room, in their floor plans.

Materials: graph paper, Floor plan guided lab, ruler, tape measure, sample floor plan, Floor plan guided questions, classrooms, hallway, bathrooms, stairwells.

Scale Factor – Lab and Project

As a group, you are going to create a floor plan for a new school building. You have the freedom to design your floor plan as you wish, but there must be specific contents in your building.

1.) You must have enough classrooms for Grades Kindergarten to 8th grade. Consider that each grade will require 2 to 3 classrooms from K to 5th grade. There should be 1 computer lab for grades K to 5th.

2.) For Grades 6 to 8, you need 1 science lab, 1 social studies classroom, 2 Language Arts classrooms and 2 mathematics classrooms. There should also be 1 computer lab.

3.) Special classrooms should include music, art, gym and foreign language (one is okay).

4.) Your building needs hallways to separate the classrooms.

5.) Your building needs restrooms (enough for 400 students).

6.) You can do a 2-story plan if you want, but you will need stairwells.

7.) You will need a cafeteria.

8.) You will need offices for the administration staff.

9.) You can consider janitors closets, extra space and storage if you want.
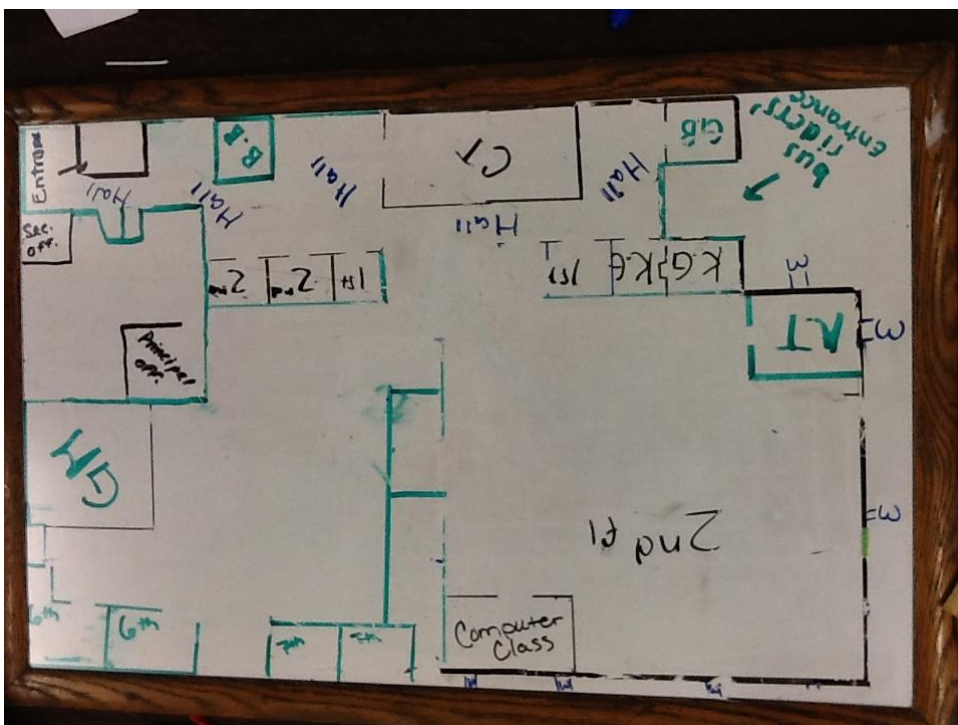
Determine what rooms your building will need. You will need to have dimensions for your rooms, bathrooms and hallways. You will go to measure these locations.

Classroom Dimension: _____ by _____

Restroom Dimensions: _____ by _____

Hallway Dimensions: _____ by _____

Determine what the scale factor will be for your floor plan. For example, will 1 unit on the floor plan paper be representative of 2 feet in the real floor plan? You may need to do a rough sketch to figure this out first. You can do many trials until you have your floor plan.

Scale Factor for small : big: _____ = _____

Come up with some ideas here:

Total number of classrooms needed? _____
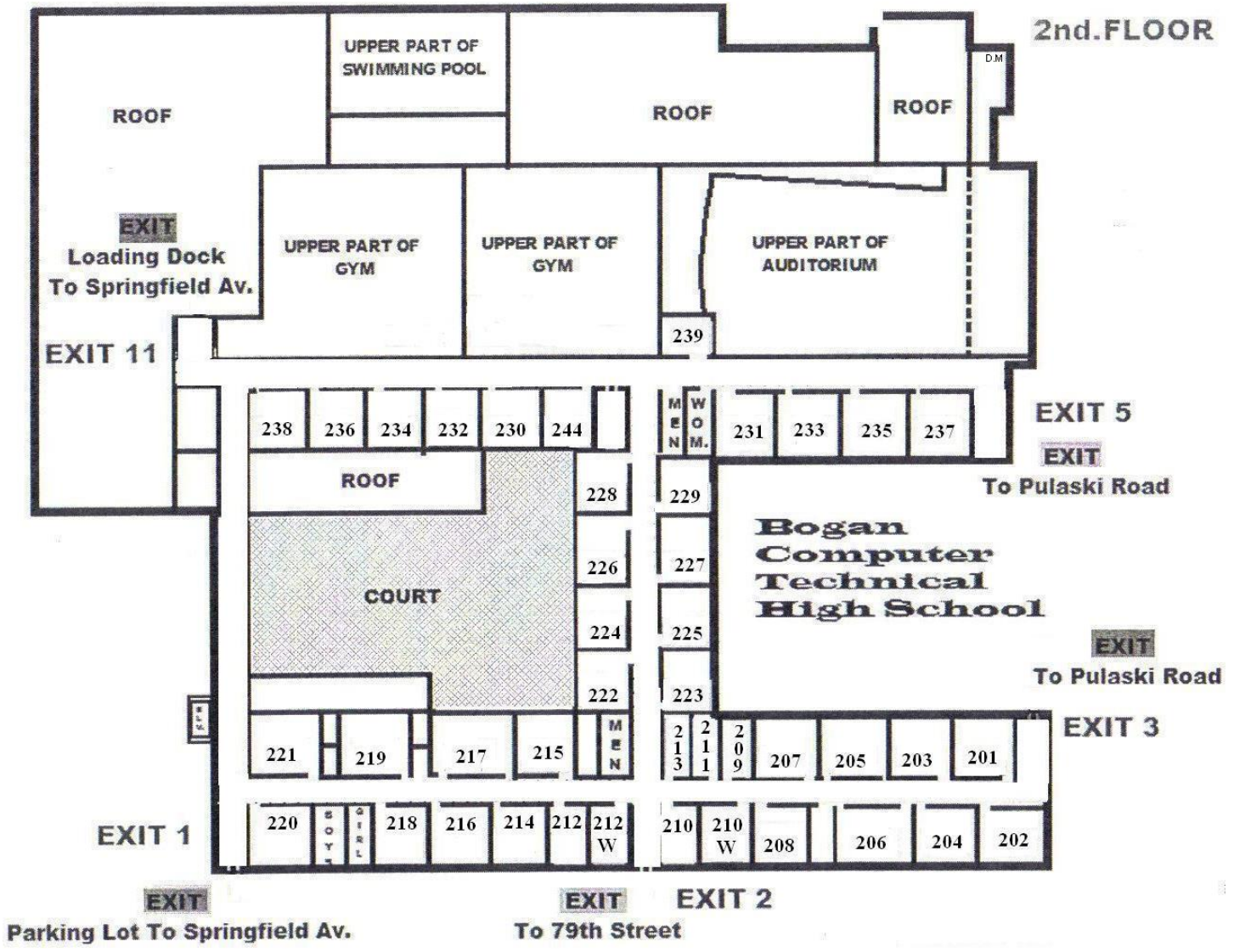

How will we locate the classrooms?

Bathrooms? _____

How will we locate the bathrooms?

Will we use stairs? How much space do we need?

Anything else we need?

2nd. FLOOR

D.M

ROOF

UPPER PART OF SWIMMING POOL

ROOF

ROOF

EXIT
Loading Dock
To Springfield Av.

UPPER PART OF GYM

UPPER PART OF GYM

UPPER PART OF AUDITORIUM

EXIT 11

239

238 | 236 | 234 | 232 | 230 | 244

MEN | WOM. | 231 | 233 | 235 | 237

EXIT 5

EXIT
To Pulaski Road

ROOF

228

229

Bogan
Computer
Technical
High School

COURT

226

227

224

225

EXIT
To Pulaski Road

222

223

EXIT 3

221 | 219 | 217 | 215 | MEN

213 | 211 | 209 | 207 | 205 | 203 | 201

EXIT 1

220 | BOYS | GIRL | 218 | 216 | 214 | 212 | 212 W

210 | 210 W | 208 | 206 | 204 | 202

EXIT
Parking Lot To Springfield Av.

EXIT
To 79th Street

EXIT 2

Floor Plan Lab – Guided Questioning

1.) Using the space provided, determine the perimeter of one of your classrooms on the floor plan. You can redraw the classroom below to help (be sure to label).

Using the space provided, determine the perimeter of the same classroom from the floor plan IN REAL LIFE. You can redraw the classroom below to help (be sure to label).

What is the ratio of the perimeter of the floor plan classroom to a real classroom?

_____ : _____

2.) Using the space provided, determine the perimeter of your cafeteria or gymnasium (or cafetorium). You can redraw the room below to help (be sure to label).

Using the space provided, determine the perimeter of your cafeteria or gymnasium (or cafetorium) IN REAL LIFE. You can redraw the room below to help (be sure to label).

What is the ratio of the perimeter of the floor plan room to the real room?

_____ : _____

3.) Is there a relationship between the scale factor of your drawing and the ratio you determined existed for the perimeters? Explain below.

4.) Using the space provided, determine the area of a classroom from your floor plan. Area can be found by multiplying the length by the width (l x w or b x h). You can redraw your classroom below to help (be sure to label).

Using the space provided, determine the area of a classroom from your floor plan IN REAL LIFE. Area can be found by multiplying the length by the width (l x w or b x h). You can redraw your classroom below to help (be sure to label).

What is the ratio of the area of the floor plan classroom to the real classroom?

_____ : _____

5.) Using the space provided, determine the area of your cafeteria or gymnasium (or cafetorium). You can redraw the room below to help (be sure to label).

Using the space provided, determine the area of your cafeteria or gymnasium (or cafetorium) IN REAL LIFE. You can redraw the room below to help (be sure to label).

What is the ratio of the area of the floor plan room to the real room?

_____ : _____

6.) Is there a relationship between the scale factor of your drawing and the ratio you determined existed for the areas? Explain below.