designing a playground: due 11-12 March 2014

The town of Shingle Mountain needs a new playground. They have enlisted a motley crew of high school freshmen and sophomores to design their equipment.

**the deliverables:** your project will involve four major components.

a.) **Mathematician:** Measurements and calculations demonstrating similarity

b.) **Architect:** A blueprint/scale drawing, measuring 17”x22” (four sheets of graph paper)

c.) **Designer:** A physical model of the structure to be designed

d.) **Marketer:** Marketing materials summarizing/selling your design

**groups:** student groups of 2-4. Group persons and roles must be submitted on Monday, 24 Feb. Official roles must be assigned, though actual work can and should be collaborative in all sections. Your grade will come from your own contributions and your group’s overall performance.

**how do we do this?** You will need to choose what equipment to design. It can be a seesaw (similar triangles), a basketball court (similar quadrilaterals, segments), jungle gym (similar quadrilaterals), slides (2) (similar triangles), swingset (similar triangles), fortress (similar polygons), Eagle’s nest (geodesic dome; similar polygons), or a design of your own choice (must be approved in advance).

1. Once chosen, the group may want to find actual equipment and record measurements, or estimate reasonable values from observations or research.
2. The mathematician should then scale down the individual measurements using the scale factor of \_\_\_\_\_\_\_. Choose an appropriate scale so that the measurements fill up most of the blueprint size.
3. The architect then uses these values and creates a scale drawing showing the equipment from one perspective (straight on, top down, 3-dimensional perspective, etc.)
4. The designer is in charge of creating a physical model using the blueprint. The scale model and the blueprint will be to the same scale. Possible materials include popsicle sticks, foam, cardboard, balsa or other soft wood, straws, toothpicks, a variety of these, or others. The model should be decorated, colorful, and realistic.
5. Finally, the marketer is in charge of producing some document (PowerPoint, flyer, pamphlet, poster, etc.) that summarizes the design process and sells the attributes of the equipment. You might include a cost estimate of the real-life equipment based on the material used.

**what do we turn in:** orderly data of actual and scale measurements and calculations, neatly presented blueprint, scale model, and marketing material. Also a reflection sheet handed out, summarizing your and your partners’ roles in the process. There will be a brief presentation to the class on March 11/12.

**Assessment Criteria:**

Measurements/Calculations: 28 points

Are all the relevant measurements provided? Think about details like the width of steps, the handlebars, the thickness of the material, and so on. A high quantity of accurate measurements will make for a better blueprint. A minimum of 15 different measurements should be collected.

Are the calculations set-up and solved properly? Make sure to choose a reasonable scale factor so that your measurements will fit on the blueprint (fixed size of 17”x22”) and make for a manageable scale model. Be sure to choose metric or imperial units and *remain consistent.*

Blueprint: 28 points

Is the blueprint an accurate representation of the equipment? A blueprint should include the name of the equipment, the scale factor/ratio, the units for the measurements, clear markings for all the number values. Choose a proper point-of-view for the blueprint: a top-down view of an outdoor basketball court makes sense, but does not work for a swingset. You may use a computer for drafting/designing some aspects of the blueprint, but the final product must be hand-drawn with ruler and pencil/pen.

Physical model: 28 points

Is the model to proper scale and professionally presented? The measurements should match the blueprint. The model should be accurately colored and feature creative design elements in its presentation. Points can be taken off for sloppiness, inaccuracy, and/or poor construction.

Marketing: 16 points

Does the document (presentation/flyer/poster/etc) capture the design process? Included should be a summary of the planning, measuring, calculating, sketching, and building steps. Points will be awarded for neatness, grammar, and creativity. Include (If possible) pictures of the process, special features of the equipment, and reasons it should be included in the playground.

Your name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Parent’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Turn in on Monday:**

**Names of group members (2-4):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Equipment to design (circle one):** seesaw jungle gym slides eagle’s nest/dome swingset fortress basketball court

other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Include a brief sketch below of your equipment (informal), suggestions will be made**

**Who will be in charge of which roles? Every group member must have at least one responsibility:**

**Mathematician: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Architect: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Designer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Marketer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**