Names:_____
_____
_____

Date:_____

3D Marbel Maze
Design Brief

Challenge:

You and your partner will use the engineering design process to plan, design, construct and evaluate a device to keep a marble rolling from point A to Point B for the longest time.

Criteria and Constraints:

- Maze must have a theme.
- Maze must have a name.
- Maze must include a drop, zig- zag, loop or spiral, and speed bumps.
- Maze must be 10" or taller.

Tools, Materials and Equipment Needed:

- You will be provided with card board, masking tape, glue gun and glue sticks, scissors and an X-acto knife.
- You will also receive a supply of craft sticks and 2 paper cups if needed.
- You may bring in any additional recycled items – plastic bottles, spoons, paper towel rolls, forks etc.

Procedure:

1. Students, working in groups of 2 or 3, will use the engineering design process to invent a 3D Marble Maze

2. Student groups will:
   a. Assign a group leader.
   b. Discuss the problem (complete EDP Worksheet).
   c. Discuss ideas for solving the problem (make sketches).
   d. Choose the "best idea" (make final sketch).
   e. Obtain materials and build a prototype (working model).
   f. Evaluate and test your prototype, refine as needed.
   g. After the prototype is finished, don't forget to show evidence of a theme - be creative.

Evaluation Criteria

Point A	10 points	_____
Point B	10 points	_____
Drop	10 points	_____
Zigzag	10 points	_____
Loop	10 points	_____
Speed bumps	10 points	_____
Theme	10 points	_____
Name	10 points	_____

Time		
0 - 1 seconds	5 points	_____
2 – 4 seconds	10 points	_____
5 - 7 seconds	15 points	_____
8+ seconds	20 points	_____
Total		_____ **/ 100**

Rate Calculations

	Distance in inches	Distance in Feet (inches/12)
Your track		

Rate =	Time (Seconds)	X	Distance (Feet)

Using the Engineering Design Process to create a 3D Marble Maze

Category	
Identify the Challenge (limitations, criteria, & specifications)	Write the challenge: *2 to 3 sentences* _____ _____ _____
Explore Ideas (brainstorm, write down ideas, make sketches)	Make 3 small sketches of your ideas. Include labels:
Plan & Develop	Make final sketch with labels and dimensions
Final Design Explanation (Which design will you build and why?)	Which design did you choose, and why? _____ _____ _____ _____

Use graph paper and create an isometric drawing of your maze. *Be sure to include dimensions*

Using inventor, create a 3-D model of your maze. *Be sure to include dimensions*

Create your maze using your plans

Test & Evaluate	Test your idea. Does your maze meet the time requirement? How did you improve your design? _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____