

## Valve Replacement Project Worksheet

**Project Challenge:** Design, construct, implant and test an artificial mitral valve that allows blood to flow in one direction from the left atrium to the left ventricle, and does NOT allow blood to flow back the other direction.

**Scoring Point System:**

- Effectiveness (50 points possible)
- Materials (50 points possible)
- Bonus (25 points possible)

**Effectiveness:** Use this table to calculate your own score:

	Example	Trial 1	Trial 2	Trial 3
<b>Number of total marbles in heart</b>				
<b>Number of marbles that move from the left atrium to the left ventricle (Step 1)</b>				
<b>Number of marbles that STAY in the left ventricle (Step 2)</b>				
<b>Percent in Step 1:</b> Divide number of marbles in step 1 by total number of marbles				
<b>Percent in Step 2:</b> Divide number of marbles in step 2 by total number of marbles				
<b>Score in Step 1:</b> Look on the table below				
<b>Score in Step 2:</b> Look on the table below				
<b>Total Score</b>				

**Step 1 and Step 2**

Percent of Blood Cells	Points Awarded
100%	25 points
70-99%	10 points
50-69%	5 points
0-49%	0 points

**Materials: To calculate your own score:**

- Begin with 50 points.
- Note that some materials cause you to lose more points than others.
- Note that some materials are neutral (meaning they do not cause you to lose points).

Material	cardboard	index cards	tissue paper	brown paper bags	Popsicle sticks	toothpicks
Points →	-10	-3	0	-2	-5	-2

Material	string	aluminum foil	construction paper	duct tape	scotch tape	Elmer's glue
Points →	0	-3	-3	-2	0	0

**Use this table to calculate your own materials score:**

<b>EXAMPLE</b>	Materials Used:									<b>TOTAL</b>
	Points:									
<b>TRIAL 1</b>	Materials Used:									<b>TOTAL</b>
	Points:									
<b>TRIAL 2</b>	Materials Used:									<b>TOTAL</b>
	Points:									
<b>TRIAL 3</b>	Materials Used:									<b>TOTAL</b>
	Points:									

**Bonus: To calculate your own score:**

- Award 25 bonus points for a valve with **two leaflets**

	Number of Leaflets	Bonus Points
<b>Example</b>		
<b>Trial 1</b>		
<b>Trial 2</b>		
<b>Trial 3</b>		

**TOTAL SCORES:**

	Effectiveness Score	Materials Score	Bonus Points	Total
<b>Example</b>				
<b>Trial 1</b>				
<b>Trial 2</b>				