

1<sup>st</sup> Tie Breaker = fewest penalty points  
 2<sup>nd</sup> Tie Breaker = Greatest mass lifted in final task  
 3<sup>rd</sup> Tie Breaker = Closest to 60 sec

**Tier Determination**

- |  |       |       |
|--|-------|-------|
|  | Tier  | Score |
| 1. A run with no violations  | _____ | _____ |
| 2. A device with construction violations, parallel design, or dead end paths | _____ | _____ |
| 3. Device impounded after deadline   | _____ | _____ |
| 4. Bad behavior, device remotely timed or controlled – no points, DQ         | _____ | _____ |

**Mission Possible B - San Diego Regional Science Olympiad – 4 February 2012**

School Name: \_\_\_\_\_ Team Name: \_\_\_\_\_

Student(s): 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

**SAFETY.**

- Team wore approved safety eyewear #2 during set-up and running of the device? \_\_\_\_\_
- Device was free of hazardous materials? (If not, specify. \_\_\_\_\_) \_\_\_\_\_
- Device was free of uncontrolled projectiles? (If not, specify. \_\_\_\_\_) \_\_\_\_\_
- All circuits carried 10 volts or less and all batteries were sealed, labeled and lead-acid free? \_\_\_\_\_

**If “no” for any, then = Tier 2**

**CONSTRUCTION PARAMETERS:**

Place a check next to each parameter that is correctly met in this device.

- |   |   |
|---|---|
| _____ All parts of device fit in a 50 x 50 x 80 cm. imaginary box.  | _____ No computers or integrated circuits |
| _____ Each task contributes to the final task.  | _____ No dead-end tasks.                  |
| _____ No hazardous liquids  | _____ No parallel tasks.                  |
| _____ Electrical components limited to: batteries, wires, motors, switches, resistors, capacitors, commercial photocell, mechanical relays. |   |
| _____ Device is NOT remotely timed or controlled = DQ   | _____ No more than three motors           |

**Time of operation: \_\_\_\_\_ seconds (max = 180 seconds)**

**If there was any Stalling while this device was running, = DQ**

**SCORING: POSITIVE POINTS**

- |   |            |       |
|---|------------|-------|
| Task Sequence List in proper format, tasks in device correspondingly labeled, submitted during Impound time | 75 points  | _____ |
| Task Sequence List a 100% match with the operation of the device?   | 25 points  | _____ |
| Team got the device ready to run within 30 minutes  | 50 points  | _____ |
| The number of whole seconds, <u>up to 60 sec</u> , that the device operated = _____ seconds                 | X 2 points | _____ |

**Tasks in part 4 of the rules: Maximum of 11 tasks: Starting + Final + 8 (b – k) + 1. Special Task**

- |   |                                   |                  |
|---|-----------------------------------|------------------|
| a. Starting Task- Initiate an action by pulling a string outside device   | 100 points                        | _____            |
| b. Push a wedge between two objects to separate them and cause the next action.   | 20 points                         | _____            |
| c. Use a lever IMA > 1 , so that IMA > 1 causes the next action   | 20 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| d. Turn a screw, moves object ≥ 2.0 cm,    screw’s axis of rotation, causes next action                                 | 20 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| e. Use pulley with IMA > 1 to lift object ≥ 5.0 cm to cause the next action.  | 20 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| f. Combine 2 levers, different classes, into IMA > 5. Use the IMA > 5 to cause next action.                             | 30 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| g. Release energy stored in a spring (not a mousetrap) to cause next action.  | 30 points                         | _____            |
| h. Use rack & pinion gear system to move object ≥ 5.0 cm, then cause next action  | 30 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| i. Use a 3 <sup>rd</sup> class lever to move an object ≥ 15.0 cm. Lever not in contact with object before or after task | 40 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| j. Move & Pour granular material from one container to another higher container.  | 50 points                         | _____            |
| k. Drop ball so that final vertical ≥ 10 cm unguided, upward bounce ≥ 5 cm causes next action                           | 50 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| l. Special Task: Pull mass up ramp ≥ 10 vertical cm to cause next action.   | 20 points                         | _____            |
| If self-measured  | 10 points                         | _____            |
| 1 point for every 100 g of the mass lifted (MAX = 100 points = 10 kg = 10,000 g)  |                                   | _____            |
| 1 point for every whole vertical cm mass is raised  |                                   | _____            |
| m. Final Task – all conditions must be met:   |                                   |                  |
| 1. Granular material pours from container onto paddle style wheel   | _____                             |                  |
| 2. Paddle wheel directly attached to an axel, no gears, pulleys, counterweights   | _____                             |                  |
| 3. Turning axel wraps strings around itself, lifts mass, team name, ≥ 10 cm   | _____                             |                  |
| 4. Teams mark line on device, timing stops, bottom of mass passes line  | _____                             |                  |
| 5. Mass must be easily removed from the axel and string.  | _____                             |                  |
|   | <u>If conditions 1-5 are met,</u> | 250 points _____ |
|   | <u>If self-measured #3,</u>       | 10 points _____  |
| And 1 point for each 10 g mass lifted in Final Task, MAX = 100 points = 1 kg = 1,000 g                                  |                                   | _____            |
| Mass = _____ g  |                                   |                  |

**Total Points Awarded: = \_\_\_\_\_**

**PENALTIES:**

- |   |                           |       |
|---|---------------------------|-------|
| # of full seconds device operated beyond 60 seconds, up to 180 seconds      | _____                     |       |
| # of times was device was touched, adjusted or restarted?                   | _____ X 15 pts.           | _____ |
| Any substance(s) left the device during operation? (not part of final task) | Deduct 50 pts.(only once) | _____ |

**Total Penalty Points: = \_\_\_\_\_**

**Points Awarded \_\_\_\_\_ - Penalty Points \_\_\_\_\_ = Score \_\_\_\_\_**