Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per:\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Metric Olympics Lab**

**Introduction:**

 The Mini-Metric Olympics is a cooperative and competitive activity. It is designed to be a fun way to explore estimation, various measurements, the proper way to use/read the measuring devices, review the metric system, practice writing appropriate data tables, and write an appropriate lab report.

 Each group rotates among the different events (Javelin, Discus, Shot-put, Grab, & Squeeze). Each event will take place at a different lab table and the surrounding area. When all events are complete, each group will select its **best athlete** for a head to head competition.

**Materials:**

straws, paper plates, masking tape, meter sticks, rulers, ping pong balls or cotton balls, marbles, graduated cylinders, stopwatch, plastic containers, plastic bins, sponges, electronic balance

**Rules and Roles:**

**Rules:** Broken Rules result in penalties and/or disqualifications.

1. NO communication BETWEEN groups.
2. Use the appropriate # of digits for measuring device.
3. Predictions for ALL team members MUST BE recorded before any actual measurements are made by any team member.
4. Use time wisely – if waiting for next event, calculate difference between prediction and actual values.

**Roles Needed:**

Leader: Settles disputes, makes final decisions, and sets the order of her/his group.

Mathematician: Ensures all data is recorded properly and **verifies** all calculations.

Measurer: Ensures all measurements are properly made.

Materials Manager: Ensures all material is properly handled and maintained, including clean-up before group moves onto next event.

Timer: Each group has a maximum of 15 minutes for all participants to complete the station.

**Procedure:**

1. Find a lab partner/s. Your teacher may assign you a group or you may be allowed to choose your own lab partners. A lab group cannot be larger than four students. Give your team a name.
2. Decide who will be the leader, mathematician, measurer, materials manager, and/or timer.
3. Your teacher will assign your team their first event.
4. Your team will have no more than 10 minutes to complete each event.
5. Everyone must record their estimated distance before any group member makes their actual measurement.
6. Record all of your data in the data table provided. Remember to be neat! Use a pencil in case you make a mistake.
7. Rotate to the next event when your teacher calls time.
8. When all events are completed you must compile all your data.
9. Analyze your data and select your group’s overall best competitor.

Any questions? Let the games begin…

#  Javelin

1. Select your javelin (straw).
2. Throw javelin. Your feet may not cross the line.
3. Estimate the distance in **centimeters** and record value.
4. Each group member must record their estimated distance before any group member makes an actual measurement.
5. Measure the distance from the starting line to the forward most end of the javelin and record.
6. Each group member repeats these steps.

***Discus***

1. Select your discus (paper plate).
2. Throw discus. Your feet may not cross the line.
3. Estimate the distance in **centimeters** and record value.
4. Each group member must record their estimated distance before any group member makes an actual measurement
5. Measure the distance from the starting line to the forward most end of the discus and record.
6. Each group member repeats these steps.

***Shot Put***

1. Select your shot-put (fuzzy ball or plastic golf ball).
2. Throw shot put. Your feet may not cross the line.
3. Estimate the distance in **meters** and record value.
4. Each group member must record their estimated distance before any group member makes an actual measurement.
5. Measure the distance from the starting line to the forward most end of the shot-put and record.
6. Each group member repeats these steps.



***Right-handed Marble Grab***

1. With only your right hand, grab a fistful of marbles from the container and place them in the container.
2. Estimate the mass, in grams, of the marbles that you grabbed and record value.
3. Each group member must record their estimated distance before any group member makes an actual measurement.
4. Measure the mass of the marbles and the beaker and record value.
5. Empty the marbles from the beaker, measure the mass of the empty beaker, and record value.
6. Each group member repeats these steps.

***Sponge Squeeze***

1. Take a water-soaked sponge in your **non-dominant** hand.
2. Squeeze the sponge (one time only) into the empty container.
3. Estimate the volume of water (in milliliters) that you squeezed out of the sponge and record value.
4. Each group member must record their estimated distance before any group member makes an actual measurement.
5. Pour the water into the graduated cylinder and record volume.
6. Each group member repeats these steps.

***Mini-Metric Olympic Tally Sheet:***

**This tally sheet is for your overall best ESTIMATOR only.**

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

Best Estimator’s Full Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teammates Full Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| Event | Prediction | Actual | Difference  |
| Javelin | cm | cm |  |
| Discus | cm | cm |  |
| Shot put | m | m |  |
| Marble Grab | g | g |  |
| Sponge Squeeze | mL | mL |  |
|  |  |  |  |
| Total Score Difference (magnitude only, unit less) |  |

Questions:

Must write in complete sentences (practice writing!!!)

1. How close where your predictions?
2. Which measurements were you most familiar with before the Olympics?
3. Which measurements did you find the easiest to make during the Olympics? Why?
4. Which measurement did you find the most difficult during the Olympics? Why?

**Metric Olympic Team Data Table:**

 **Javelin:**

|  |  |  |  |
| --- | --- | --- | --- |
| Athlete | Prediction (cm) | Actual (cm) | Difference (cm) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Discus:**

|  |  |  |  |
| --- | --- | --- | --- |
| Athlete | Prediction (cm) | Actual (cm) | Difference (cm) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Shotput:**

|  |  |  |  |
| --- | --- | --- | --- |
| Athlete | Prediction (m) | Actual (m) | Difference (m) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Marble Grab:**

|  |  |  |  |
| --- | --- | --- | --- |
| Athlete | Prediction (g) | Actual (g) | Difference (g) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

 **Sponge Squeeze:**

|  |  |  |  |
| --- | --- | --- | --- |
| Athlete | Prediction (mL) | Actual (mL) | Difference (mL) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |





Extensions

1. Metric Scavenger Hunt.
2. Calculation of Percent Error
3. #L = bathtub
4. arrange containers order of volume and accurately predict volumes
5. arrange objects lightest to heaviest & accurately predict masses
6. Accurately estimate trip within school and to school. Draw map to scale.











