

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

### **iFLY Middle School Measurement Worksheet**

Ball type: \_\_\_\_\_

1. Use the scale to measure the mass of the ball

mass = \_\_\_\_\_ g

2. Measure the circumference (C) of the ball

C = \_\_\_\_\_ cm

3. Find the radius of the ball

$$C = 2\pi r$$

$$r = \frac{C}{2\pi}$$

r = \_\_\_\_\_ cm

4. Use the radius to calculate the frontal area (the area the wind "sees")

$$A = \pi r^2$$

A = \_\_\_\_\_ cm<sup>2</sup>

5. With your group, discuss how area and weight would contribute to the ball's terminal velocity. How does your ball compare to those of the other groups?

**Type of Ball****mass (Kg) circumference (m) radius (m) frontal area (m<sup>2</sup>) Velocity (mph) Velocity (m/s)**

wiffle	0.017	0.225	0.04	0.004	25	11.18
big yellow ball	0.164	1.02	0.16	0.083	26	11.62
pink googly ball	0.306	0.53	0.08	0.022	33	14.75
small basketball	0.289	0.552	0.09	0.024	60	26.82
nerf	0.131	0.27	0.04	0.006	70	31.29

*Example Data from Austin*

	<b>mass (Kg)</b>	<b>circumference (m)</b>		<b>Velocity (mph)</b>
<i>wiffle</i>	<i>0.017</i>	<i>0.225</i>		<i>25</i>
<i>big yellow ball</i>	<i>0.164</i>	<i>1.02</i>		<i>26</i>
<i>pink googly ball</i>	<i>0.306</i>	<i>0.53</i>		<i>33</i>
<i>small basketball</i>	<i>0.289</i>	<i>0.552</i>		<i>60</i>
<i>nerf</i>	<i>0.131</i>	<i>0.27</i>		<i>70</i>

**Ratio of Mass to Frontal Area vs. Velocity**

