**Muscles Lab – Voluntary versus Involuntary**

**Purpose:** To measure the voluntary and involuntary movement of eye muscles.

**Materials:** clock or watch with second hand  
plastic sheet (30 x 30 cm)  
Cotton balls

**Procedure:**

**Part A**
1. Look at your partner’s eyes. Count the number of blinks in one minute. NOTE: Do not try to reduce the number of normal blinks. **Record in Data Table I.**
2. Repeat step 1 above two more times. **Record in Data Table I.**
3. Have your partner measure your number of blinks. Repeat 2 more times and **record.**
4. Complete the data table by determining the total and average number of blinks.

**DATA TABLE I  Number of Blinks in One Minute**

<table>
<thead>
<tr>
<th>Trial</th>
<th>Partner</th>
<th>Yourself</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part B**
1. Watch your partner’s eyes again. Time in seconds how long he/she can go without blinking. **Record in Data Table II.**
2. Change roles. Have your partner time how long YOU can go without blinking. **Record in Data Table II.**

**DATA TABLE II  Time without blinking (seconds)**

<table>
<thead>
<tr>
<th></th>
<th>Time without blinking (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partner</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Yourself</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Part C**
Have your partner hold a sheet of clear plastic in front of his/her face. NOTE: The plastic sheet should NOT touch your partner’s face! As you throw a cotton ball at the sheet, notice and record if your partner does or does not blink. Use a check mark to record for your partner ONLY. (Your partner will record your results.)

<table>
<thead>
<tr>
<th>Did Blink</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did Not Blink</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Questions and Conclusions

1. Does Part A show that blinking is voluntary or involuntary? ____________
   
   Explain.

2. Does Part B (no blinking) show that blinking is voluntary or involuntary? __________
   
   Explain.

3. Describe how your eyes felt after not blinking.

4. Do you think blinking is helpful and protective? WHY?

5. How do you explain the fact that your average time and that of your partner in Part B are not the same?

6. What does the activity with the cotton ball and plastic prove?

7. Does Part C prove that blinking is protective and helpful? EXPLAIN.

8. What might happen if you were unable to blink?

9. Examine Slide Set 10, views 5 (voluntary muscles) and 6 (involuntary muscle cells).

   Draw your slides below. Label key features as described in brochure.

   Voluntary Muscle Cells

   Involuntary Muscle Cells

   Magnification: _______  Magnification: ______

   Where are these found?

10. Examine the 3 types of muscle cells on page 586 of your text. What do you think the muscle cells controlling your blinking reflex would look like? Draw or describe.