**Appendix 2: Student Handout**

**Cross-modal Perception Lab**

**PreLab Assignments:**

1. Read the following:
	1. ‘The Effect of Visual Images on Perception of Odors’ - all pages
	2. ‘The Nose Smells What the Eye Sees: Cross Modal Visual Facilitation of Human Olfactory Perception’ – pages 1 and 2.
	3. ‘Multisensory Flavor Perception’ pages 24-26.
2. Complete the pre-lab quiz. There will be questions on your pre-lab quiz from these research papers as well as this lab handout)

**Introduction:**

Based on the above reading you can clearly see that our sensory experiences occur as a result of multisensory integration. Auditory and visual cross modal perception has been shown to have a significant impact in anything from virtual reality environments to the McGurk effect in which incongruent visual and auditory stimulus can lead to significant difficulty in identifying a sound correctly. By offering a subject incongruent sensory information we can often facilitate the experience of perceptual illusions.

In this lab we will be studying crossmodal perception. As always, our perceived reality is the result of the interaction of multiple sensory modalities and is, therefore, subject to misperception.

**In this lab you will be performing several sensory tasks.** Students can take turns being the test subject, however, the test subject for each separate experiment should remain the same. (For example, if student #1 is the subject for Experiment A1 they must also be the subject for Experiment A2. Student #2 can then be the subject for Experiment B, and so on. For each experiment, students who are not the test subject give instructions, serve as the data recorders and analyze the data. All students work together to assess their data and answer the assessment questions at the end of data collection.

 **After your data is collected you will be given an answer key to evaluate your results.**

**Experiment A: Flavor with olfaction and in the absence of olfaction**

1. In the first part of this experiment **(Experiment A**1) test subject #1 will taste 6 colorless beverages and attempt to identify the flavors while wearing a nose clip to impede olfaction. The test subject should taste the beverages in the order of the numbered cups and state their perceived flavor and degree of confidence. The lab partner(s) should record the answers on the answer sheet.
2. In the second part of this experiment **(Experiment A2)** the test subject will be given 6 clear beverages to taste without using the nose clip. The subject should taste the beverages in the order of the numbered cups and state their perceived flavor and degree of confidence. The lab partner(s) should record the answers on the answer sheet.

**A1 and A2:** for both portions of this lab a small cup of plain water will be offered to clear the palate between samples.

**Experiment B: Flavor with congruent and incongruent visual cues**

Each group will be given 10 beverages of varying flavors and colors. Test subject #2 should taste the beverages in the order of the numbered cups and state their perceived flavor and degree of confidence. A lab partner should record the answers on the answer sheet. Water should be used to clear the palate between samples.

**Experiment C: Scent with no visual cues, congruent and incongruent visual cues**

1. **Experiment C1:** Each group will be given 6 vials containing varying scents to smell while blindfolded. The vials are numbered on the bottom. The lab partner will offer the test subject the scents one at a time. The test subject should smell the vial and state the perceived scent and degree of confidence. One of the lab partners should record the answers on the answer sheet. Coffee grounds should be used to clear olfaction between scents.
2. **Experiment C2:** The test subject will then be offered varying scents paired with visual images. The subject will state the perceived scent and degree of confidence. One of the lab partners should record the answers on the answer sheet. Again, coffee grounds can be used to clear olfaction between scents.

**Important instructions for student presenting scent and picture pairs to subject:**

Uncap the vial and show the subject the picture at **exactly the same time** that you present the vial to be smelled. Present both stimuli for only a few seconds. \*Make sure that the subject is not facing the lab table and cannot see the vials during this section\*

Present in the following order:

1. Vial 3 with lime picture
2. Vial 2 with cinnamon picture
3. Vial 1 with lime picture
4. Vial 3 with orange picture
5. Vial 6 with apple picture
6. Vial 6 with pineapple picture
7. Vial 4 with pineapple picture

**Part D: Create your own hypothesis**

In this part of the lab, each group will create a hypothesis to determine which parameters (taste alone, taste with vision or olfaction) will allow the test subject to most accurately identify flavor. Make sure you complete your hypothesis as a group **before** collecting any data.

Each groupwill be given 3 candies of differing flavors and 3 corresponding scents. The subject will then sample each of the candies utilizing the following procedure:

Step 1: identify flavor by tasting while blindfolded, without smelling the corresponding scent

Step 2: identify flavor by tasting while blindfolded, while smelling the corresponding scent

Step 3 identify flavor by tasting while seeing candy color prior to tasting (without scent)

**Important instructions for student presenting candies and scents to subject:**

1. AFTER the subject is blindfolded go to the front of the room to receive your candies. Do NOT allow the subject to see the flavors or colors of the candies prior to Part 3.
2. When offering a scent make sure you offer the scent at the same time that you offer the candy being tasted.
3. Complete all 3 parts of the lab with one candy flavor before moving on to the second and third flavors.