

## TRAITS THAT DEFINE THE ORDER PRIMATES

### PART ONE: Adaptation of Primate Hands

Living things have bodies that are adapted for the places they live and the things they do. By carefully observing bodily structures (form), we can make some deductions as to what purposes those structures are put (function) to make an organism adapted for a successful lifestyle.

Most monkeys, apes, and human hands have long, straight digits equipped with flattened nails, sensory pads at the end of the digits, richly supplied with blood vessels and nerve endings that enhance touch. Most notably, the pentadactyl (five digit) hand of primates contains an opposable thumb. The primate brain is specialized to interpret information about the environment transmitted by the hand's discriminating sense of touch (Zihlman 2000).

Human hands, not used for locomotion purposes, have also become adapted for the things they do, many of which require fine manipulation along with a precise and powerful grip. Humans, as well as monkeys, gorillas, and other primates, have a hand that can *grasp* objects. In this exercise, you will perform several common actions. Then you will change your hand so that it resembles that of a non-primate animal. You will determine whether or not you can successfully perform the same actions. This will demonstrate how the human hand is adapted for the actions it performs. Work with your lab partner to complete this exercise.

#### **Procedure:**

1. Remove from your lab box, the shirt, the small plastic bottle, two short pieces of string, and the bottle of glue and paper. You will be using these to perform a number of activities, first with your hands as they are, then with your fingers & thumb securely taped together. Decide whether you or your partner will go first. Each of you will perform these actions and record the data for each other in the appropriate table (since your hands/thumbs will be taped!). Here are the activities I want each of you to perform:
  - a. Tie a knot in a piece of string
  - b. Unscrew a bottle cap.
  - c. Unbutton three buttons and button them again.
  - d. Open the bottle of glue and squeeze glue along the line on the paper; close top of glue bottle.
  - e. Write your name on a piece of paper.
2. Begin by doing each of the activities with your hands and thumbs free. Have your partner time how long it takes you to do each one, and record the times in the table below.
3. Using the masking tape, have your partner tape all of your fingers of each hand together (you should not be able to move your thumb or fingers independent of one another). After your fingers are securely taped, try each of the activities listed in Procedure 1 again. Have your partner time each activity as you did before and record the time in the data chart on your worksheet. ***If an activity is not done in two minutes, record the word "unsuccessful."***
4. Untape your hands and have your partner do steps 2 and 3.

Activities	Time Required To Perform Activity	
	Hands/thumbs free	Thumbs/fingers taped
Tie string		
Unscrew bottle cap		
Button/Unbutton		
Glue		
Write name		

**Write your name on the lines below:**

Hand/thumbs free: \_\_\_\_\_

Thumb and fingers taped: \_\_\_\_\_

Now, read the handout in the box “*Manual Dexterity: Hands and Doing*” from the Human Evolution Coloring Book (you do not have to color the illustration) and answer the questions that follow based on your reading and the exercise you just completed.

### **Questions to Ponder and Answer**

1. Think of some of the tasks you perform on a daily or regular basis that require grasping hands and an opposable thumb. List them below.
  
2. Unlike most other mammals, primates, including humans, use their hands for feeding themselves. From the reading, describe some of the activities related to food processing and feeding in which primates engage.
  
3. Monkeys, apes and humans are all very tactile and social. Describe some of the ways in which hands and touch are important for social communication and interactions among primates.

## PART TWO: INFLUENCE OF COLOR ON WHAT WE SEE

**GRAB A LAB PARTNER BEFORE READING ANY FARTHER.** Decide who will be the researcher and who will be the subject of the research, first, then you'll reverse roles the second time around. **DECIDE NOW, THEN READ THROUGH THE ENTIRE EXERCISE BEFORE DOING ANYTHING ELSE!**

**Step 1.** In the lab box, locate the folders labeled *SCENES A and B* – **DO NOT OPEN THEM.**

**Step 2.** Have your partner sit on one side of the table while you sit on the other side facing her/him. Decide who will be the researcher and who will be the subject. It doesn't matter who plays which role, since you'll be reversing roles so that each of you have an opportunity to try the exercise.

**Step 3.** Tell your subject to close her/his eyes.

**Step 4.** Open the *Scenes A & B* folder. Inside you'll find two labeled pictures. Remove the picture labeled *Scene A* and place it **face down** in front of your subject.

**Step 5.** Tell your subject that when you say go, the subject is to open his/her eyes, turn the picture over, and look at the picture. Tell your subject that they will NOT be allowed more than 10 seconds to look at the picture. **During the 10 seconds the subject is to write down the first five things they notice** (have your subject write those things they notice ON THEIR WORKSHEET. (you'll record your observations in the space below during your turn).

**Step 6.** At the end of 10 seconds, the researcher will turn the picture face down.

**Step 7.** Ask the subject to close her/his eyes. Put the *Scene A* picture back in the folder and remove *Scene B*. Place it face down in front of the subject and repeat Steps 5 and 6 with this picture.

**Step 8.** Reverse roles and repeat steps 4 through 7.

**WHEN YOU ARE FINISHED, PUT THE PICTURE BACK IN THE FOLDERS AND PLACE THE FOLDERS BACK IN THE BOX**

### **Questions to Ponder and Answer**

Was there a difference between what the subject saw \_\_\_\_\_ YES \_\_\_\_\_ NO  
the first time and the second time?

If there was a difference, how might you explain the reason for the difference (REMEMBER, be a scientist and gather all the data before making an hypothesis!)

## PART THREE: Facial Expressions and Gestures

Primates depend upon their stereoscopic, binocular, 3D color vision for a number of things:

- Locating brightly colored fruit in the green forest
- Maneuvering through tangled pathways,
- Spotting predators and neighboring groups sharing their range
- Identifying individuals within their group, including mating partners

Primates are highly social animals and vision plays a key role in how they communicate with one another, both within the social group as well as between social groups. Facial expressions (as well as vocalizations), are used to express greetings, anger, fear, submission, dominance, and a host of other information.

Look at the handout in the box titled, “*Visual Communication: Facial Expressions and Gestures*” from the *Human Evolution Coloring Book* (you do not have to color the illustration) and then answer the following questions.

1. The text suggests that some facial expressions in chimpanzees and humans may serve common functions. Discuss.
2. The text states that visual signals may carry information about age, sex, reproductive state, and rank. Cite THREE examples of this.
3. Why is it important for individuals to learn how to communicate their needs through appropriate visual cues?
4. “A primates’ mouth and eyes are the most important components of a facial expression.” Give some examples based on the reading.
5. What was the most interesting/important thing you learned about primate facial expressions and gestures from this reading?