

A Tree of Genetic Traits

Activity Overview

Participants mark their traits for tongue rolling, PTC tasting (a harmless, bitter chemical), and earlobe attachment on tree leaf cut-outs. They then place their leaves on a large tree whose branches each represent a different combination of traits. When completed, the tree forms a visual representation of the frequency of trait combinations within the group.

Learning Objectives

- ▶ Traits are observable characteristics that are passed down from parent to child.
- ▶ An individual will have many traits they share in common with others.
- ▶ An individual's overall combination of traits makes them unique.
- ▶ Some traits are more common in a population than others.

Logistics

Time Required

- ▶ **Activity Time:**
30 minutes
- ▶ **Prep Time:**
30 minutes to review activity, make copies of tree leaf cut-outs, and prepare traits tree

Materials

PTC paper, hard candies, leaf cut-outs, tape, scissors, transparencies or large butcher paper

Prior Knowledge Needed

None

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Activity Instructions

- Copy the *Genetic Traits Tree* graphic provided on page 4 (or page 6 for Spanish speaking audiences) onto an overhead transparency. Use an overhead projector to project the transparency large onto a blank wall. Alternatively, draw a large tree on butcher paper based on page 4. Post it in an easily accessible and visible area of the room.
- Provide each participant with a leaf and instruct them to cut it out.
- Explain that traits are observable characteristics we inherit from our parents. Demonstrate the tongue rolling and earlobe attachment traits. Have participants mark “yes” or “no” on their leaf for these traits as appropriate.
- Hand out PTC paper. Instruct participants to place a piece of PTC paper on the tip of their tongue to see if they can taste anything. The chemical tastes bitter to those who can taste it. For those who cannot taste PTC, the paper has no taste.
 - *Note:* PTC paper is inexpensive and can be purchased from Sargent Welch (www.sargentwelch.com), Carolina Math and Science (www.carolina.com) or Ward’s Natural Science (<http://www.wardsci.com>).
- Instruct participants to check “yes” or “no” on their leaves for PTC tasting. Hand out a hard candy to each participant to neutralize the taste of the PTC.
- Demonstrate how to determine where to place the leaves on the Trait Tree starting at the base of the branches and working your way out toward the tips.
- Call participants up in groups to place their leaves on the appropriate branches. The leaves will be clustered around the branch representing the most common combination of traits in the group. Some branches of the tree will remain relatively sparse.
- *Optional:* Make leaf cut-outs in two different colors, one for males and one for females, to track combinations of traits within the different genders.
- *Optional:* Increase your data pool by including additional groups in the exercise, taping all leaves to one tree.

Quantities

Per Participant

- ▶ One leaf cut-out, hard candy, piece of PTC paper

Per Group of 2

- ▶ Scissors, pen or pencil

Whole Group

- ▶ Tape

Common Misconception

A widespread misconception is that all traits exhibit either a dominant or recessive pattern of inheritance. But these terms only apply to single gene traits. The traits included in this activity are part of the small number that may be due to only one or two genes. However, most human genetic traits are influenced by several genes as well as interactions with the environment. The inheritance of complex traits is difficult to predict, and does not follow typical dominant or recessive patterns.

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Discussion Points

- Some traits are more common in a population than others. What is the most common combination of traits in the group? What is the least common combination of traits in the group?
- Every person has a unique combination of traits. If we were to look at more traits than three, we would eventually need a branch on the Trait Tree for each person in the group.

Credits

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Learn More

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This activity was adapted from “State Your Traits - Genetic Traits Tree”, The GENETICS Project, University of Washington (2001).

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Leaf Cut-outs

Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

Earlobes
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PTC Tasting
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Tongue Rolling
 Yes ☐ No ☐

Earlobes
 Attached ☐ Free ☐
PTC Tasting
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Tongue Rolling
 Yes ☐ No ☐

Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

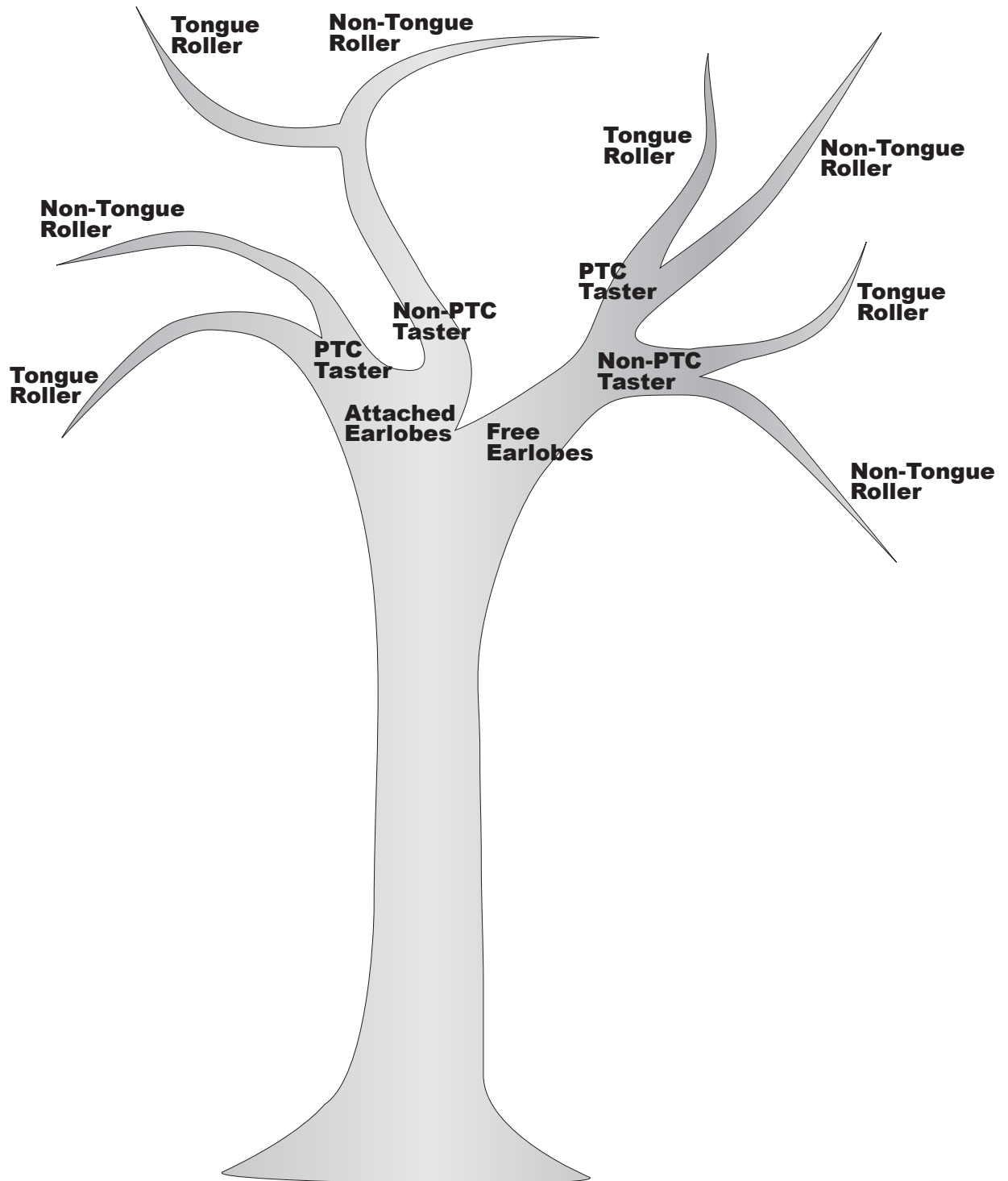
Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

Earlobes
 Attached ☐ Free ☐
PTC Tasting
 Yes ☐ No ☐
Tongue Rolling
 Yes ☐ No ☐

Adapted from "State Your Traits - Genetic Traits Tree", the GENETICS Project, University of Washington (2001).

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Example Trait Tree



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Leaf Cut-outs

Lóbulos de Orejas
Unidos ☐ Libres ☐

Sabor a la Feniltiocarbamida (PTC)
Si ☐ No ☐

Enrolla la Lengua
Si ☐ No ☐

Lóbulos de Orejas
Unidos ☐ Libres ☐

Sabor a la Feniltiocarbamida (PTC)
Si ☐ No ☐

Enrolla la Lengua
Si ☐ No ☐

Lóbulos de Orejas
Unidos ☐ Libres ☐

Sabor a la Feniltiocarbamida (PTC)
Si ☐ No ☐

Enrolla la Lengua
Si ☐ No ☐

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Si ☐ No ☐

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Si ☐ No ☐

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Si ☐ No ☐

Enrolla la Lengua
Si ☐ No ☐

Lóbulos de Orejas
Unidos ☐ Libres ☐

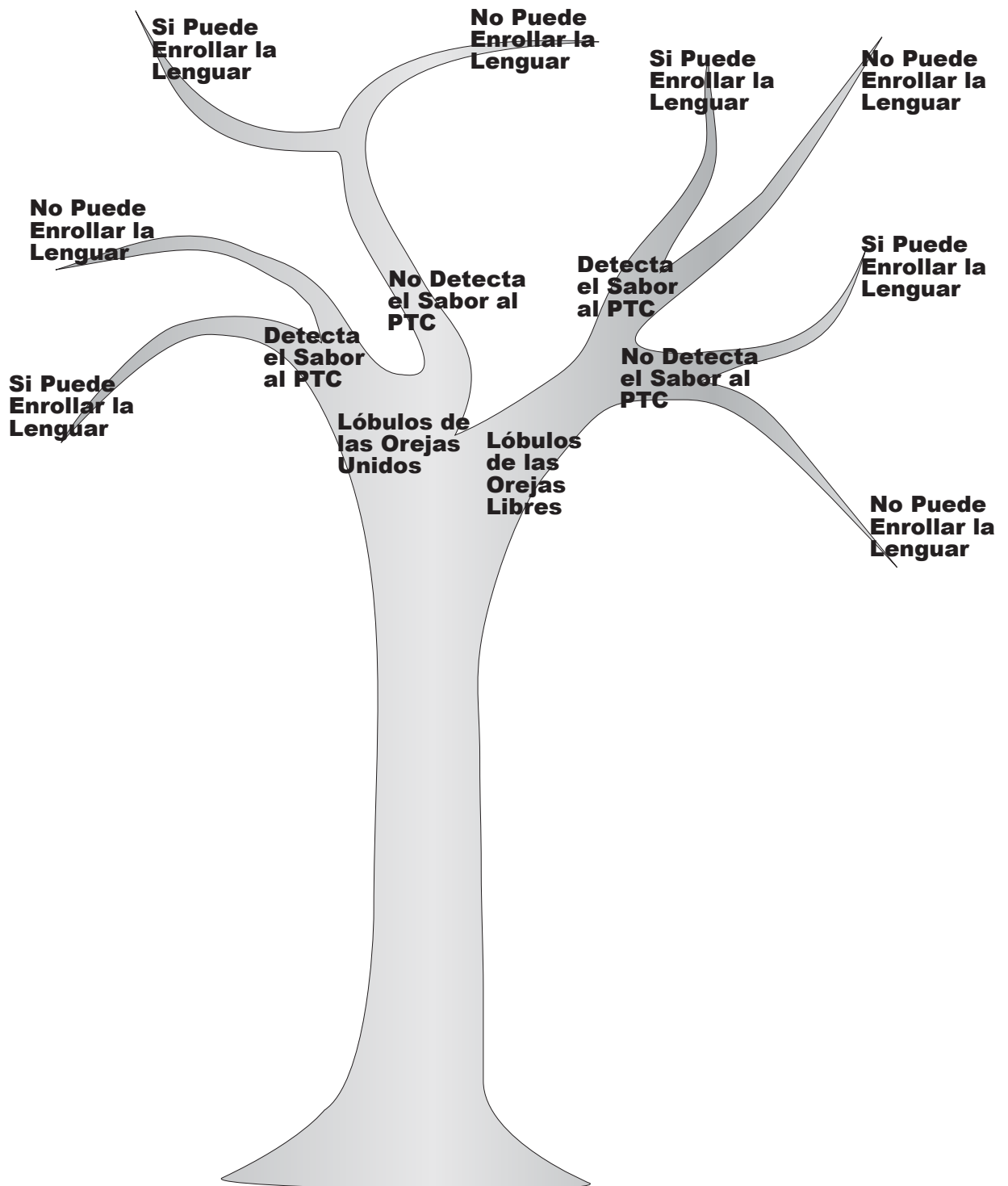
Sabor a la Feniltiocarbamida (PTC)
Si ☐ No ☐

Enrolla la Lengua
Si ☐ No ☐

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El Árbol de los Rasgos



Adapted from "State Your Traits - Genetic Traits Tree", the GENETICS Project, University of Washington (2001).