

GSSCC - - DNA Special Interest Group - - May 5, 2026
Using WATO to Explore Your DNA Match Relationships
handout compiled by Gail Burk ©2026

WATO defined - - What Are The Odds, “WATO,” is a tool at DNA Painter designed to help genealogists narrow down potential relationships for their DNA matches.

Introduction - - Genealogists can use the WATO tool at DNA Painter to help solve questions related to DNA matches. WATO can suggest the most likely position of an unknown person (or “target”) within a family tree using DNA match data. WATO helps identify unknown parents, which is crucial for adoptees. WATO can also identify potential relationships by calculating which branch of a tree is statistically most probable for that relationship, based on shared centimorgans (cM). The regular WATO tool is accessible for free at DNA Painter. WATO *plus* offers some enhancements. You can create a single free tree using WATO *plus*, but a DNA Painter subscription is required to create additional WATO *plus* trees and to access advanced features.

Reasons to Use WATO - - There are a number of reasons genealogists who have DNA tested should consider using WATO:

To Identify Unknown Parents or Adoptees - - WATO evaluates which parent, grandparent, or ancestor a target likely descends from, specifically helping to identify unknown parents or grandparents.

To Test Multiple Hypotheses - - You can build a tree, add multiple potential hypothetical placements of the target, and the WATO tool calculates which, if any, of the hypothetical relationships is possible, based on centimorgan data.

To Validate Family Trees - - WATO can serve as “quality control” to verify if a DNA match is correctly placed in a family tree.

To Handle Complex Scenarios - - WATO can suggest hypotheses and handle complex relationships, including half-relationships.

To Visualize Relationships - - WATO provides a visual, interactive, and easy-to-understand pedigree chart to test scenarios.

The WATO tool produces a score for each hypothesis, indicating the relative probability, which helps narrow down where to focus further, using traditional research. WATO works with shared matches from any database, including AncestryDNA, 23andMe, and MyHeritage.

Getting Started with WATO - - In preparing to use WATO, you need to have spent some time grouping your matches, building a research tree for your matches, and deciding which group of inter-related matches could be relevant to identifying the unknown parent you are seeking. You will need to connect two or more of these matches into a tree by doing genealogical research. For best results, use matches who share 50 cM or more.

You can either manually build a WATO tree, or you can import a GEDcom. If you are building a manual tree, name the most recent common ancestor (MRCA) or couple that you have identified for the matches you will be using; add all of the adult children for the MRCA; add descendants as needed to connect down to your DNA matches. Include half siblings, if relevant. You have the option to add birth and death dates using the “Add/Edit Details” function. WATO can sometimes rule out a hypothesis based on the age of a parent.

If you import a GEDcom tree into WATO, you can follow the instructions at DNA Painter on how to do this. Once the tree has been imported, select the MRCA. After you have added the DNA matches, you may want to remove branches that do not lead to a match. For each DNA match in the WATO tree, add the centimorgan amount shared with the target person. You may be able to rule out some hypotheses based on grounds other than DNA (e.g., age, geography, sex).

Basically, WATO lets you draw a pedigree chart of DNA matches who all appear to share a common ancestor with each other, and they also share DNA with you. The tool allows you to enter cM amounts of DNA you share with each match. You can then add yourself to this tree in hypothetical locations where you suspect you might belong. The tool will tell you if your hypothesis is genetically possible and can demonstrate if one of your hypothetical relationships is more likely than another.

The WATO tool encourages you to explore multiple genealogical explanations for your genetic relationships. This helps prevent confirmation bias. When you enter more possibilities, WATO gives you feedback on how likely one competing hypothesis is over another. The feedback it gives you is about the odds: which of your hypotheses is more likely? So it requires more than one hypothesis.

When you start, the tool will ask for the name and birth year of someone with an unknown parent. You will enter that name into the template. The person with the missing parent might be you, one of your parents, or a more distant ancestor. You can also specify if the missing parent is the mother, father, or just either parent.

The tool will then ask you to confirm whose DNA matches you will be using and what the relationship of this DNA tester is to the person with the missing parent. The DNA

tester might be the child, grandchild, or more distant descendant of the person with the missing parent.

Don't add yourself or your known relatives to this tree; it should be a tree that connects the unknown DNA matches to each other. WATO will then help you explore how you might link into this tree.

How It Works - - There are multiple possible relationships for a DNA match (other than a parent or sibling) of any given centimorgan amount, but some are more likely than others. By building a tree linking several matches from the same extended family, you can often determine which hypothesis is most likely. WATO calculates a probability for each hypothesis based on its relationship to the matches, then reports an overall score for each hypothesis.

Use Tutorials at DNA Painter to Learn How to Apply WATO - - On the Tutorials page at DNA Painter, you can view step-by-step guides on how to apply the WATO tool to research various questions. Review the links under sections for “How to Set Up Your Tree” if you have an unknown parent; unknown grandparent; unknown great-grandparent or more distant ancestor. Tree instructions also address situations where you have a mystery match you want to identify; or you have a cluster of mystery matches who all descend from one person or couple.

You will also want to read the tutorials on how to add hypotheses, and click on the links to videos and blog posts. You can also Google “how to use WATO” to see more links to blogs, webinar recordings, and videos. Check out the tutorials at DNA Painter here: <https://dnapainter.com/help/user-guide/tutorials>

Important Note about Identifying Distant Ancestors Using WATO - - While there might be exceptions to this rule, the furthest back ancestor for whom WATO is likely to be able to distinguish among hypotheses based on autosomal DNA matches is a 2nd or 3rd-great grandparent. If relationships between the match and the DNA tester exceed 4th cousin once removed or its equivalent, the DNA probabilities may produce misleading results. This is partly because the most distant relationships are all currently combined together in one group at DNA Painter. Jonny Perl has written that he hopes to add more granular probabilities in the future.

Evaluation of Hypothesis Scores - - The WATO scores are “odds ratios,” with each hypothesis ranked by how it compares to the weakest possible hypothesis. Hypotheses with red flags are not possible given the data. (Hypotheses with red flags have odds of 1-in-a-million odds or worse.)

Hypotheses with green flags are possible. The weakest possible hypothesis always has a score of 1. A score of 10 is 10 times more likely than a score of 1; a score of 100 is 10 times more likely than a score of 10 and 100 times more likely than a score of 1. You can compare how your best hypothesis compares to the next one(s) down. What is the ratio of the two scores? If a hypothesis score is one to three times more likely than the lowest possible hypothesis, that is not especially meaningful. If a hypothesis score is three to twenty times more likely, or twenty to one hundred times more likely, that is strong support for that hypothesis. If a hypothesis score is greater than 150 times more likely than the lowest scoring hypothesis, that is very strong support for that hypothesis.

Of course, a best-case scenario with WATO would be one in which all hypotheses are ruled out except for one. In that case, the one remaining hypothesis will have a score of 1, which is the default score. As you evaluate potential hypotheses of varying strength or weakness, you can do genealogical research to help rule a hypothesis in or out. You may also want to do some targeted DNA testing in order to gain more data for your WATO analysis.

Miscellaneous Considerations - - Here are some additional aspects to consider when using WATO:

Autosomal DNA matches below 40 cM do not provide much information about relationships, due to so much overlap in potential relationship categories. You can use them in WATO, but you'll also need closer matches in order to achieve an accurate WATO analysis. Low matches are best used to rule out an hypothesis (e.g., a first cousin cannot share only 39 cM) rather than to prove one.

When trying to identify a grandparent or great grandparent, do not include close relatives of your target who are also descended from that grandparent or great grandparent. For example, if you want to identify Samuel's father using Roseann's DNA matches, you cannot include Roseann's siblings, children, nieces/nephews, etc. as matches to Roseann. You can, however, include DNA matches to the siblings of your target using the "twinning" trick. To use twinning, create an artificial identical twin for each match. For one "twin", use the target's shared DNA amount. For the other, use the target's sibling's DNA amounts.

A Word about WATO plus - - Jonny Perl has written a helpful post comparing WATO to WATO *plus*. WATO *plus* asks for more specific information up front and is therefore able to make more useful suggestions. For example, while in the original WATO you just stated the birth year of the DNA tester, in WATO *plus*, you give the birth year of the person who has the unknown parent (this could be the parent, grandparent or other ancestor of the tester).

In *WATO plus*, the Hypothesis is the person you think was the unknown parent. In the original *WATO*, you added a hypothesis to each place where you thought the DNA tester might fit into the tree. This worked fine in unknown parentage cases, but got confusing for other scenarios such as unknown grandparents.

In *WATO plus*, you can take account of the age that a candidate to be their parent was at the time they were born. Also, scores are given as percentages in *WATO plus*, whereas originally, the score was an absolute number. The percentages are easier to understand.

The default set of probabilities is different with *WATO plus*. In both *WATO* and *WATO plus* you can switch between 2016 and 2020 (beta) probabilities. In *WATO plus*, the 2020 probabilities are the default; *WATO* uses 2016 probabilities.

WATO vs *WATO plus*

	WATO	WATO <i>plus</i>
Who does the hypothesis represent?	The DNA tester	The person you think could have been the unknown parent
Scores	Numerical	Relative probability percentages
Age probabilities	Not considered	Can be factored into the calculation
Access	Free with DNA Painter account	One tree available free; subscription required for additional trees.
Default probabilities	2016	2020

(DNA Painter table showing key differences between *WATO* and *WATO plus*)

See *WATO plus* user guide here: <https://dnainter.com/help/user-guide/wato-plus>

See post at DNA Painter here: <https://blog.dnainter.com/blog/wato-vs-wato-plus/>

See *WATO plus* FAQ here: <https://dnainter.com/help/user-guide/wato-plus/faq>

WATO plus requires a DNA Painter subscription, which at the present time, costs \$55 for twelve months.

Find information about subscribing here: <https://dnainter.com/subscribe/landing>

Resources

Blog posts

DNA Painter - - February, 2025

<https://blog.dnapainter.com/blog/category/wato/>

DNA Painter - - August, 2024

<https://blog.dnapainter.com/blog/using-wato-plus-to-find-an-unknown-parent/>

Family Locket - - October, 2021

<https://familylocket.com/wato-or-not-to-wato-what-is-the-question/>

Webinars

Legacy Family Tree Webinars (archived webinars and syllabi require subscription)

Using Multiple WATO Analyses to break through a Brick Wall - - May, 2023

What are the Odds? Finding Answers Using DNA Painter's WATO Tool - - Sept., 2021

WATO Facebook page

DNA Geek group

<https://www.facebook.com/groups/WhatAretheOdds/>

Sources: Diahn Southard blog post at Your DNA Guide

<https://www.yourdnaguide.com/ydgblog/wato-what-are-the-odds>

Jonny Perl tutorial at DNA Painter

<https://dnapainter.com/help/user-guide/tutorials>

Leah Larkin blog post at The DNA Geek

<https://cms-z-assets.familysearch.org/74/34/d617fbdd4c63820317ff7edcaf50/larkin-working-with-wato-handout-rt24.pdf>