

## Toothpick Fish

### Purpose

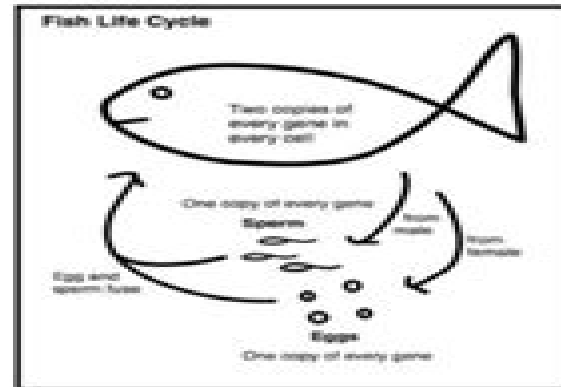
We are going to experiment with genes and environment for a population of "toothpick" fish. You will learn about the relationships between many different aspects of fish life: genes, traits, variation, survival, and reproduction. The activity here is a simulation, but it models the way fish and other organisms live in nature.

### Materials (for each pair)

- 1 "gene pool" container (e.g. a petri dish)
- 8 green toothpicks
- 8 red toothpicks
- 8 yellow toothpicks

### Introduction

The colored toothpicks represent three different forms of a gene (green, red, and yellow) that controls one fish trait: skin color. The table below tells you which forms (alleles) of the gene are dominant, which are recessive,



The green gene (G) is...	Dominant to all other color genes
The red gene (R) is ...	Recessive to green, incomplete dominance with yellow*
The yellow gene (Y) is...	Recessive to green, incomplete dominance with red*

\* Combining red and yellow genes results in a fish with orange skin color.

REMEMBER: EACH TOOTHPICK REPRESENTS A GENE, NOT A FISH.

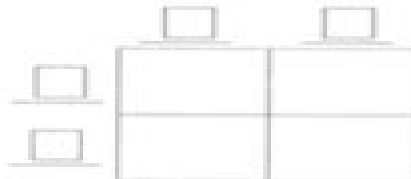
### Directions:

- Count your toothpicks to make sure you have 8 of each color for a total of 24 toothpicks.
- Figure out which gene combinations give rise to which fish colors and fill in the answers on the table on the next page.

Fish Color (phenotype)	Gene Combinations (Genotype)
Green	
Red	
Orange	
Yellow	

Based on the genotypes that you identified in Step 2, answer the questions below. Use Punnett squares to determine your answers.

- Can two red fish mate and have green offspring? \_\_\_\_\_ What is the only possible offspring for two red fish? \_\_\_\_\_ What is the only possible color for offspring of two yellow fish? \_\_\_\_\_ Explain your answers.



# Toothpick Fish Experiment Answers

**DP Hallahan**



## **Toothpick Fish Experiment Answers:**

Fish Tank Physics Projects Madeline P. Goodstein, 2002 Introduces students to science projects that transform an ordinary fish tank into an easy to use tool for carrying out science experiments and science fair projects Includes the physics of refraction and reflection surface tension cohesion pressure and sinking *101 Cool Science Experiments*, 2005 Science experiments you can do in your own kitchen using everyday things like vinegar string eggs and paper **Good Health**, 1929 **The American Food Journal**, 1912 **Pop, Sizzle, Boom!** Amy Oyler, 2017-06-13 A Parents Choice Award Recommended Book The most clever fun and exciting book of kids science experiments ever This book is perfect for kids who like the excitement of exploding things boiling things and generally making a mess while learning about science Get ready for amazing projects like Slime Party Make slime with Elmer s Glue Color changing milk Mentos Diet Coke Geyser PVC Rocket Launcher Puffy Paint in the Microwave Solar Oven S mores Homemade Light Saber **The Aquarium**, 1935 *The Glass Container*, 1924 Normal Instructor and Teachers World, 1928 **The Feathered World**, 1923 American Miller, 1923 **Forest and Stream**, 1891 **The Christian Union** Henry Ward Beecher, 1890 Outlook Alfred Emanuel Smith, Francis Walton, 1890 **Real Japanese Cooking** Makiko Itoh, 2025-08-05 Maki Itoh has succeeded in creating a treasure trove in her exploration of Japanese recipes and culinary traditions Perfect for the Japanese food loving home cook Elise Bauer Founder SimplyRecipes com The first comprehensive cookbook to fully cover all aspects of Japanese cuisine with 600 recipes This book is the culmination of a lifetime steeped in two cultures Born in Tokyo and raised in New York Makiko Itoh grew up in the heart of her mother s acclaimed Japanese restaurant a culinary landmark for over twenty years Now a celebrated bilingual food writer and translator she brings a rare perspective uniquely equipped to bridge the gap and share the soul of Japanese cuisine with the world Her book provides answers to all the questions that people usually ask about one of the world s greatest cuisines including Why is Japanese food so unique This book provides a full overview from aesthetics to umami Essential ingredients like miso mirin dashi sake and kombu how and why are they used How to prepare and serve a Japanese meal from cookware to tableware and etiquette Which recipes are right for you the 600 recipes in this book cover everything from sushi to ramen to donburi rice bowls nukazuke pickles and Japanese bread Itoh s mission is to demystify Japanese cuisine for non Japanese home cooks Her book contains 400 beautiful color photos with clearly presented recipes interspersed with fascinating essays and sidebars explaining all aspects of Japan s unique food culture A must read book for every Japanese food lover **Curriculum Foundation Series**, 1965 **Minicam**, 1937 **Comfort**, 1922 **The Ladies' Home Journal** Edward William Bok, 1914 Neither use nor ornament Tracey Potts, 2024-06-18 Neither use nor ornament is a book about personal productivity narrated from the perspective of its obstacles clutter and procrastination It offers a challenge to the self help promise of a clutter free life lived in a permanent state of efficiency and flow The book reveals how contemporary projections of the good productive life rely on images of failure Riffing on the

aphorism less is more a dominant refrain in present day productivity advice it tells stories about streamlining efficiency and tidiness over a time period of around 100 years By focusing on the shadows of productivity advice Neither use nor ornament seeks to unravel the moral narratives that hold individuals to account for their inefficiencies and muddles *Scientific American* ,1868

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