Traits Rotate

Process Book
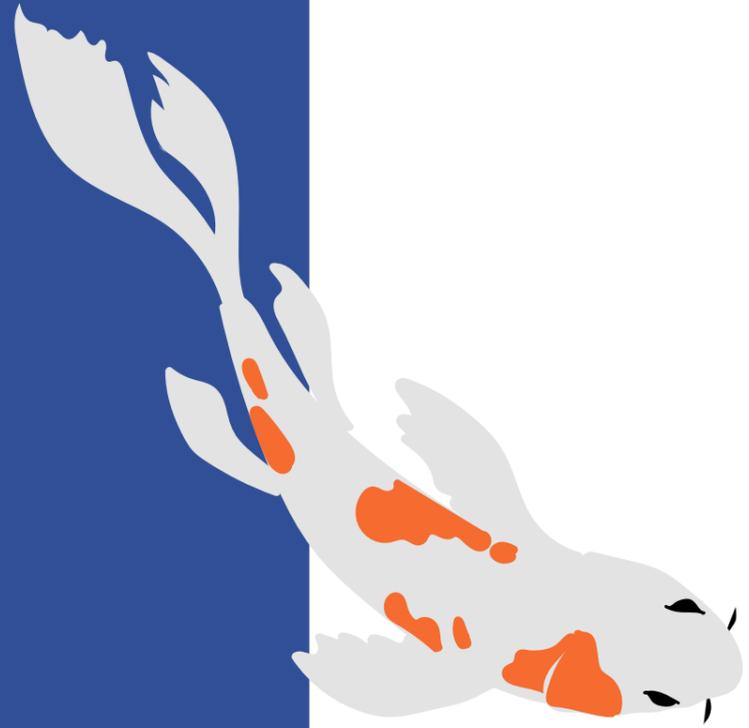
Emani Carter

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About the designer: Emani Carter
Visual Communication Design Major at Stevenson University
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Biology Partners: Kelsey Duprey & Riley Sulivan

Client: The National Human Genome Research Institute's
Education and Community Branch

Brand attributes, promise, and/or mission: Help students
Learn the concepts of the science of genotypes and phenotypes

Competitive Landscape: Other scientific games- mostly memory
and concept games

Target audience: 8th grade middle school students

Call to Action: To engage science students, and aid teachers in
facilitating learning

Functional Specifications: Aim to be appropriate for age group, for
all genders, stylized design, bright colors, semi-realistic depictions

Project Timeline:
Client/designer meeting 10/8
Game Testing 12/3
Portfolio Review 12/12

Budget: $40

Target Audience: 7th-9th Graders, and their teachers

Demographics:
- Age: 11-14 years old-students; teachers-21+
- Gender(s) : male, female, non-binary
- Income: unimportant to me so I didn't ask
- Education level: students- kindergarten to
  9th grade science; teachers-masters degree+
- Virginia/Maryland

Psychographics (of the student):
- Interests/Activities (inside and out of school) : YouTube,
  YouTubers, pets in general- especially dogs and cats, dressing
  to express yourself, Instagram, snapchat, sports, etc.
- Attitudes/opinions (in general and about science class) :
  exaggeration of emotions and feelings, wanting to fit in

Chosen Identifiers:
- Ages 12-14
- Non-binary game
- Affordable. Very cheap printable game so it is
  available to most with just access to a printer
- Education level – new 7th graders
- Virginia/Maryland

Game Topic Research: Genotypes and Phenotypes:

The genotype–phenotype distinction is drawn in genetics.
"Genotype" is an organism's full hereditary information.
"Phenotype" is an organism's actual observed properties, such
as morphology, development, or behavior. This distinction is
fundamental in the study of inheritance of traits and their evolution.

There are three available genotypes, PP (homozygous dominant),
Pp (heterozygous), and pp (homozygous recessive)

grades 3-6

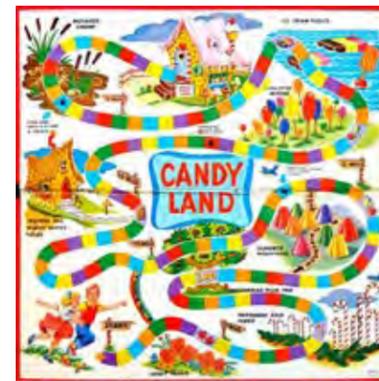**PE station ideas** (in pairs)

'Bounce & hit through the tunnel'

You'll need:

Setup
– Make many tunnelled paths about 10m long –

Gameplay
1 One at a time, hit the ball in the air whilst walking through the tunnel
2 On your next go, bounce it on the ground through
3 Keep alternating each go
– Hit in air, bounce on ground.

Pair stations

FINISH

go forward 2 spaces

go back to the START

go back 2 spaces

go back 2 spaces

go forward 2 spaces

go back to the START

START

CANDY LAND

HOW TO PLAY MARBLES

Terms for Playing Marbles

How to Play Marbles

Free Printable Game Play Cards

Play-Doh
Numbers, Letters 'n Fun
Includes 8 cans!
Over 25 pieces

Parents (F₁) : Yy x Yy

	Female gametes	
	Y	y
Y	YY	Yy
y	yY	yy

Male gametes

3/4 yellow seeds, 1/4 green seeds

Unaffected "Carrier" Father — Unaffected "Carrier" Mother

Unaffected 1 in 4 chance — Unaffected "Carrier" 2 in 4 chance — Affected 1 in 4 chance
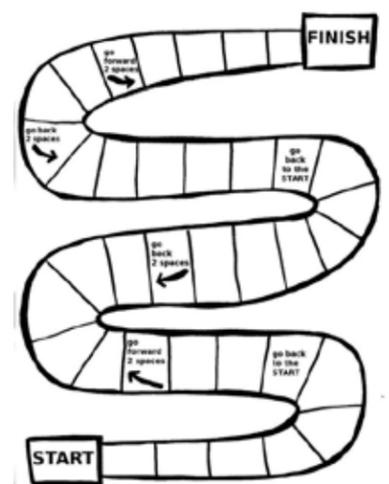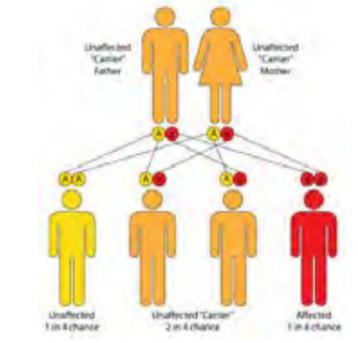
Homozygous Dominant A A

Heterozygous A a

Homozygous Recessive a a

	Mother genotype	Father genotype	Offspring genotype
1	AA	AA	AA
2	AA	AB	AA AB
3	AA	BB	AB
4	AB	AA	AA AB
5	AB	AB	AA AB AB BB
6	AB	BB	AB BB
7	BB	AA	AB
8	BB	AB	AB BB
9	BB	BB	BB

SINGULARITY

TRIO

9/17/19: Initial thoughts

Games are used to review material, quick vocabulary, applying concepts they have learned in order to complete the game, like being quizzed, trivia, moving around, "taco, cat, pizza"

10/8/19: Narrowing down ideas

Decided on idea 2 because the educators thought that the students would like the creating aspect more and there is more room to make the game appropriate for the age level.

We have to choose traits that are only dominant and recessive!!
-Choose an animal instead of a human because of ^
-Create a list of dominant and recessive traits

10/22/19: Further thoughts

In terms of the design I want to have more of a hand touch to the project. I think I am going to paint/draw the animals and take them into photoshop to make them vector images and use them throughout the design of the game. I have decided to use yellow, purple and blue as the main color pallet. I will incorporate newspaper into the design somehow too – being conscious to use science articles or information. I was working on the pieces above for personal reasons and they inspired the look for this game project.

11/12/19: Exploring issues

Running into the problem of having to use real traits or not to have to make the dominant and recessive trait cards make since. What happens when they land on the same spot again, like if you land on leg again what happens to the legs that you already have? Third deck, with animal. Get a Velcro sheet and attach small pieces of Velcro to the back of each individual part. Make only one version of each animal

Idea 1 (Change): Matching Card Game : Students are assigned a child, and they attempt to match the child with the parents based on the child's alleles, they have to confirm by completing a Punnet square. If you think you've found the parent then you do a Punnet square to confirm/ check. Racing game- They are trying to match the parents and children the fastest

Have multiple sets for each player, pieces: timers, card sets, piece of paper, pencil

Idea 2: Group board game : Have a blank person and they roll a dice and you move that amount, and you pull two cards (Dominate and/or recessive) the cards give you the genotype, and then you get the phenotype by looking at the key. Game is finished when they finish the person. If they land on a blank spot they have to draw a card and answer a question about genetics, if they answer correctly they roll again, and if incorrectly they lose their turn.
One board, pieces: key with dominant and recessive and checklist of all parts needed to collect, laminated paper, dry erase marker

Additional thoughts from educators: design different body parts from different animals (side view) have a start but no finish. Add incomplete dominance or the concept of multiple alleles?

Idea 2 is the concept that was taken and edited to be a playable game. The basic concept is still the same where the player is using dominant and recessive genotypes to create an animal through play. The additional thoughts from the educator of using different animals instead of humans, and having a start, but no finish to the game were implemented into the game. Incomplete dominance and the concept of multiple alleles were left out because it was decided that it would complicate the play too much, and it was unclear how to add it into the play.

11/4/19: Logo reflection

After deciding on the name Trait Rotate and drawing out potential logo designs, I liked tthat #2 had thick letters, which to me were like the design of the animals (a vital piece to the game design and play), but at the same time #6 uses thin letters which could be a nice compliment or contrast to the design of the animals. The prof. then pointed out that design #8 had similar qualities to numbers 2 and 6, and that I should combine them. She gave insight on the fact that with the arrows being in the middle of the word rotate it draws the viewers eye to that point, which in this case is a negative thing. It is more important that the eye is drawn to the word trait because that is what is rotating. Things to keep in mind: where the arrows start, and what they point to, hierarchy of words, thickness of typeface

After choosing the top three typefaces, I used each to create its arrows. I created outlines and then cut up the letters for the parts that I needed so that the arrows would also match the typeface. For better visual kerning and leading I also created outlines and ungrouped the letters to adjust. I then added geometric ends to the letters to create a unity between the logo and the board tiles.
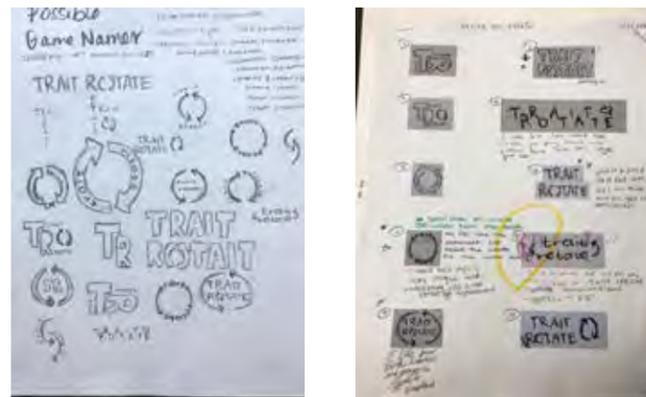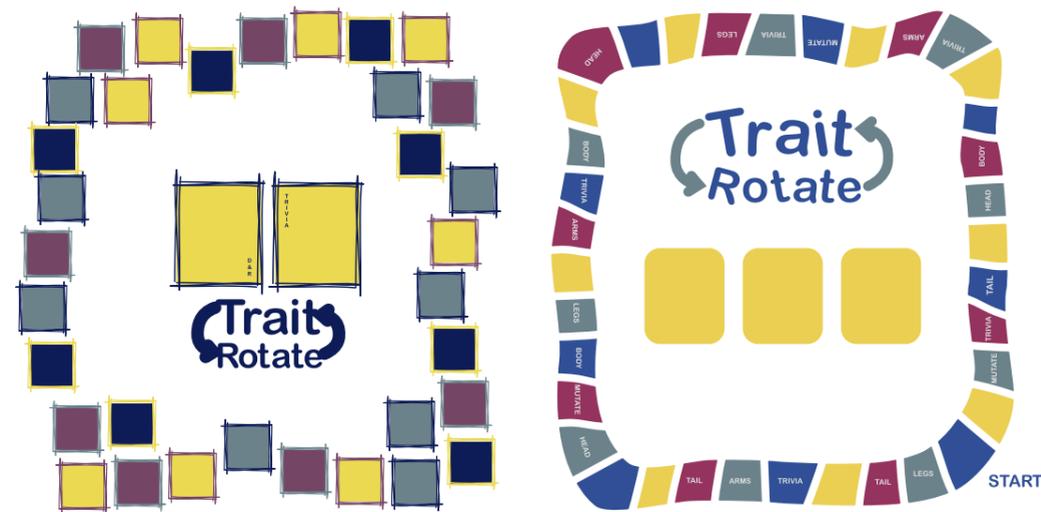

The board and its evolved mostly with smaller adjustments after making the initial complete change. The concept of the combination of geometric and organic sides carried over into the design of the logo. The colors for the board were chosen as a variation of the colors that the research showed that middle school students liked.

12/10/19: Testing reflection

The students from the middle school came on 12/3/19. I was very nervous to meet them at first, simply because of the unknown. But all in all it was a pleasant experience, the students were very nice and actually helpful giving valuable feedback, and edits to the form and function of the game. I was very happy to see that overall they understood the game and its play and liked the design and even said that it was fun to play, that they wanted to continue playing. After only needing to make a few small edits to the board and instructions I was very happy with the end result.
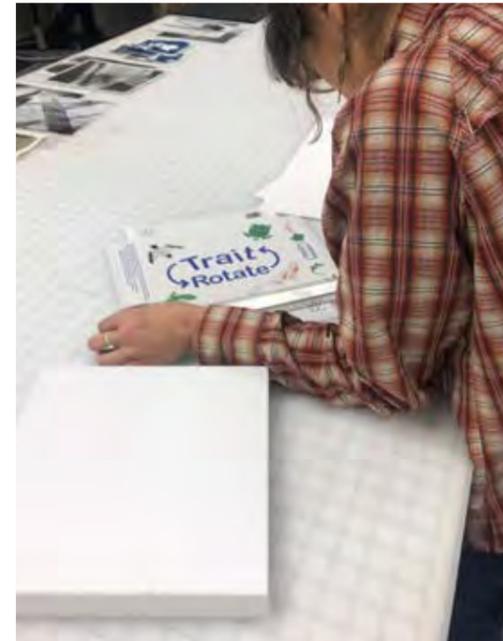
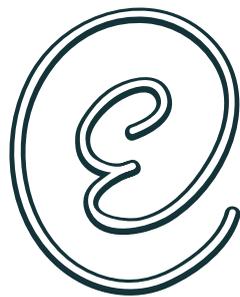I also tested the gme with my roomate and classmates.

12/10/19: Packaging Reflection

I decided to wrap the box on my own out of a personal preference of having hands on work. There were definitely many lessons to be learned during this process.

When attempting to wrap my box I discovered that my document was the wrong size and that it needed to be reprinted. This was slightly upsetting, but thankfully Janine was available to reprint it at that time. In the end it needed to be printed three times.

Emani Carter