

Complex Traits Activity

# DATA NOTEBOOK

Introduction to Physical Anthropology  
Professor Julie J. Lesnik

Available for download at: <https://www.entomoanthro.org/blog/gamers-dice-and-genetic-complexity>

**TABLE 1a Female Genotype**

Locus #	Alleles	Maternal Genome		Paternal Genome	
		Result	Value	Result	Value
1	3				
2	6				
3	6				
4	6				
5	20				

**Table 1b Phenotype**

Rule		Result
Co-Dom	1=A, 2=B, 3=O	
	H/T	
Random		
Random		
Random		
Random		

**BOX 1** →

**TABLE 2 Female gametes**

Locus #	Egg 1			Egg 2		
	Result H/T	Maternal/ Paternal	Value	Result H/T	Maternal/ Paternal	Value
1						
2						
3						
4						
5						

**TABLE 3a Offspring Genotype**

		Egg #	Sperm #
Locus #	Alleles	Value	Value
1	3		
2	6		
3	6		
4	6		
5	20		

**Table 3b Offspring Phenotype**

		Result
Rule		
Mendel	1=A, 2=B, 3=O	
	H/T	
Random		
Random		
Random		
Random		

**BOX 2** →

**TABLE 4 Environmental Effects**

	Maternal		Offspring	
<i>SKIN COLOR</i> <i>Does the adult lifestyle include:</i>	<i>d20 roll</i>	<i>adjust</i>	<i>d20 roll</i>	<i>adjust</i>
Lots of time outdoors in strong sunlight?				
Lots of vegetables rich in carotenoids?				

**BOX 3** →

↑  
**BOX 4**

**TABLE 5 PKU Screening**

PKU probability  $1/8000$  = same number on the d20 three times in a row.

**Offspring**

Roll #	d20 result
1	
2	
3	

Does the offspring have PKU?

**YES**

**NO**

**TABLE 6 Final phenotypes**

<b>6a Mother</b>	
Box 1	
Box 3	
<b>Final Mother Phenotype</b>	

<b>6b Offspring</b>	
Box 2	
Box 4	
Total	
If yes for PKU, multiply the Total by 0.90	
<b>Final Offspring Phenotype</b>	

Continuous variation in skin pigmentation



## Discussion

What is the blood type for each: mother, father, and offspring?

How much did your offspring's pre-environment phenotype (Box 2) differ from the mother's (Box 1)? What factors could have affected this?

How much did your offspring's phenotype get modified by the environment?

In what environment would your offspring be best fit? Why? If you take away the environmental factors, would they still be fit for that environment?

What result did you get for locus 5 for the offspring's phenotype? What if a mutation occurred here that meant this locus could no longer contribute to melanin production.. how would that affect your individual's overall phenotype? What if that mutation happened at locus 3 instead?

If you had to try to convey the concepts of genetic complexity to someone unfamiliar with the terminology used in this activity (such as a younger sibling), how would you explain it?