

Fingerprints and Incomplete Dominance Lab

NAME _____

PERIOD _____

BACKGROUND INFO:

FINGERPRINTS: EVERY PERSON HAS THEIR OWN UNIQUE PATTERN OF FINGERPRINTS. THIS FACT HAS LONG BEEN USED BY POLICE IN IDENTIFYING SUSPECTS. HOWEVER, ALL PATTERNS FIT INTO ONE OF THREE MAIN TYPES: **WHORL**, **LOOP** OR **ARCH**. WITHIN EACH OF THESE TYPES THERE IS AN UNLIMITED AMOUNT OF VARIATION. BUT EACH PERSON'S PRINTS WILL FALL INTO ONE OF THESE THREE MAJOR GROUPS.

FINGERPRINT GENETICS: THE THREE MAJOR FINGERPRINT GROUPS REPRESENT A CLASSIC EXAMPLE OF *INCOMPLETE DOMINANCE*. *INCOMPLETE DOMINANCE* OCCURS WHEN NEITHER THE DOMINANT NOR RECESSIVE ALLELES FOR A TRAIT ACT FULLY TO CREATE AN INTERMEDIATE PHENOTYPE. THE DOMINANT GENE DOES NOT COVER UP THE RECESSIVE GENE, BUT INSTEAD THEIR TRAITS ARE BLENDED TOGETHER. THIS SITUATION IS SEEN IN THE DIAGRAMS BELOW:



ANSWER THESE QUESTIONS BASED ON THE BACKGROUND SECTION ABOVE.

1. NAME THE PRINT PATTERN THAT IS HOMOZYGOUS DOMINANT? _____
2. NAME THE PRINT PATTERN THAT IS HOMOZYGOUS RECESSIVE? _____
3. NAME THE PRINT PATTERN THAT IS HETEROZYGOUS? _____
4. NAME THE PRINT PATTERN THAT IS A RESULT OF *INCOMPLETE DOMINANCE*? _____
5. IF THERE WERE NO *INCOMPLETE DOMINANCE* FOR THIS TRAIT, BUT ONLY COMPLETE DOMINANCE, WHAT WOULD BE THE ONLY TWO FINGER PRINT GROUPS? _____ AND _____
6. THERE ARE OTHER EXAMPLES OF *INCOMPLETE DOMINANCE* FOUND IN NATURE. LOOK UP THE TERM *INCOMPLETE DOMINANCE* IN A TEXTBOOK OR WEB SITE, AND DESCRIBE ONE OTHER EXAMPLE BY ANSWERING THESE QUESTIONS BELOW:

A. TEXTBOOK TITLE, PAGE NUMBER, OR URL WHERE A SECOND EXAMPLE WAS FOUND: _____

B. EXAMPLE IS FROM A PLANT OR ANIMAL? _____

C. NAME OF PLANT OR ANIMAL THE EXAMPLE IS FROM _____

D. DESCRIBE THE PHENOTYPE (APPEARANCE) FOR THE FOLLOWING:

❖ HOMOZYGOUS DOMINANT FORM: _____

❖ HETEROZYGOUS FORM: _____

❖ HOMOZYGOUS RECESSIVE FORM: _____

Get a Stamp
here ↓

THE EXPERIMENT: WHEN YOU HAVE CORRECTLY ANSWERED THE QUESTIONS ABOVE, SHOW IT TO YOUR TEACHER. YOU WILL RECEIVE A PIECE OF SCOTCH TAPE, AND YOU MAY BEGIN THE EXPERIMENT.

A. PROBLEM: THE PROBLEM IN THIS EXPERIMENT IS TO DETERMINE YOUR PHENOTYPE AND GENOTYPE FOR THE FINGERPRINT GENES.

B. METHOD: PART ONE –

1. PREPARE A SCOTCH TAPE FINGERPRINT OF YOUR INDEX FINGER.
2. RUB #2 PENCIL IN ABOUT A ONE INCH SQUARE ON A SHEET OF PAPER. THE IDEA IS TO MAKE A DARK MARK ON THE PAPER.
3. RUB THE FINGER PAD OF **YOUR LEFT INDEX FINGER** ON THE DARKSPOT.
4. PLACE A STRIP OF SCOTCH TAPE ON THE FINGER PAD, STICKY SIDE FACING THE SKIN. WHEN YOU REMOVE THE TAPE, YOUR FINGERPRINT OUTLINE WILL REMAIN ON THE TAPE.
5. PLACE YOUR TAPE PRINT IN THE SPACE BELOW. **ALSO, WRITE IN YOUR CORRECT GENOTYPE AND PHENOTYPE.** ↓ **PLACE YOUR PRINT HERE!**

PHENOTYPE OF PRINT: **WHORL, LOOP OR ARCH** _____

GENOTYPE OF PRINT: **LL, Ll OR ll** _____

GENOTYPE NAME: _____
(HOMOZYGOUS DOMINANT, HETEROZYGOUS, OR HOMOZYGOUS RECESSIVE)

YOUR PRINT IS A DIRECT RESULT OF *INCOMPLETE DOMINANCE*? (YES OR NO)

C. METHOD: PART TWO –

1. THERE ARE THREE POSSIBLE PHENOTYPES: **WHORL, LOOP AND ARCH**. FIND ONE OF EACH TYPE FROM YOURSELF OR OTHERS IN THE CLASS AND TAPE THEIR SCOTCH TAPE PRINTS REPRESENTING EACH TYPE IN THE SPACE BELOW. BE SURE TO FILL IN ALL REQUESTED INFORMATION:

	WHORL	LOOP	ARCH
→ (prints here)			
Genotype: (LL, Ll OR ll)	_____	_____	_____
Print is due to <i>incomplete dominance</i> ? (yes or no)	_____	_____	_____
Name of person:	_____	_____	_____