Human Inheritance
Task Information

Subject: Biology

Content:

- MST Framework Reference:
  Standard 4-Science: The living environment
- Regents Biology Syllabus:
  Unit V: Transmission of traits from generation to generation
- Variance Biology Program Guide:
  Genetics and molecular biology: Patterns of inheritance

Format: Paper/Pencil

Purpose: To apply knowledge of genetics to the occurrence of traits on a family tree

Skills:

Primary: Interpreting data, Applying math
Secondary: Generalizing, Inferring

Time: 15-20 min.

Materials: Worksheet

Preparation: None

Safety: N/A

Extensions/Modifications: None

NYS Alternative Assessment in Science Project
NSF Grant #MDR-9154506

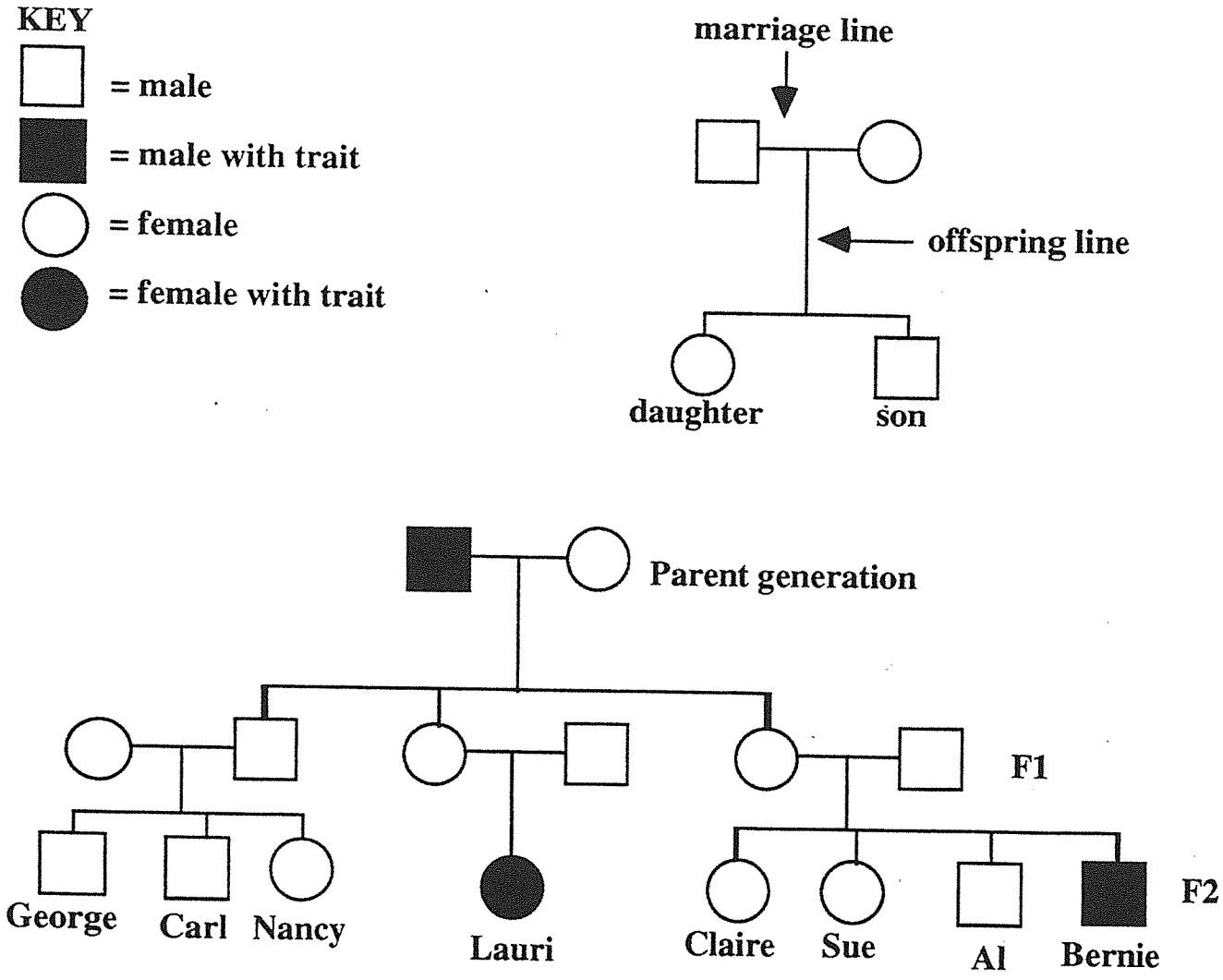
Human Inheritance

Task: In this task you will analyze genetic characteristics from a family tree.

Part 1

Directions

Base your answers to the following questions on the pedigree chart below and on your knowledge of biology. The pedigree traces the expression of a particular trait, represented by the darkened symbol, through three (3) generations. These generations are labeled Parent Generation, F1, and F2 so that they correspond to the generations of pea plants that Gregor Mendel used to formulate his Laws of Heredity.



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Student ID BIO - HI -3 **Scoring Form - Human Inheritance**

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Part 1

1. Recessive Trait	0	(1)				
2. Mendel's Explanation	(0)	1	2			
3. Family Genotypes	0	(1)	2	3	4	5
4. Explanation	(0)	1	2	3	4	

Part 2

1. Recessive Trait	(0)	1			
2. X Chromosome	0	(1)			
3. Explanation of Sex Link	(0)	1	2	3	
4. Code	(0)	1	2	3	
Genotypes	(0)	1	2	3	4
5. Probability	(0)	1	2		

Total Score 3pts

Total possible score - 25 points

Student ID _____ **Scoring Form - Human Inheritance**

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Part 1

1. Recessive Trait	0	1				
2. Mendel's Explanation	0	1	2			
3. Family Genotypes	0	1	2	3	4	5
4. Explanation	0	1	2	3	4	

Part 2

1. Recessive Trait	0	1			
2. X Chromosome	0	1			
3. Explanation of Sex Link	0	1	2	3	
4. Code	0	1	2	3	
Genotypes	0	1	2	3	4
5. Probability	0	1	2		

Total Score _____

Total possible score - 25 points

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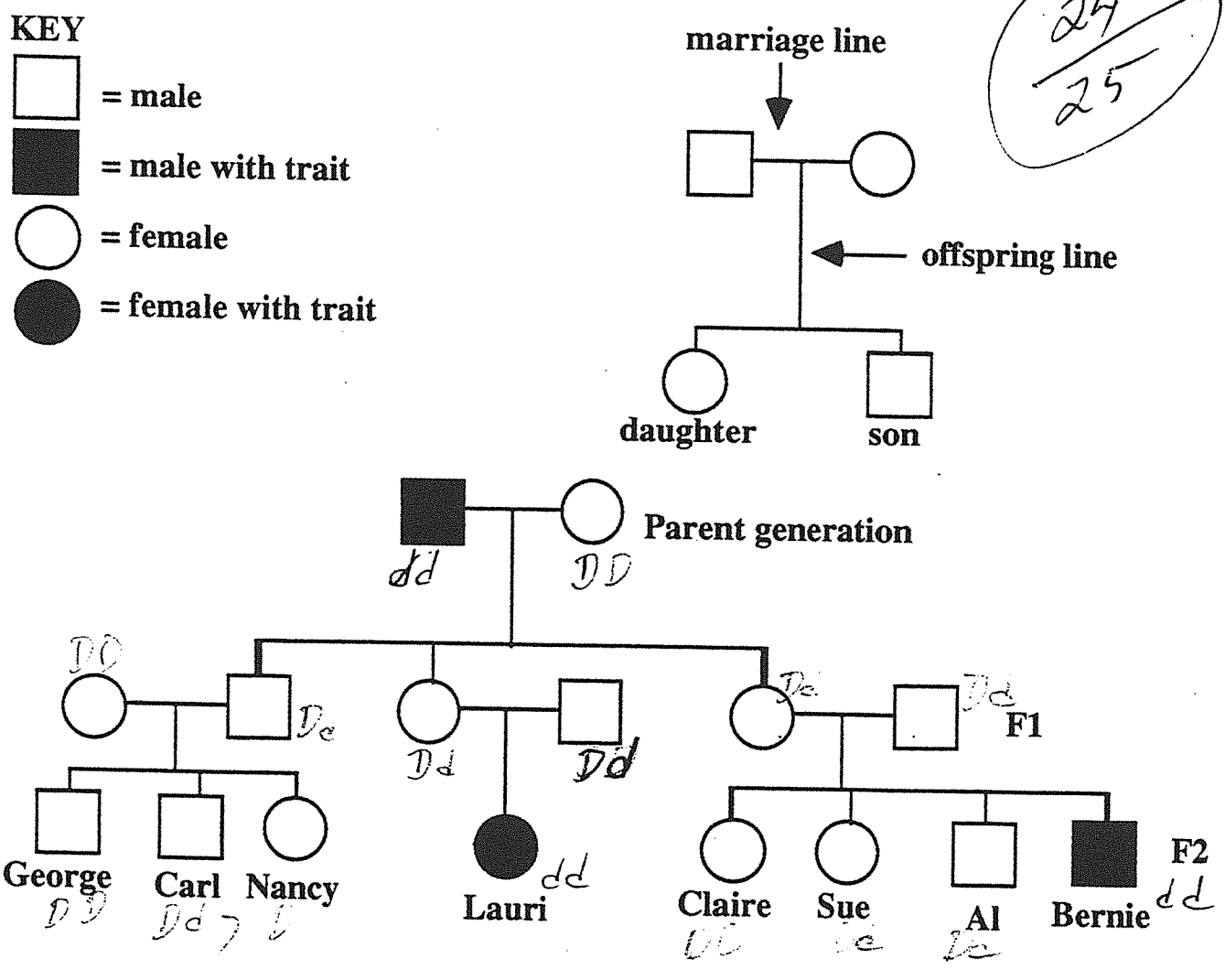

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BIO- HI -1

Answer sheet
Part 1 - Human Inheritance

1. Is the trait represented by the darkened symbol dominant or recessive?

Recessive

2. Using complete sentences describe how Mendel would have explained your answer to question #1?

Mendel would have said that the trait must have been hidden (recessive) for Laura and Bernie to have gotten the trait from their parents who did not show it.

3. Describe all the possible genotypes of Bernie, his mother, his father, and his brother, Al.

Bernie was pure recessive, his mother and father were hibrid but his brother Al could have been hybrid or pure dominant

4. Using complete sentences explain how you determined your answer to question #3.

To have the trait Bernie must be pure if it is recessive and his parents must have both had the hidden gene.

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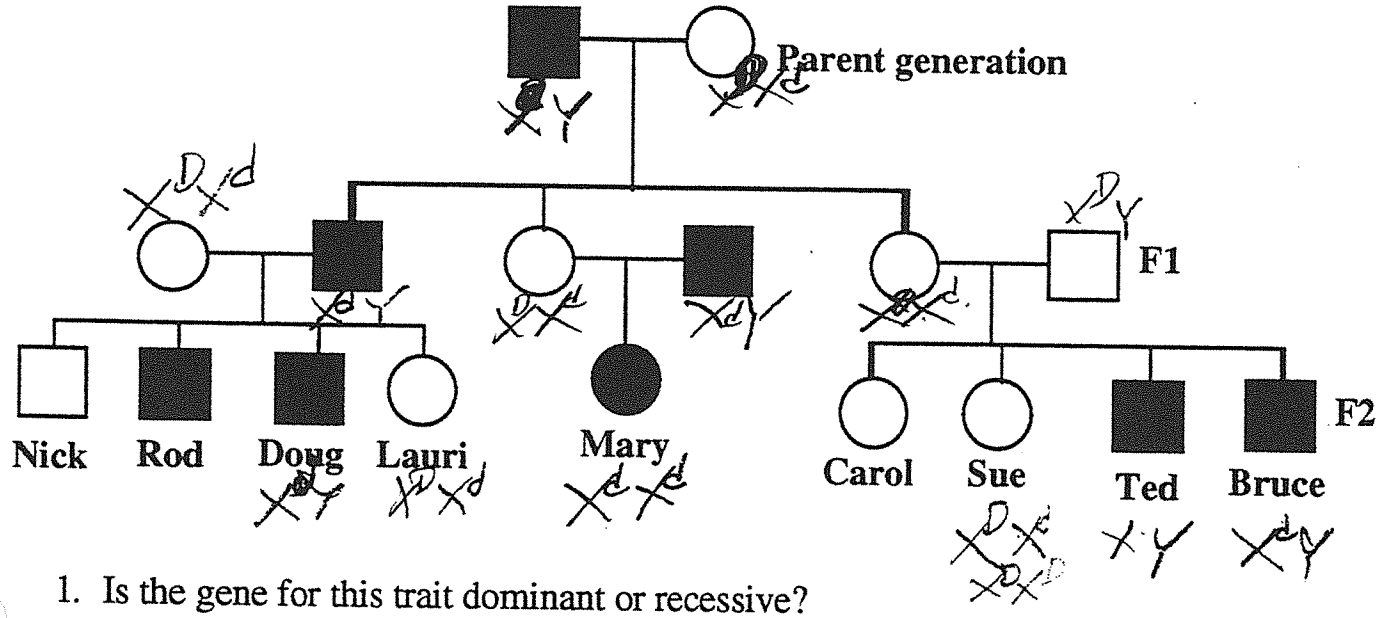
Part II

Directions:

Base your answers to the following questions on the pedigree chart below and on your knowledge of biology. The pedigree traces the expression of a particular trait, represented by the darkened symbols, through three (3) generations. Studies have shown that individuals with this trait are frequently male. The trait rarely appears in females and only if the father also has the trait.



1. Is the gene for this trait dominant or recessive?

Recessive

2. Is the gene for this trait carried on the X or Y chromosome?

X chromosome

3. Using complete sentences explain why the trait is more common in males than in females?

To have the trait a female must have two recessive genes but a male will have it with only one.

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4. Using coded symbols give the genotypes of the following family members? Be sure to include your symbol for representing the genotypes you describe.

Symbols - X^D - female No Trait, X^d female Trait, Y - male ch

Bruce - X^DY

Mary ~~Sue~~ - X^Dx^d

Their Mother - X^Dx^d

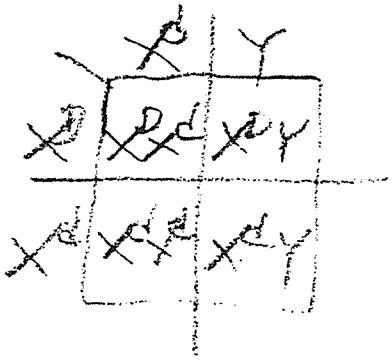
Their Father - X^DY

5. If Doug marries a woman whose lacking the trait, but whose father has the trait, what is the probability that they will have a son with the trait? What is the probability of their daughters having the trait?

There is a 50-50 chance for both their sons and daughters.

Doug X^dY

Woman X^Dx^d



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Bio-HL-2

Human Inheritance

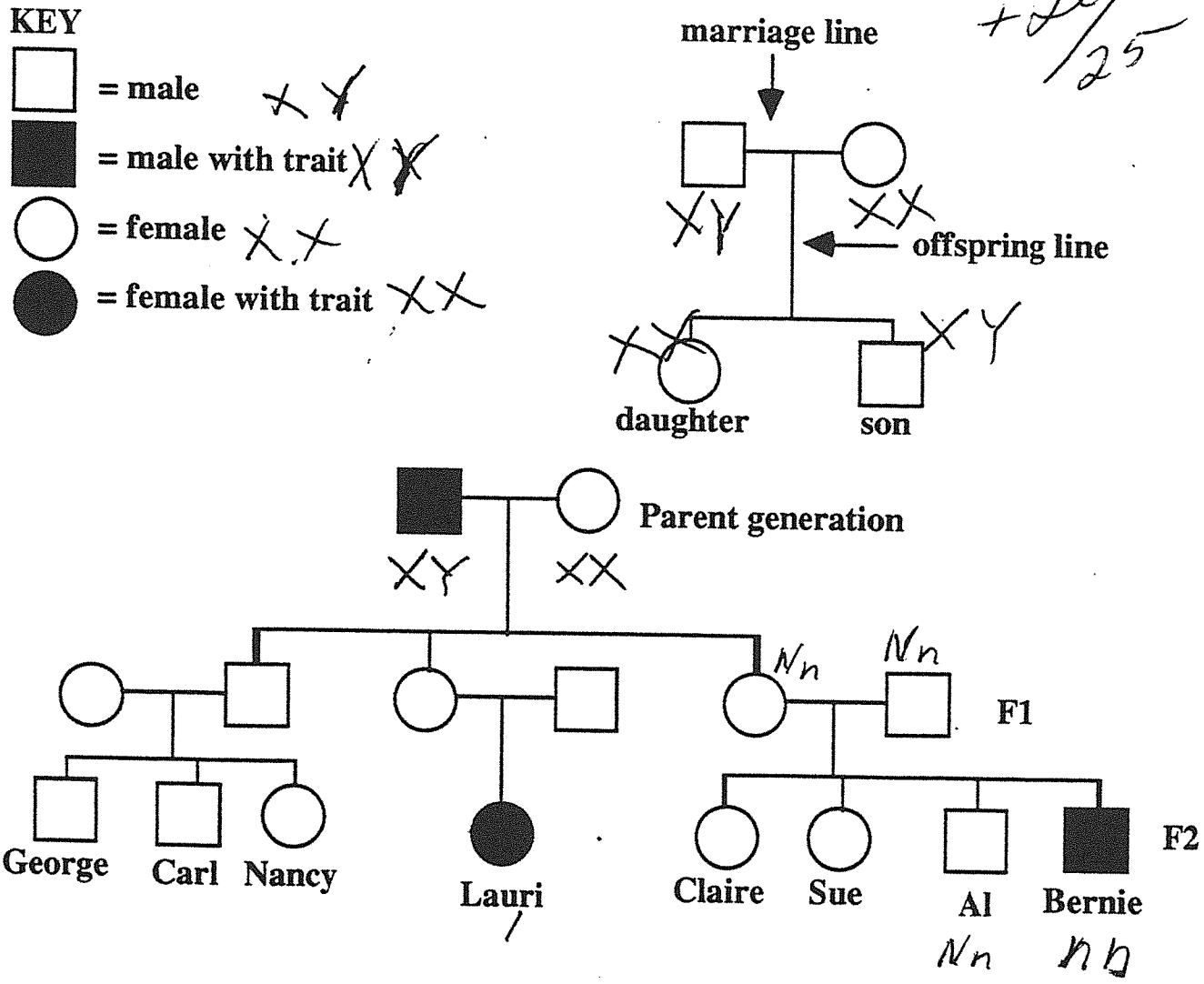
Task: In this task you will analyze genetic characteristics from a family tree.

Part 1

Directions

Base your answers to the following questions on the pedigree chart below and on your knowledge of biology. The pedigree traces the expression of a particular trait, represented by the darkened symbol, through three (3) generations. These generations are labeled Parent Generation, F1, and F2 so that they correspond to the generations of pea plants that Gregor Mendel used to formulate his Laws of Heredity.

+20/25



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BIO-HI-2

Answer sheet
Part 1 - Human Inheritance

1. Is the trait represented by the darkened symbol dominant or recessive?

RECESSIVE

2. Using complete sentences describe how Mendel would have explained your answer to question #1?

THE TRAIT STAYED HIDDEN FOR A GENERATION SO MENDEL WOULD HAVE CALLED IT RECESSIVE. IN F1 FAMILIES TWO NORMAL PARENTS had children WITH the trait.

3. Describe all the possible genotypes of Bernie, his mother, his father, and his brother, Al.

BERNIE - homozygous RECESSIVE. MOTHER - HETEROZYGOUS. FATHER - heterozygous + Al - heterozygous.

4. Using complete sentences explain how you determined your answer to question #3.

I USED LETTERS TO show THE alleles and GENES in EACH PERSON. BERNIE had TWO h and THE others had ONE of each. N and n.

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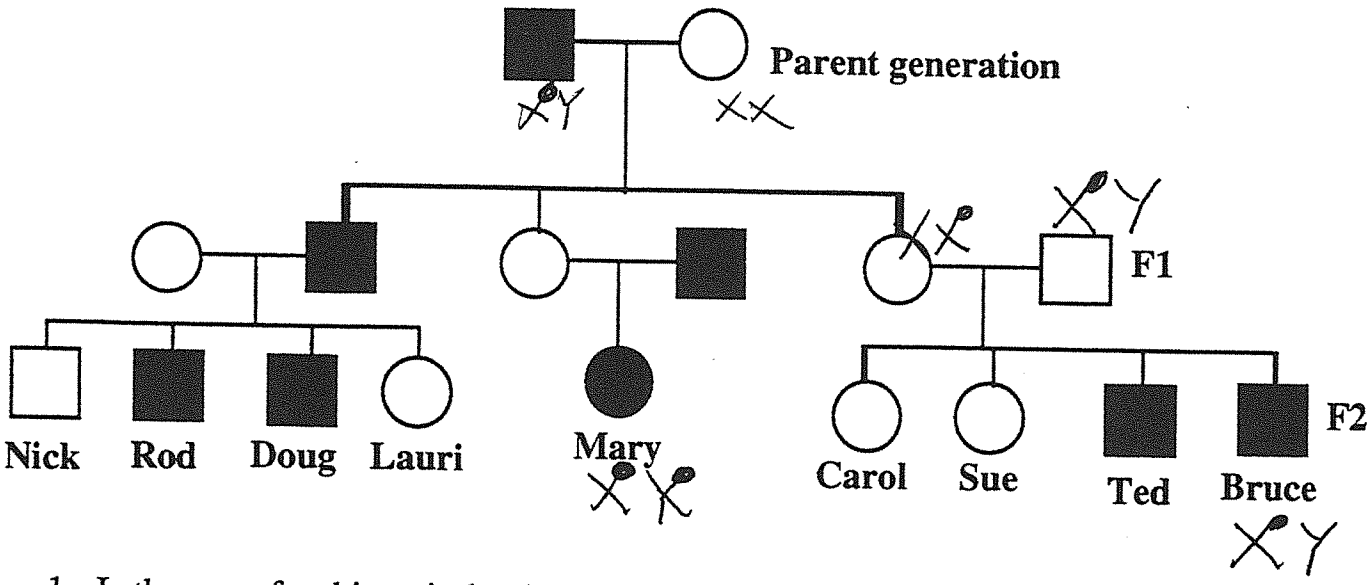
BIO-HI-2

Part II

Directions:

Base your answers to the following questions on the pedigree chart below and on your knowledge of biology. The pedigree traces the expression of a particular trait, represented by the darkened symbols, through three (3) generations. Studies have shown that individuals with this trait are frequently male. The trait rarely appears in females and only if the father also has the trait.



1. Is the gene for this trait dominant or recessive?

RECESSIVE

2. Is the gene for this trait carried on the X or Y chromosome?

X

3. Using complete sentences explain why the trait is more common in males than in females?

Males have an X and Y chromosome but females only have two X.

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DIU-H1-2

4. Using coded symbols give the genotypes of the following family members? Be sure to include your symbol for representing the genotypes you describe.

Symbols - $X^{\bullet}X$ FEMALE. $X^{\bullet}Y$ MALE

Bruce - $X^{\bullet}Y$

Mary - $X^{\bullet}X$

Their Mother - $X^{\bullet}X$

Their Father - $X^{\bullet}Y$

5. If Doug marries a woman whose lacking the trait, but whose father has the trait, what is the probability that they will have a son with the trait? What is the probability of their daughters having the trait?

There is a good chance that THE SON will get it, but NOT THE daughter.

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Bio- H+ -5

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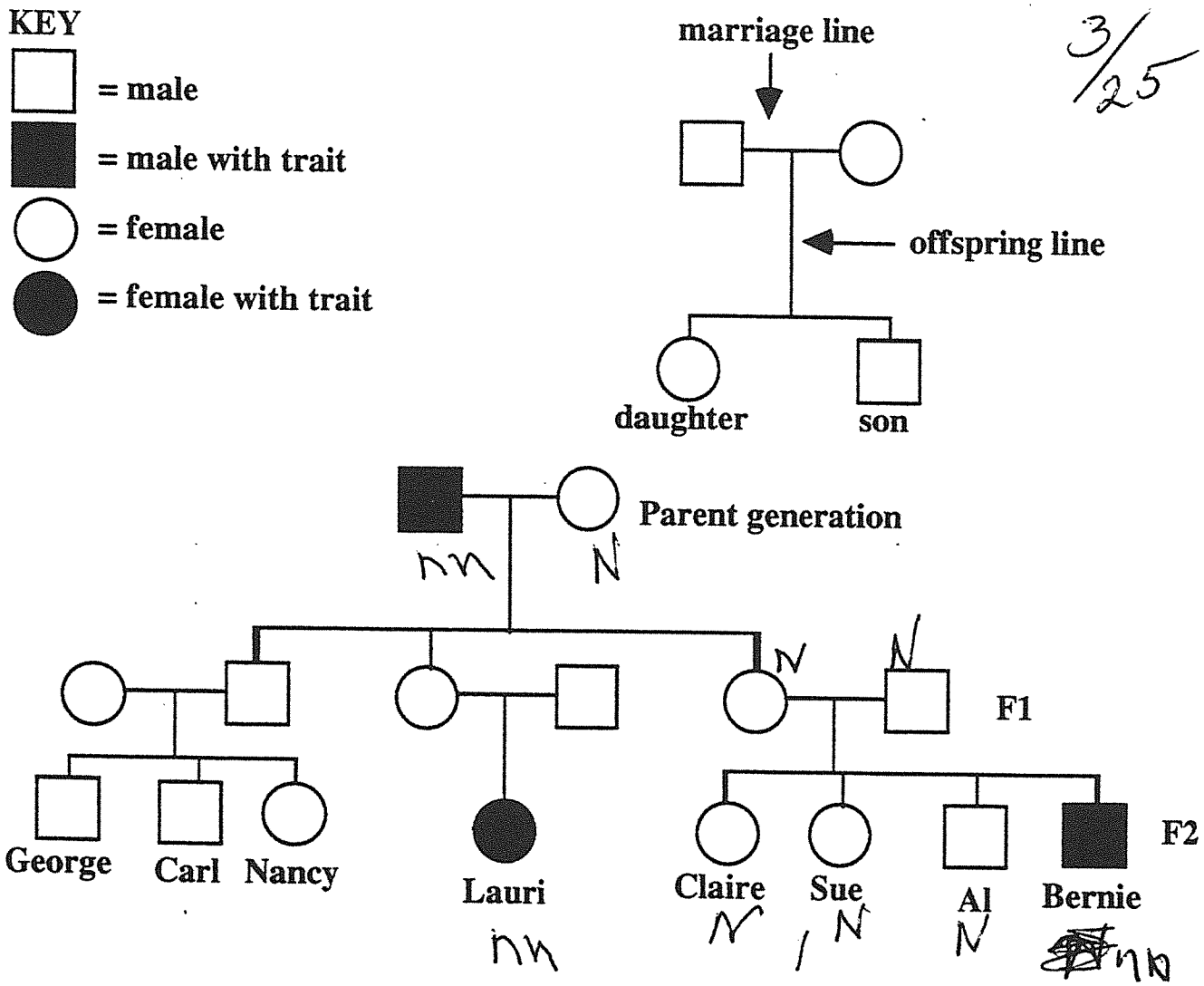
3/25



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BIO-HI-3

Answer sheet
Part 1 - Human Inheritance

1. Is the trait represented by the darkened symbol dominant or recessive?

Recessive

2. Using complete sentences describe how Mendel would have explained your answer to question #1?

There are only three of the black squares and circles

3. Describe all the possible genotypes of Bernie, his mother, his father, and his brother, Al.

Bernie has the trait so it is nn. None of the others have it so they are all Normal

4. Using complete sentences explain how you determined your answer to question #3.

I looked at the picture and figured out things.

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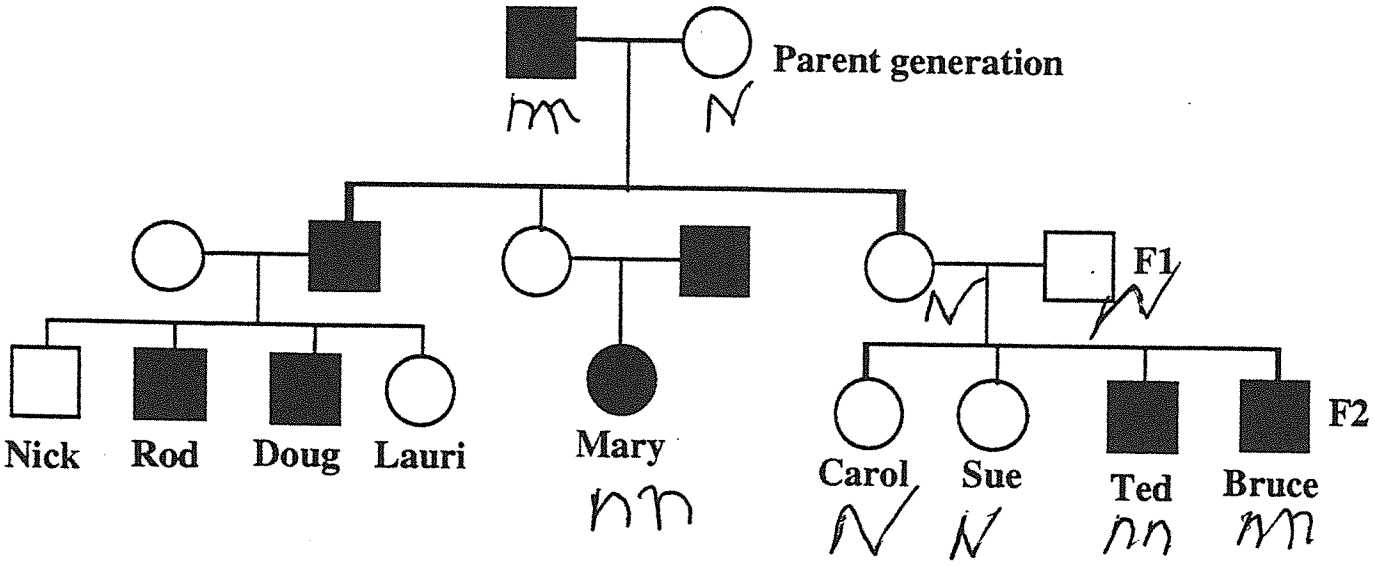
BIO-HI-3

Part II

Directions:

Base your answers to the following questions on the pedigree chart below and on your knowledge of biology. The pedigree traces the expression of a particular trait, represented by the darkened symbols, through three (3) generations. Studies have shown that individuals with this trait are frequently male. The trait rarely appears in females and only if the father also has the trait.



1. Is the gene for this trait dominant or recessive?

in men.

2. Is the gene for this trait carried on the X or Y chromosome?

X

3. Using complete sentences explain why the trait is more common in males than in females?

Most often men get the genes like in color blind people.

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B10-H 1-3

4. Using coded symbols give the genotypes of the following family members? Be sure to include your symbol for representing the genotypes you describe.

Symbols - N Normal. ~~E~~ h - recessive. Not there.

Bruce - hh

Mary ~~E~~ hh

Their Mother - N

Their Father - N

5. If Doug marries a woman whose lacking the trait, but whose father has the trait, what is the probability that they will have a son with the trait? What is the probability of their daughters having the trait?

~~Girls dont get it but theirs~~ Boys do.