

Junior's Family Tree

Standards of Learning

Science 4.5, 4.8, 5.5, 6.9, LS.13

Math 4.19, 5.17, 6.20, 7.14, 7.15, 7.17, 7.18

English 4.1, 4.3, 4.6, 4.7, 5.4, 5.7, 6.4, 6.5, 7.6, 7.7

Objective

Students will:

- Show that traits are passed on from one generation to the next

Materials

For Teacher:

Meet Junior: A Quart of Paint, An Interview With a Horse Breeder (handout provided)

Junior's Relative Fact Sheet – Teacher's Copy (handout provided)

For each Student:

Meet Junior: A Quart of Paint, An Interview With a Horse Breeder (handout provided)

Junior: A Quart of Paint Activity sheet (handout provided)

For Each Team:

- Junior's Family Tree Team Project (handout provided)
- Junior's Relatives Fact Sheet (handout provided)
- Color Junior (handout provided)
- Family Tree Horse Templates (handout provided)
- Chart paper
- Glue
- Markers/crayons/colored pencils
- Rulers

Background Knowledge

Throughout history, many animals and plants have been bred to perpetuate certain traits. Horses, cows, tomatoes, corn and strawberries are just a few examples of living things that have been selectively bred by humans. Breeders of horses are very aware of horse family traits. The horse traits they breed can be visual, such as hair coloring and muscularity, or intangible, such as temperament and health characteristics.

Traits are passed down through genes in cell. Genes are made of DNA molecules. Each parent contributes one half of the genetic makeup of offspring. Your students will learn more about cells, chromosomes, and the details of heredity as they learn about the cell.

This lesson includes an interview with a horse breeder and shows students that certain traits are passed on from one generation to the next. The students will trace the family history of a horse named Junior and learn why he has the characteristics he does. Feel free to extend this activity, and have students observe and review their own family traits.

Procedure



1. Explain to the students that they are about to read an interview with a horse breeder. Read aloud and discuss Meet Junior: A Quart of Paint with the class.
2. Distribute the Junior: A Quart of Paint activity sheet to each student. Individually, have the students review the interview and then complete the worksheet. Share and discuss the student worksheets.
3. Divide the students into groups of three or four. Review the Junior's Family Tree Team Project with your students and set guidelines for group work. The more organizational structure you provide at the onset, the more successful the students will be. Have the students complete the Junior's Family Tree Team Project.
4. At the completion of the activity, have student groups display Junior's Family Tree. Discuss the similarities and differences between the family tree diagrams. Keep in mind that the students should not be graded on "right" or "wrong" answers in this activity. They should be assessed on how well they thought out the "blue-eyed" question and how well they worked in their groups.
5. Discuss that Junior obtained half of his genes from each parent and that his parents obtained half of their genes from their parents. Since blue eyes are a recessive trait, blue-eyed genes had to come from both sides of Junior's family. Discuss as much or as little of this as you feel appropriate.
6. Have the students complete a paragraph that starts with a sentence similar to the one written below:

"I learned quite a bit about traits and heredity while charting Junior's family tree".

- Choose a different animal (steer, dog) and discuss its family tree.
- Have students do the activity individually rather than in groups.

Extension

- Invite a horse trainer to class to discuss how certain characteristics affect a horse's ability to perform certain functions.
- Have students research the characteristics needed to be a good cutting horse, racehorse, riding horse, or a horse that is part of a transport team.
- Discuss that human traits are passed on from one generation to the next. Have students give examples of traits they have inherited from their ancestors. Remember that inherited traits are not always visual but may include traits such as health and temperament. Discuss how family members feel about the traits changed over time.
- Have students make a personal family tree by interviewing an older family member.
- Have students research how certain plants and animals have been selectively bred for certain characteristics. Good examples include corn (maize), cows, figs, grapes and cotton.
- Invite a seed-manufacturing representative to class or take a field trip to a seed company. Discuss the processes used to produce seeds that have desirable traits.
- Collect seed packets of different varieties of the same item such as corn, beans, or radishes. In groups, have students read the packets and analyze what characteristics they think were selectively bred for home gardeners (for example, long beans, sweet corn, mild tasting radishes, etc.).
- Have the students read the story Corn is Maize by Aiki (see page 67). Discuss how corn was selectively bred over time to produce the corn we have in the marketplace today.





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Lesson adapted from California AITC.
Artwork by Clifton Rodgers
Revised 7/2007

MEET JUNIOR: A QUART OF PAINT

An Interview with a Horse Breeder

- Narrator:** *Horses are used in a variety of ways-for working on cattle ranches, for racing, for show, for strength, etc. In this interview, you will learn about a horse named Junior: A Quart of Paint! He is part quarter horse and part paint horse. Can you figure out how he got his name? You will have another little mystery to solve as soon as this interview is over.*
- Owner:** Welcome to my family's ranch. My name is Karen.
- Interviewer:** How long have you lived here?
- Owner:** I have been breeding paint and quarter horses since 1988. However, my family has been breeding horses since the early 1950's. We have owned this property since 1961.
- Interviewer:** Who is this interesting horse? (*Interviewer points to a horse*)
- Owner:** He is part paint horse and part quarter horse. Meet Junior: A Quart of Paint.
- Interviewer:** What beautiful eyes he has!
- Owner:** I know! It was a real surprise when he opened his eyes for the first time. Both of his parents have brown eyes!
- Interviewer:** Tell me a little bit about paint horses and quarter horses.
- Owner:** Well, quarter horses have a special build (*She points to Junior as she talks*). They generally have big hips, a short back, a nice long neck, and a small head. Quarter horses are bred for these characteristics. Junior is also part paint horse. A paint horse is a special kind of quarter horse. Paint horses are known for their coloring. Junior's base coloring is bay (*a brownish color*), but he has lots of white hair. It looks as though he has been painted with white paint. When I breed for offspring, I want horses with "painted" coloring and the nice build of an attractive quarter horse.



Interviewer: Tell me what quarter horses and paint horses are used for.

Owner: There are many breeds of horses. Quarter horses are generally used for riding and cutting cattle. Cutting cattle means to remove a particular steer or cow from a herd of cattle and make it go where you want it to. Paint horses are also often used for pleasure riding and showing. Junior, here, would be a good horse for a young person to own. He could be a real good show horse some day. He has a real sparkle in his eye and has a lot of personality. He also has great lines.

Interviewer: Tell me a little about his coloring.

Owner: He has brown markings on his head up to his ears. We call this a “medicine hat”. Since his face is all white, we call it a “bald face”. See here (*she points toward the mane and tail*)... he has black markings on the tip of his tail and on the part of his mane that hangs down on his forehead. All of these things are markings that an owner may or may not want on a paint horse.

Interviewer: Tell me about his parents.

Owner: Junior’s mother is a mare named Heart’s Delight. She is bay colored (brownish) and has a white tail with a black tip. Her legs are white and her neck and back are somewhat short. She has brown eyes. She is a very gentle horse but is very lively. In fact, I think she is more lively than Junior. By the way, she is called a dam because she is a mom.

Interviewer: What about Junior’s father?

Owner: Well, we call the father of a horse a sire. His name is Triple Feature. He is a sorrel colored (*a light reddish brown*) quarter horse. His hair, mane and tail are all sorrel colored. His is a beautiful horse. I especially like his blaze face. A blaze face is one like this horse has here. (*She points to a horse that has a white strip that runs between his eyes and down to his nose.*) Junior’s father is not quite as big as Heart’s Delight. He’s very calm and pleasant with good athletic ability. Junior has great athletic ability, too.

Interviewer: What color are Triple Feature’s eyes?



Owner: His eyes are brown! That is why I was quite surprised to see that Junior's eyes are blue.

Interviewer: Where did he get his blue eyes then?

Owner: Well, I can tell you a little about Junior's grandparents. That may help!

Interviewer: Great! But I only have a few minutes before I have to head back to the office. Let's go for it! This is getting interesting.

Owner: Junior's mother's mother, known as a second dam, was named Pretty Papoose. She was a paint horse with brown and white body hair. She had four white legs and a blaze face. She was owned by some children. Junior's grandfather on his mother's side (known as a "dam sire") is named Dixie Wardrum. He is part paint and part quarter horse and lives on our ranch. He is very gentle and docile. He is bay and white with four white socks, which are white markings on his lower legs-like socks! He has sparking brown eyes.

Interviewer: Wow! You certainly know a lot about Junior's relatives. Can you quickly tell me about his other two grandparents?

Owner: Certainly. I know all of this information because in the horse breeding industry it's very important to know the history of your horse. We register our horses. Junior's father's mother, I guess I can call her the sire's dam, is named Welcome Home. She has an elegant long neck and is bay colored with a black mane and tail. She has four white socks. Welcome Home is a very gentle horse.

Interviewer: I am enjoying hearing the horse's names. Someday you will have to tell me how horse breeders name their horses. Anyway....I think you have to tell me about one more grandfather.

Owner: Yes! Junior's father's father, known as a sire's sire, is called Triple Tough and is a quarter horse. He has two white socks on his hind legs and brown eyes. He was one of my first horses. He's a bit wild and difficult to work with, but he certainly is a beautiful horse!

Narrator: *As the owner and interviewer walk back to the ranch entrance, they stop and look at Junior one more time. He is eating grass in the pasture. He looks up at the two.*



Owner: Junior likes to eat hay and grain with rice bran in it. But he also loves spending his days in the pasture. I hope Junior will make a good show horse or good working cattle horse. We'll just have to wait and see how well he does as he grows and gets trained.

Interviewer: Look! Junior's looking right at me. His eyes are so sparkling! Well, you never did tell me how Junior got those beautiful blue eyes! I guess I will have to figure that out on my own!

Owner: Thank you for stopping by. Come back anytime to see Junior.

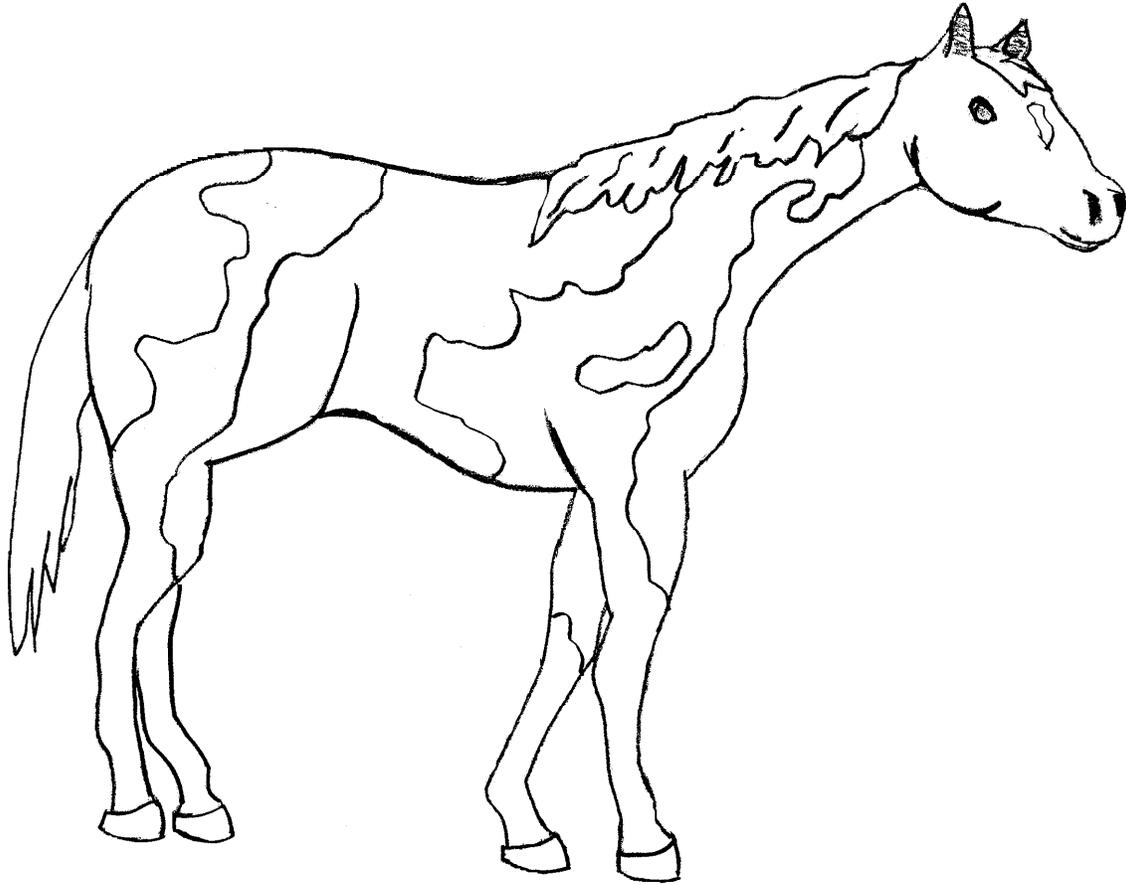
Narrator: *So, how did Junior get those blue eyes!*



Name: _____ Date: _____

Junior: A Quart of Paint Activity Sheet

After listening to the interview about Junior, color the picture as realistically as possible.



1. What are some characteristics of Junior that you were unable to show by coloring?

2. After discussing your drawing with your classmates, are there any changes you would make to the picture you colored of Junior? If so, what would they be?



Name: _____ Date: _____

Junior's Family Tree Team Project

Horses are necessary on many farms in the United States today. Cattle ranchers use horses to round-up cattle. Certain horses are preferred for this job because they require particular characteristics. Can you imagine a rancher riding a horse that was not fast enough to help rope a calf, or a horse whose legs were too wobbly to climb a rocky mountain? Horse owners not only choose their horses for strength and agility, but they also choose horses for their temperament and appearance. As you complete this activity, you will see that horse breeding is a very complex science.

Your team will create a model of Junior's family tree using facts that you obtained from his breeder during the interview and by making assumptions of your own. Junior has a combination of his mother's and father's genes. Junior's mother and father got their genes from each of their parents. Complete the following procedure to make Junior's family tree and determine how Junior got his blue eyes!

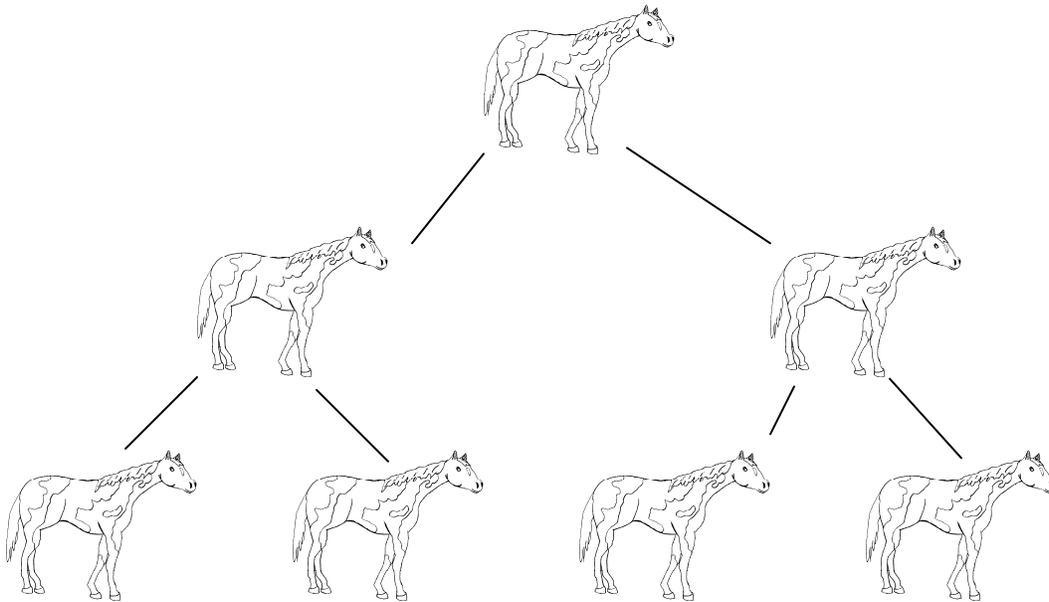
Materials

- *Meet Junior: A Quart of Paint*, An Interview with a Horse Breeder
- *Junior's Relatives Fact Sheet*
- *Color Journey* handout
- *Six Family Tree Horse Templates*
- Large sheet of chart paper
- Markers, crayons or colored pencils
- Black marker
- Ruler
- Glue

Procedure

1. Establish a neat and organized work place for your team.
2. Organize the material provided by your teacher.
3. Fill in the facts you learned from the interview about Junior and his relatives on the *Juniors Relatives Fact Sheet*.
4. As a group, review what Junior really must look like. Have someone in the group color Junior's picture on the *Color Junior* handout.
5. Make a rough sketch of Junior's family tree using the following diagram as a guide.





Your rough sketch should include descriptions of each relative in the family tree. The descriptions should include appearance as well as characteristics you cannot see. Have your teacher approve your rough sketch.

6. Make your final display of Junior's family tree on the large sheet of chart paper. Your family tree must include the following items.
 - The names of your group members
 - Accurately colored pictures of each relative
 - Written descriptions of characteristics one cannot see for each relative
 - Lines that accurately connect one horse to the next
 - A written explanation describing where Junior got his blue eyes
 - Any facts or details your group would like to add



Junior's Relatives Fact Sheet

Teacher's Copy

Junior

Quarterhorse/paint horse
Bay colored (brownish)
Lots of white hair
Medicine hat (Brown markings on his head
Up to his ears)
Bald fact (white face)
Black markings on tail tip and on forehead mane
Blue eyes
Big hips
Short back
Long neck
Small head
Good, lively personality
Great athletic ability

Heart's Delight

Junior's Mother (dam)

Brown eyes
Bay colored (brownish)
White tail with black tip
White legs
Short neck and back
Lively

Triple Feature

Junior's Father (sire)

Quarterhorse
Brown eyes
Hair, mane and tail are sorrel (light reddish
Brown)
Blaze face
Calm and pleasant
Good athletic ability

Pretty Papoose

Paint horse
Bay colored
White legs
Blaze Face
Gentle

Dixie Wardrum

Junior's Mother's Father (dam's sire)

Quarterhorse/Paint horse
Bay colored
White socks
Brown eyes
Gentle and docile

Welcome Home

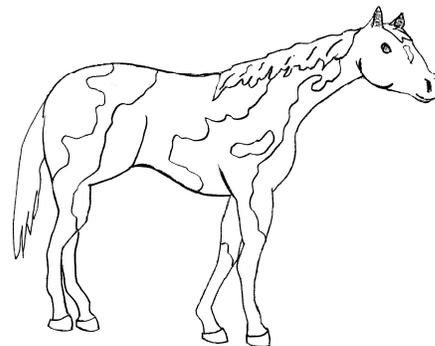
Junior's Father's Mother (sire's dam)

Bay colored
Black mane and tail
White socks
Long neck
Gentle

Triple Tough

Junior's Father's Father (sire's sire)

Quarterhorse
Two white socks
Brown eyes
Wild

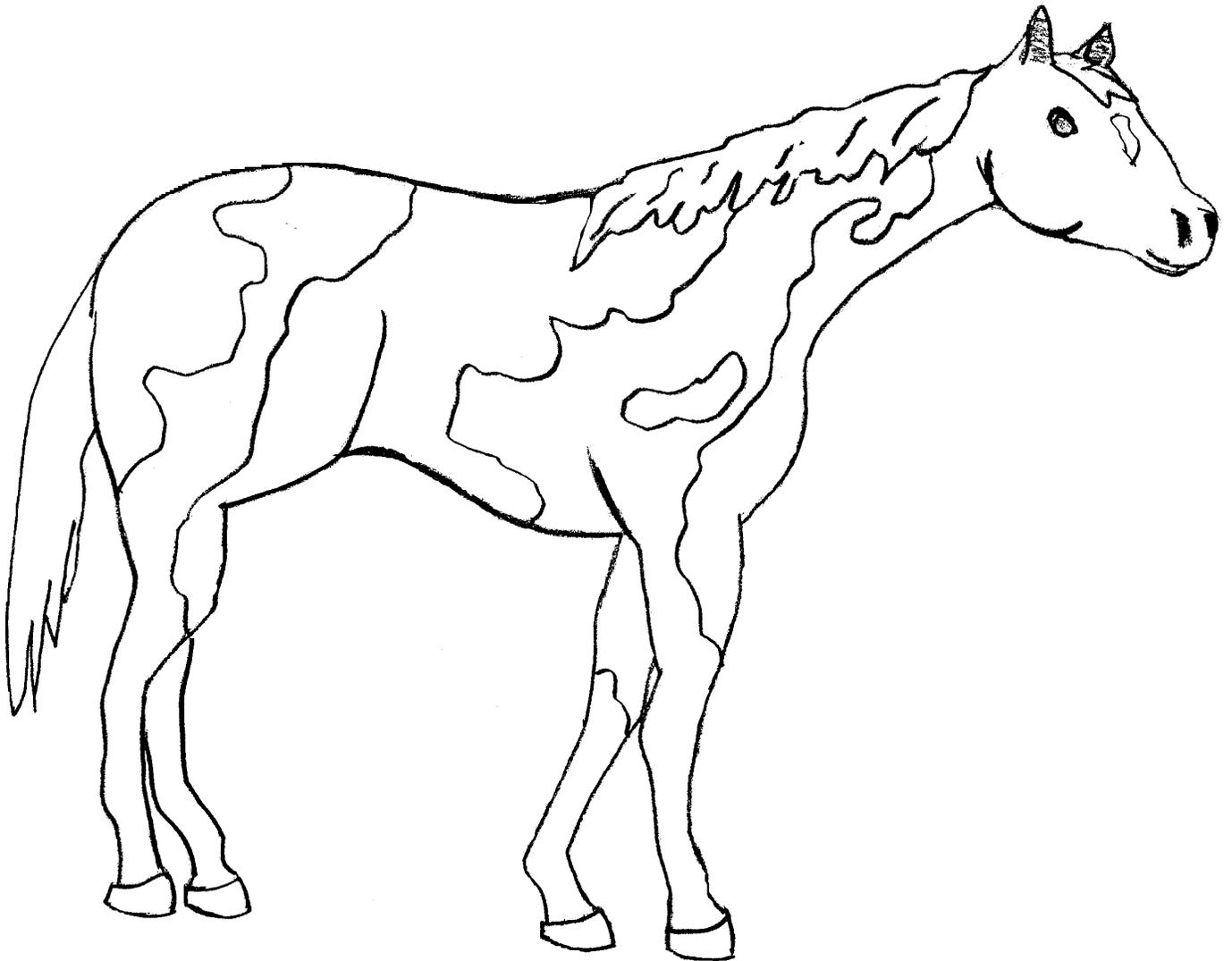


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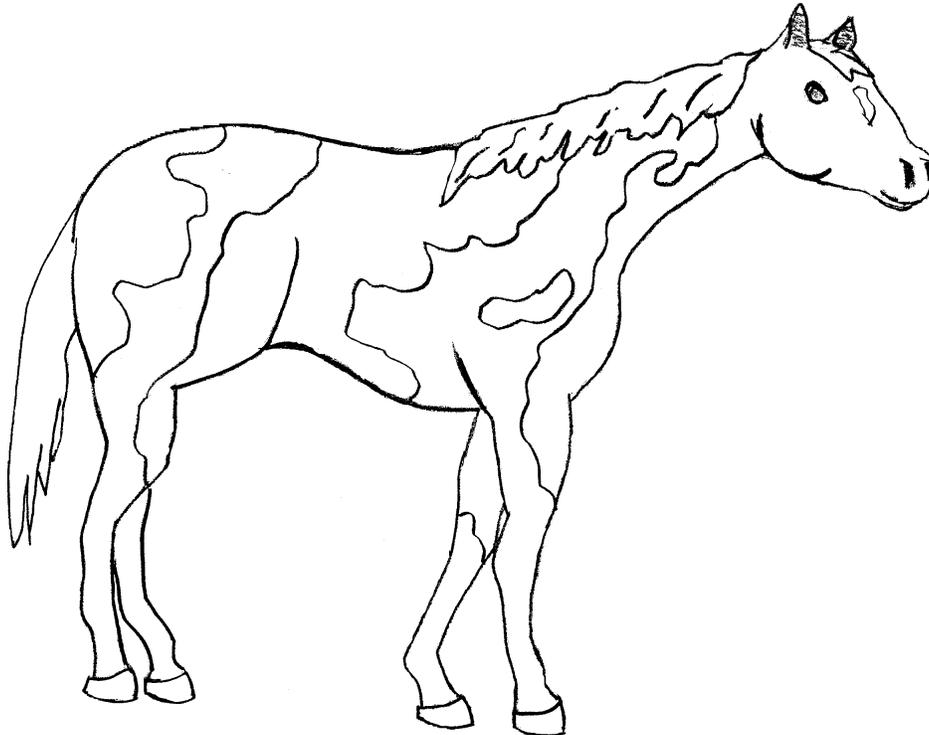
Name: _____ Date: _____

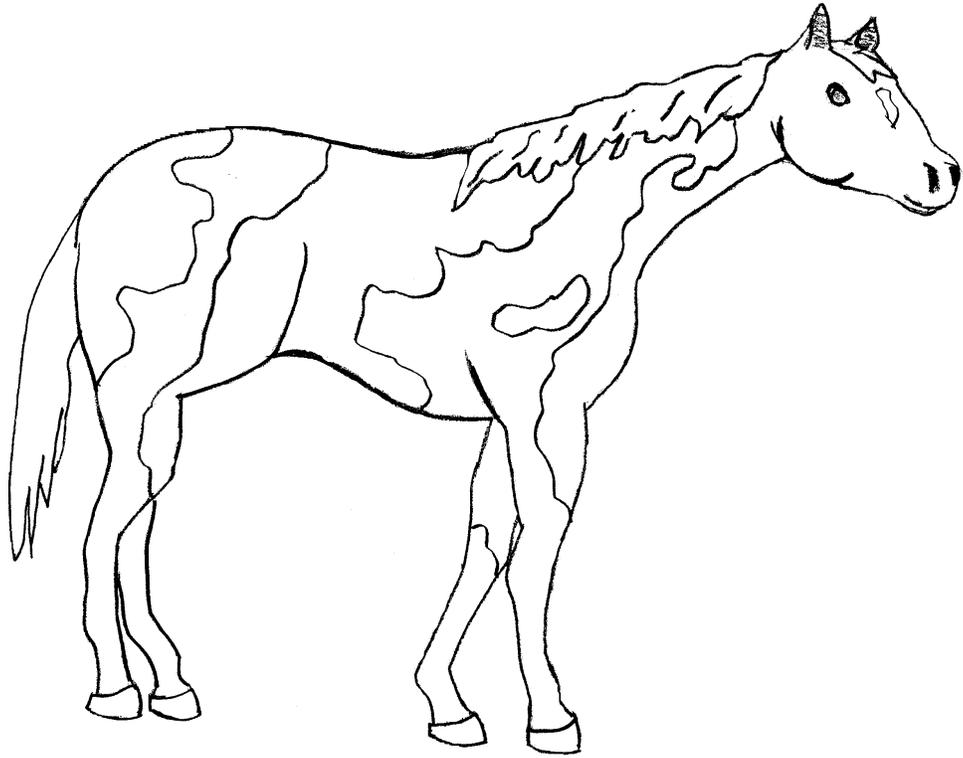
Color Junior

After discussing what Junior looked like with your team members, color this picture accurately and use it to begin your family tree project.



Family Tree Horse Templates





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Junior's Eyes

Given: Blue eyes are recessive Directions: Use the handout to determine the phenotype and possible genotypes for EYE COLOR.

JUNIOR
 Phenotype _____
 Genotype(s) _____
 Possible _____

On the back, answer the following:
 1) Could all six of Junior's relatives have brown eyes? 2) Summarize your data by describing how Junior could end up with blue eyes. Include Punnett Square(s) to support your explanation.

<p>Triple Feature Sire Phenotype _____ Genotype(s) _____ Possible _____</p>	<p>Triple Tough Sire's sire Phenotype _____ Genotype(s) possible _____</p>
<p>Heart's Delight Dam Phenotype _____ Genotype(s) _____ Possible _____</p>	<p>Welcome Home sire's dam Phenotype _____ Genotype(s) possible _____</p>
<p></p>	<p>Dixie Wardrum dam's sire Phenotype _____ Genotype(s) possible _____</p>
<p></p>	<p>Pretty Papoose dam's dam Phenotype _____</p>



Genotype(s) possible _____

Junior's Eyes – KEY B_ = brown, bb= blue

Given: Blue eyes are recessive Directions: Use the handout to determine the phenotype and possible genotypes for EYE COLOR.

Triple Feature
Sire
Phenotype _____
Genotype(s)
Possible _____ Bb _____

Triple Tough
Sire's sire
Phenotype __brown _____
Genotype(s) possible __ BB or Bb
{NOTE: Both Triple Tough & Welcome can NOT be BB*
Welcome Home
sire's dam
Phenotype ___? brown or blue
Genotype(s) possible: BB, Bb, bb

JUNIOR
Phenotype __blue _____
Genotype(s)
Possible ___bb _____

Dixie Wardrum
dam's sire
Phenotype _____
Genotype(s) possible __BB or Bb
{NOTE: Both Dixie & Pretty
{can NOT be BB*
Pretty Papoose

Heart's Delight
Dam
Phenotype _____
Genotype(s)

On the back, answer the following:
1) Could all six of Junior's relatives have brown eyes? 2) Summarize your data by describing how Junior could end up with blue eyes. Include Punnett Square(s) to support your explanation.



Possible __Bb__ dam's dam
Phenotype? Brown or blue
Genotype(s) possible BB,Bb,bb

*If one parent is homozygous (BB) then the other must be either Bb or bb.

