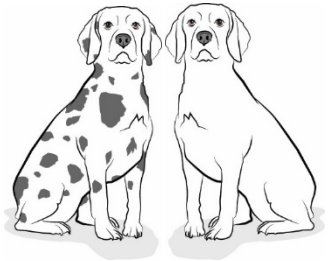
Features Analysis Chart—Genetics

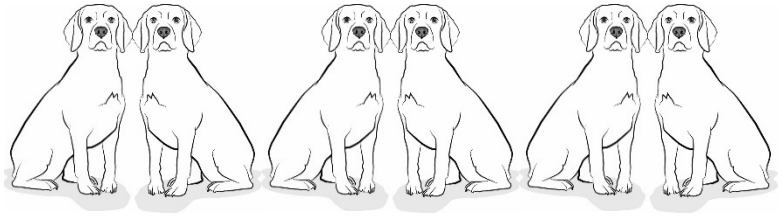
Teacher Name: _____ **Circle One: PRE POST**

Describe the assessment item: Question 3 on the pre-post assessment for the Genetics unit:

a. A spotted dog is bred with a solid-colored dog:



All of their puppies are solid colored.



Provide one explanation for why all of the puppies are solid colored.

b. After the puppies grow up, one of them is bred with another solid-colored dog. This dog also had one parent with spotted fur and one with solid-colored fur. What would you expect their puppies to look like?

c. Explain your response for part b.

Describe the ideal response:

a. All of the puppies are solid colored (without spots) because each puppy has two different alleles. Each inherited an allele for spotted fur from one parent and an allele for solid-colored fur from the other parent. The solid-colored fur trait must be dominant because a dominant trait shows up if an individual inherits two different alleles from the parents.

b. I'd expect some of the puppies to have spotted fur and some to have solid-colored fur. Since solid-colored fur is the dominant trait, I'd expect more of the puppies to have solid-colored fur and fewer to have spotted fur (a ratio of about 3:1).

c. Puppies with spotted fur will show up in the second generation, even though neither parent has spotted fur, because each puppy inherits one allele from each parent, and each parent has one spotted allele and one solid-color allele. Which of the parents' alleles the puppies inherit is entirely random, so they might get the same allele from each parent or a different allele from each parent. If a puppy inherits two spotted alleles, it will be spotted. If it inherits two solid-color alleles or a spotted allele and a solid-color allele, the puppy will be solid colored.

Features of a Complete, Accurate Response	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1. Puppies inherit the trait for spotted or solid-colored fur from their parents' genes (which are found on chromosomes).																																				
2. Alleles are different forms of a gene that provide instructions for variations of a trait. These dogs have spotted alleles and solid-color alleles.																																				
3. Offspring get one allele from each parent.																																				
4. Which allele offspring inherit from each parent is random.																																				
5. The solid-colored-fur trait (or allele) is dominant, and the spotted-fur trait (or allele) is recessive.																																				
6. If offspring inherit two different alleles from their parents, the dominant trait will show up.																																				

Features Consistent with Student Misconceptions/Problems	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1. No mention of genes or alleles.																																				
2. No mention of dominant or recessive traits (or alleles).																																				
3. Traits are inherited from just one parent.																																				
4. Which trait a puppy inherits depends on whether it's a girl or a boy, or whether the trait comes from its mother or father.																																				
5. Certain traits are stronger or better than others. That's what makes them dominant.																																				
6. Offspring choose which traits they will have.																																				
7. Traits are found on chromosomes (no mention of genes or alleles).																																				
8. Other incorrect or unclear ideas																																				