Blocking Dogs

Select Your Dog:

Name	Breed	Clinic

Breed Density Change (B)	Clinic Density Change (C)	Average Density Change (D)	Other Density Change (O)

Design I: Completely Randomized Design:

One way to assign treatments is to randomly allocate the dogs into treatment groups.
Sketch a completely randomized design for this study below:

Draw a pink card to indicate your year-long treatment. Record the bone density change from your randomly assigned treatment

Treatment	Density Change

Your total bone density change is based on a combination of your typical dog density change, breed, clinic, other contributing factors and treatment. Calculate your total bone density change for the completely randomized year-long study and record it below:
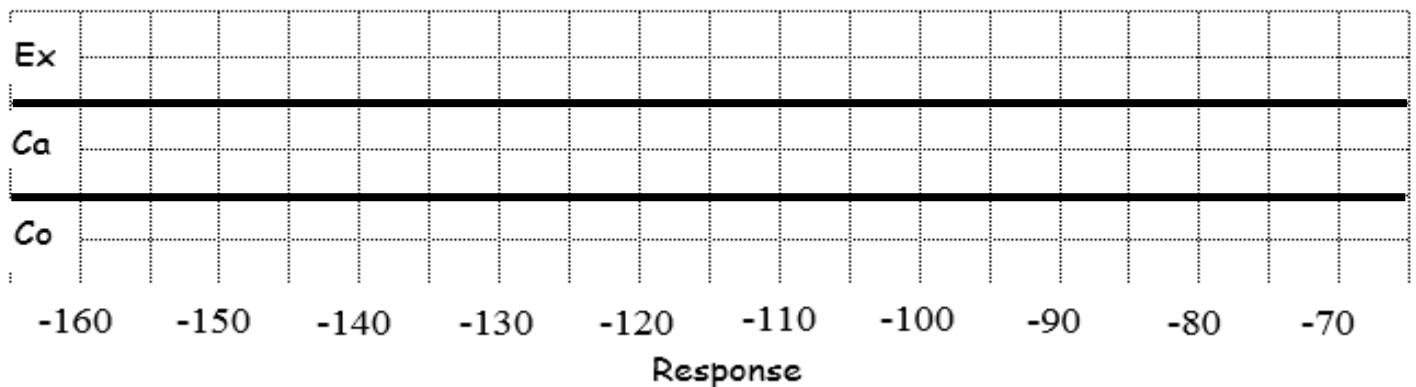
Breed (B)	Clinic (C)	Average (D)	Other (O)	Treatment ((T)	**TOTAL**

Use this table to go throughout the class and gather all of the totals – sort them by treatment:

Ex							
Ca							
Co							

Create 3 dot plots to indicate the treatment:

Answer the following questions:
Is there a clear difference between the treatments (look at the centers)?

How does the variability within each treatment group affect our ability to see differences in overall bone density change from group to group?

Return your Treatment card to the Researcher to prepare for the next simulation.

Design 2: Randomized Block Design, Blocked by Breed

Another way to assign treatments is to separate the dogs by breed and then randomly allocate the dogs in each breed into three treatment groups.
Sketch a blocked by breed design for this study below:

Draw a pink card to indicate your year-long treatment. Record the bone density change from your randomly assigned treatment

Treatment	Density Change

Your total bone density change is based on a combination of your typical dog density change, breed, clinic, other contributing factors and treatment. Calculate your total bone density change for the completely randomized year-long study and record it below:

Breed (B)	Clinic (C)	Average (D)	Other (O)	Treatment ((T)	**TOTAL**

Locate the other 5 dogs from your breed. Record each dog's bone density change based on treatment below. Then, calculate the overall average bone density change for your breed. Finally, calculate the effect of the treatment on the average bone density change by subtracting the breed average from each dog's observed response. Then, gather data from the rest of your class about the dogs

		Akitas		Beagles		Collies		Dalmations	
Raw Data	Ex								
	Ca								
	Co								
Breed Averages									
Data with breed variability removed									

Complete three dotplots below, one for each treatment.
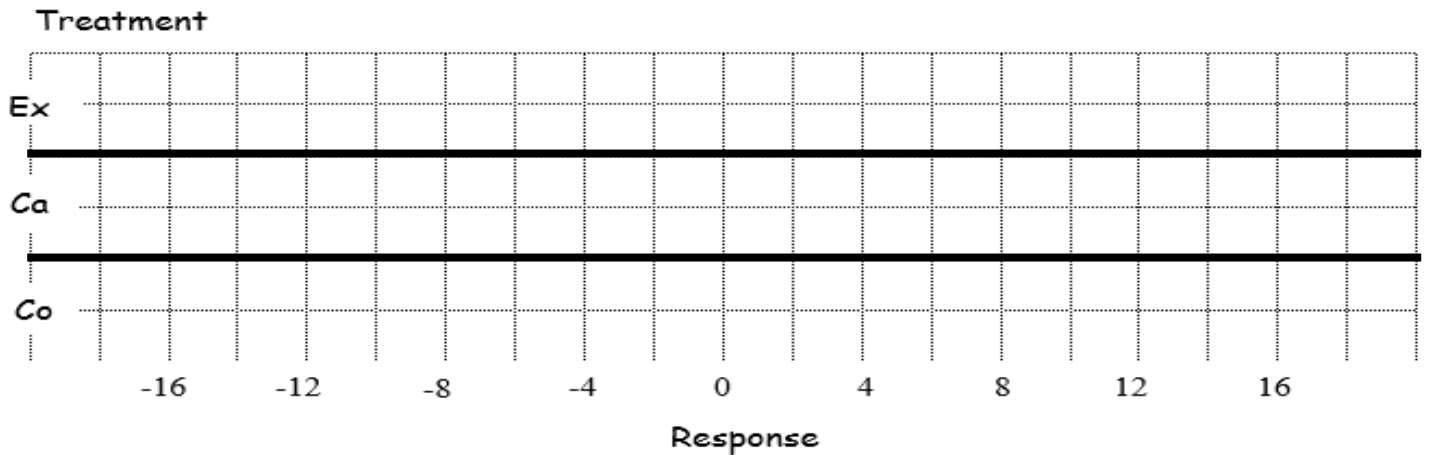
Treatment

| | -16 | -12 | -8 | -4 | 0 | 4 | 8 | 12 | 16 |

Ex

Ca

Co

Response

Answer the following questions:

Is there a clear difference between the treatments (look at the centers)?

Can you estimate the average amounts by which the treatments improve bone density?

Return your Treatment card to the Researcher to prepare for the next simulation.

Design 3: Randomized block Design, Blocked by Clinic:

Another way to assign treatments is to separate the dogs by clinic and then randomly allocate the dogs from each clinic into three treatment groups.

Sketch a blocked by clinic design for this study below:

Draw a pink card to indicate your year-long treatment. Record the bone density change from your randomly assigned treatment

Treatment	Density Change

Your total bone density change is based on a combination of your typical dog density change, breed, clinic, other contributing factors and treatment. Calculate your total bone density change for the completely randomized year-long study and record it below:
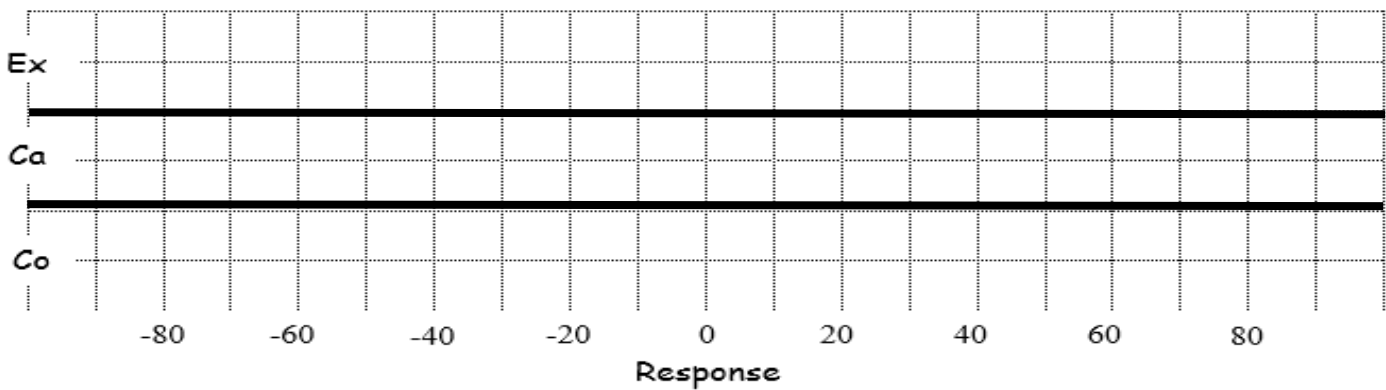
Breed (B)	Clinic (C)	Average (D)	Other (O)	Treatment ((T)	TOTAL

Locate the other 5 dogs from your clinic. Record each dog's bone density change based on treatment below. Then, calculate the overall average bone density change for your clinic. Finally, calculate the effect of the treatment on the average bone density change by subtracting the clinic average from each dog's observed response. Then, gather data from the rest of your class about the dogs

		Paw Prince		Pooch Palace		Treehouse		Barking Lot	
Raw Data	Ex								
	Ca								
	Co								
Clinic Averages									
Data with breed variability removed	Ex								
	Ca								
	Co								

Complete three dotplots below, one for each treatment.

Answer the following questions:

Is there a clear difference between the treatments (look at the centers)?

In which simulation/design was it easiest to discern the effects of the three treatments?

How did the characteristics of the variables and the design of the allocation work together to make that particular design scheme work best?