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Concrete Composites Lab Worksheet

Pre-Activity Assessment: Characterization of concrete

1. Below is the recipe for making cement. Identify if each item is a solid, liquid, or gas. Then, classify if each item as an element, compound, a homogeneous mixture or a heterogeneous mixture.

Cement + Sand + Gravel + Water → Concrete

State of Matter					
Type of Matter					

2. Hypothesize whether you think the process of mixing cement, sand, and gravel into Quikrete is a physical or chemical process. Why do you think this?

3. Hypothesize whether you think the process of turning cement mix into concrete is a physical or chemical process. Why do you think this?

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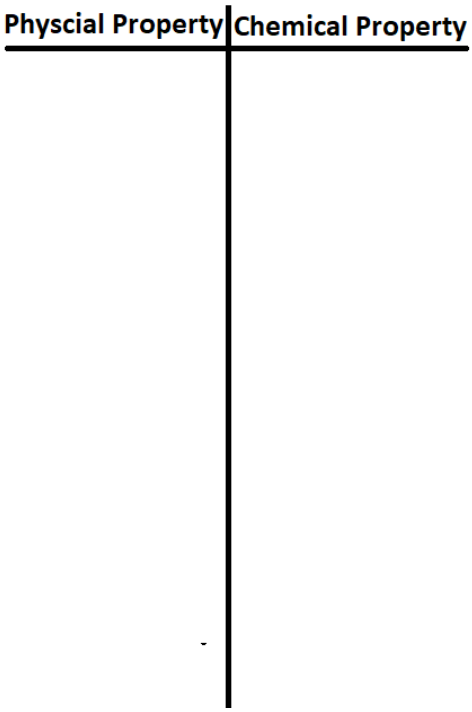
Formative Assessment: Properties of concrete

1. Listed below are the properties we will be testing for our concrete samples. Identify if the property is a physical or chemical property by placing it in the T-Chart.

Mass	Wettability
Volume	Luster
Strength	Solubility at Room Temperature
Reactivity with Soap	Reactivity with Oxygen
Density	Texture
Conductivity	Phase at Room Temperature
Reactivity with Acid	Reactivity with Water
Color	Hardness
Shape	Reactivity with Alcohol



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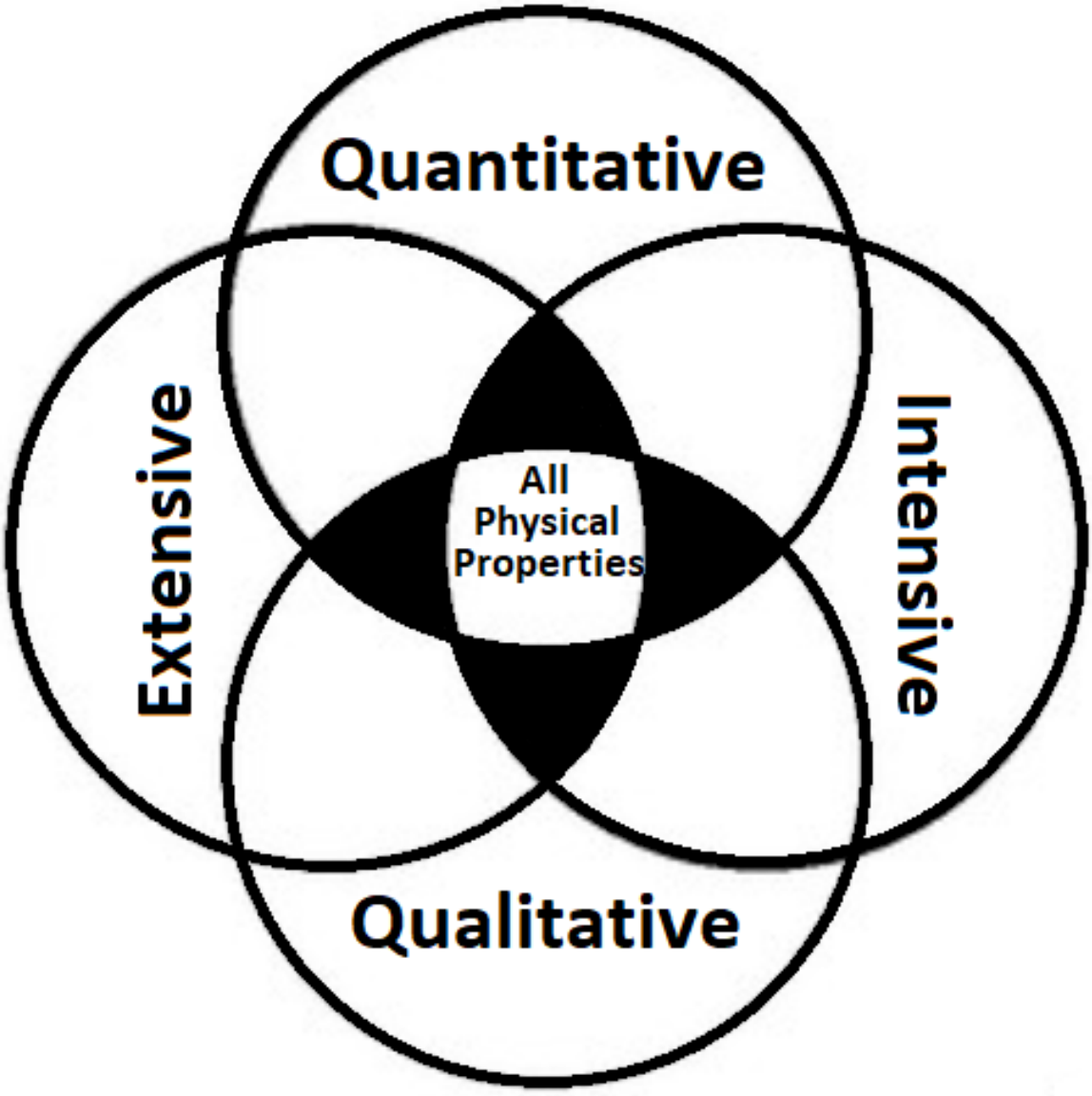
2. If the property is a Physical Property, identify if the property is quantitative or qualitative and if it is intensive or extensive by writing the property where it belongs in the Venn diagram below.



3. Explain how you identified if the property was physical or chemical.

Follow the procedures for each station to collect the data for the following properties.

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Physical Properties:	**Observations:**
Color	
Shape	
Luster	
Texture	
Phase at Room Temp.	
Solubility at Room Temp.	
Hardness	
	Measurements:
Wettability (s)	
Average Mass (g)	
Average Volume (cm)	
Average Density (g/cm)	
Average strength (lbs)	
Chemical Properties:	**Observations:**
Reactivity with Oxygen	
Reactivity with Soap	
Reactivity with Water	
Reactivity with Alcohol	
Reactivity with Bleach (Base)	
Reactivity with HCl (Acid)	
Solubility at Room Temp.	
Hardness	

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Post-Activity Assessment: Changing Cement

Complete the following sentences.

The hardness test performed was an example of a _____ change. I know this because _____
_____
_____
_____.

The reactivity tests performed were an example of a _____ change. I know this because _____
_____
_____
_____.

Making Sense Assessment: Conclusions

Draw your conclusion based on the graphs created from the whole class data. Compare the results of the density, wettability, and strength tests on the different composites and identify which performed best for these properties below.

1. Describe the relationship between density and the composite compositions.

2. Describe the relationship between wettability and the composite compositions.

3. Describe the relationship between strength and the composite compositions.

4. In your opinion, which concrete composite performed the best overall? Why do you think this?

5. An important part of the engineering process is to improve what has already been done. Based on which composite you think performed the best, choose one variable you can change to improve it. Make sure to describe which property you are trying to improve and why your change would result in a better concrete composite.