Student Name: _____
Date: _____

Which Mixture Produces the Best Cast?

Background Info:

You are a casting technician for a company (Casts 'R Us). Your boss has asked you to find out what mixture of Plaster of Paris and water will produce a cast that not only looks good but that can also survive falls from large distances.

Objective:

Find out which of the 3 mixtures of Plaster of Paris and water gives the best results in terms of aesthetics, endurance, and cost.

Vocabulary:

Viscosity -

_____

_____

Materials:

Plaster of Paris	3 Plastic beakers	Measuring cylinder
Stirring stick	3 Star molds	Aluminum foil
Ruler		

Procedure:

Preparing the Mixtures & Molds:

____ 1) Measure out 60 mL of Plaster of Paris in a beaker.

____ 2) Pour 35 mL of water into the beaker with the Plaster of Paris.

____ 3) Stir the mixture until all of the powder is dissolved in the water.

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____ 4) Measure the ***volume*** of your mixture and record this in the table.

____ 5) Place the star mold on a sheet of aluminum foil and pour the mixture into the star mold. Try to get as much of the mixture into the mold as possible. The more you get in, the better your results will be!

____ 6) Measure the ***height/thickness*** of the mixture, using a ruler. Record this in your data table as cast A.

____ 7) Repeat steps 1-6, using 30 mL of water. Record data as cast B.

____ 8) Repeat steps 1-6, using 25 mL of water. Record data as cast C.

____ 9) Look at each star mold and make observations about each mold below.

____ 10) Let the molds sit for three to four days.

Observations:

Which mixture was the hardest to pour?	
Which mixture was the easiest to pour?	
Did all of the mixtures completely fill the mold?	
Did any of the mixtures spill out of the mold?	
Other observations?	

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Data Table:

Cast Properties						
Cast	Water (mL)	Mixture Volume (mL)	Mixture Height (cm)	Cast Height (cm)	Cast Mass (g)	Cost ($)
A	35					
B	30					
C	25					

Testing the Castings:

____ 1) Remove the casts from each of the molds. Be sure to keep track of which is which!

____ 2) Measure the ***height*** of each cast. Record in your table.

____ 3) Measure the ***mass*** of each cast. Record in your table.

____ 4) Drop each of the casts from a height of 5cm. If the star breaks (loses at least one arm), then record the height that you dropped it from. If not, then increase the height by 5 cm and continue dropping the stars at increasing heights until they break. Record in the ***Cast Strength*** data table.

____ 5) Get results from 2 other groups and calculate the average break height. Record in table.

____ 6) Record observations you made during the experiment.

____ 7) Calculate the cost for making each cast. Record in cast properties table.

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____ 8) Answer the questions in the ***Evaluation*** section in the ***Casting Analysis*** worksheet.

Data Table:

Cast Strength				
	Break Height (cm)			
Sample	Test 1	Test 2	Test 3	Average
35 mL				
30 mL				
25 mL				

Observations:

Which cast was the easiest to get out of the mold?	
Which cast was the hardest to get out of the mold?	
Which cast looked the best?	
Did any of the mixtures spill out of the mold?	
Other observations?	

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Calculate Cost of Each Cast:

If water costs $0.03/mL and the Plaster of Paris cost $0.05/mL, what is the production cost of each star?

formula: cost = (volume of water x 0.03) + (volume of plaster x 0.05)

eg: cost = (50mL x $0.03/mL) + (100 mL x $0.05/mL)

cost = ($1.50) + ($5.00)

cost = $6.50

Cast A	*Cast B*	*Cast C*