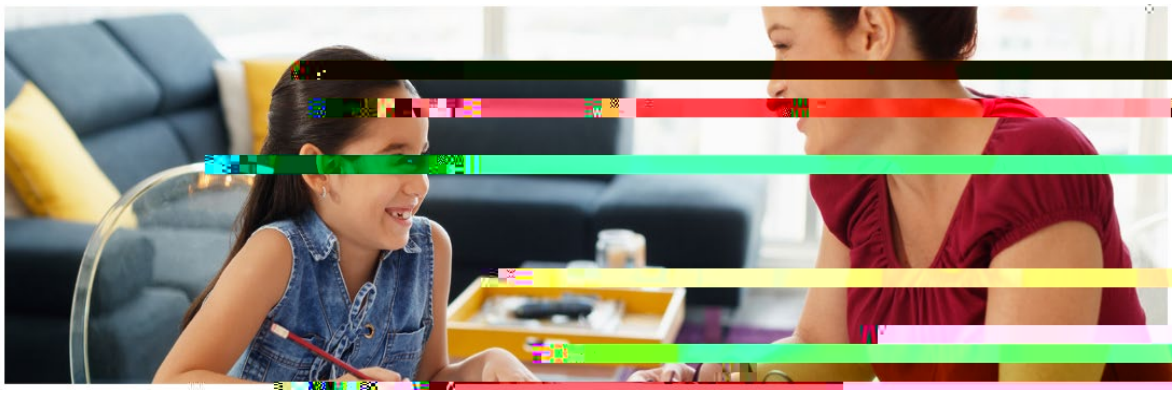
Offline Distance Learning

Secondary



Science

High School

May 2020

1. We think the height from which a sphere is dropped and the angle at which the sphere impacts the ground affects crater

Inquiry Skills Assignment #2: Keep it Hot

A class of students performed a series of experiments to determine which of several materials would be most effective for insulating a paper cup. One group of lab partners tested four different materials: black paper, white paper, aluminum foil, and cloth. The following table shows their results:

Insulating Material	Temperature of Water in Cups at the Start of the Experiment	Temperature After 5 Minutes	Temperature After 10 Minutes
Black Paper	70° C	60° C	52° C
White Paper	50° C	45° C	40° C
Aluminum Foil	85° C	70° C	60° C
Cloth	60° C	54° C	48° C

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3. What valid conclusions can you draw from these results? Explain your answer.

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If you think you do not, tell what other information you would need.

Inquiry Skills Assignment #3: Soapy Water

Students in a science classroom were conducting experiments to explore the use of various substances in removing soap from water. One way to remove soap from water is to have it react with other substances. When the reactions occur, a solid called a precipitate is sometimes formed. A precipitate can be filtered out of the water.

Group A carried out the following experiment:

1. We put soapy water into three separate plastic cups.
2. A different substance was added to each of the cups.
3. After waiting 5 minutes, the mixture in each cup was filtered.
4. We examined the precipitate (which remained in the filter paper) and the filtrate (which was in the test tube) for each mixture.

The table below shows their results:

	1	2	3
Substance Added to Soapy Water	Epsom Salt	Table Salt	Sugar
Precipitate	White, milky	White, milky	None

Group B carried out the following experiment.

1. We placed 50 mL of soapy water into four plastic cups.
2. We added 10 grams of sugar to cup 1, 10 grams of table salt to cup 2, and 10 grams of Epsom salt to cup 3. Cup 4 had no substance added.
3. We mixed each with a plastic spoon.
4. We filtered all 4 cups.
5. We then poured the filtrate (remaining liquid) into four separate test tubes, shook them and measured the height of the soap suds,

The table below shows their results:

Cup	Substance

2. Based on the problem Group Á •] v À • š] P š] v P U ^ / v } µ Œ Æ ‰ Œ] u v š Á } u ‰ Œ] ((Œ Á Z] Z } v ‰ Œ } À] š Z u } • š (Œ] š] } v U If the data Á Be sure to include evidence from the data to strengthen your conclusion. _____

4. }u‰ Œ 'Œ}µ‰ v 'Œ}µ‰ [• Æ‰ Œ]u vš do you think is better designed? Explain why you think so.____

Inquiry Skills Assignment #5: Ice Cold Experimentation

A class of students wanted to answer the problem: Which is better for melting ice: ordinary table salt or rock salt? One group of lab partners filled three identical beakers with ice and water. Next, they added table salt to the first beaker, rock salt to the second beaker, and nothing to the third beaker. Then they used thermometers to measure the temperature in each beaker. The table below shows their results:

Contents of Beaker	Temperature After 5 Minutes
Ice water and table salt	7^{O} C Ice btudents4.04 (o) teB~®úÕS ~ÎáRÀ7)…' Î° 'ìã•u' ° 'ìã„vE'

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   a. They were more specific in the amount of ice and salt added.
   b. They massed the beakers before and after adding salt.
   c. They used larger beakers.
   d. They started with colder water temperatures.

8. How could the second group have most improved their experimental design?
   a. They could have added two scoopfuls of salt instead of one.
   b. They could have started with more ice.
   c. They could have performed more trials.
   d. They could have left the mixture sit for less time.

Inquiry Skills Assignment #6: Cold Packs

Group A carried out the following experiment:

Their results are shown below:

Cup	Chemical Used	Beginning Temperature (^{o}C)	Ending Temperature (^{o}C)
A	NH_4Cl	25	18
B	$CaCl_2$	23	28

Group B carried out the following experiment:

1. We were conducting an experiment to see which chemical is best for use in a pack.
2. We filled 3 plastic cups with 50 mL of water and measured the mass.
3. We measured the temperature of the water in each cup, added NH_4Cl to one cup, $CaCl_2$ to the second cup, NaCl to the third cup, and measured the mass of each cup.
4. We stirred the content of each cup and measured the temperature again.
5. We then added more of the chemical to each cup, stirred and measured the temperature again.

Their results are shown below:

Cup	Chemical	Mass of Cup with Water	Mass of Cup with Water and Chemicals	Temperature Before Chemical Added	Temperature After Chemical Added	Temperature After More Chemical Added
A	NH_4Cl	52.1 g	54.8 g	23°C	18°C	17°C
B	$CaCl_2$	52.1 g	53.7 g	23°C	21°C	26°C
C	NaCl	52.2 g	57.0 g	23°C	21°C	20°C

3. Group B decided to add more chemical to each cup after recording their temperature. Was this step necessary? Explain your answer using evidence from the data table. _____

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Group C carried out the following experiment:

1. The problem we investigated was which chemical makes the best pack.
2. We poured 50 mL of water into each of three cups.
3. We then added one teaspoon of NaCl to one cup, one teaspoon of $CaCl_2$ to another cup, and one teaspoon of NH_4Cl to the third cup and measured the temperature of the water in each cup.

Their results are shown below:

Cup	Amount of Chemical	Chemical Used	Temperature (°C)
A	1 Teaspoon	NaCl	23
B	1 Teaspoon	$CaCl_2$	28
C	1 Teaspoon	NH_4Cl	20

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a. The size of the cup
b. The type of chemical used
c. The temperature of the water
d. The amount of each chemical used

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a. Add a Cup D with 50 mL of water only as a control
b. Measure the beginning temperature
c. Use two teaspoons of chemicals instead of one
d. Do more trials

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a. Each chemical was equally good at making the best pack.
b. Out the chemicals tested, $CaCl_2$ could make the best cold pack.
c. Neither of the chemicals is better than distilled water may0hAgthe b6.008 (hes) 605.98 Tm (d.)Tj ET 8TT0865 0 0 1 41.0

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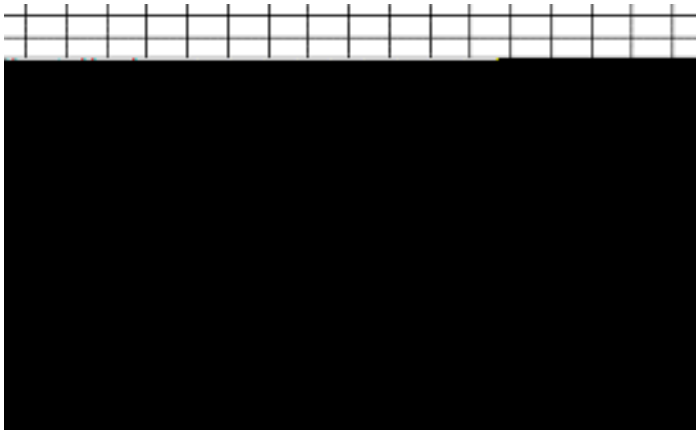

2. t Z š } v o µ •] } v • v Œ Á v (Œ } u ' Œ } µ ‰ [• Æ ‰ Œ] u i k š h e s v c o c l u s i o n s a r e M , } Á À • } v š Z P Œ } µ ‰ [• Æ ‰ Œ] u v š v Œ f u l y µ o š • M Æ ‰ o] v Ç } µ Œ v • Á Œ

Group B carried out the following experiment:

1. Take three large plastic cups and fill each with 150 mL of water. Label them Cup X, Cup Y and Cup Z.
2. Do not put any salt in Cup X. Add 7g of salt to Cup Y and 14g of salt to Cup Z.
3. Stir the cups of water until all of the salt is dissolved.
4. Place a small cup into each cup of water.
5. Add washers to each small cup until it sinks.
6. Measure the mass of the washers in each cup and repeat the experiment.

Their results are shown below:

CUP	Amount of Salt	Trial 1 Mass of Washers	Trial 2 Mass of Washers
X	0g	100.3g	100.2g
Y	7g	117.6g	119.5g
Z	14g	131.4g	133.0g

3. d Z] •] • ' Œ } µ ‰ [• • š š u u W š } (š • Z š µ % p Œ } š Z o ((š } (Á] P Z š } v š Z I s] o] š Ç this a clear statement of the problem they investigated? Explain fully why or why not.

4. The results of the Group [experiments show that the amount of salt in the water (salinity) affects the degree to which objects can stay10.

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6)

2) What would be a proper scientific question that can be explored for this investigation?
   a. How many drops of water does a penny hold?
   b. Which solution is the hardest to work with?
   c. c. Which solution is the easiest to work with?
   d. d. How does the amount of soap in the solution affect the number of drops a penny will hold?

3) How should the students best communicate the results of their experiment?
   a. They should make a list of the number of drops.
   b. They should make a data table of the number of drops.
   c. They should make a pie chart of the number of drops.
   d. They should average the number of drops for each trial and create a graph.

Use the information and data table below to answer questions 4-5.

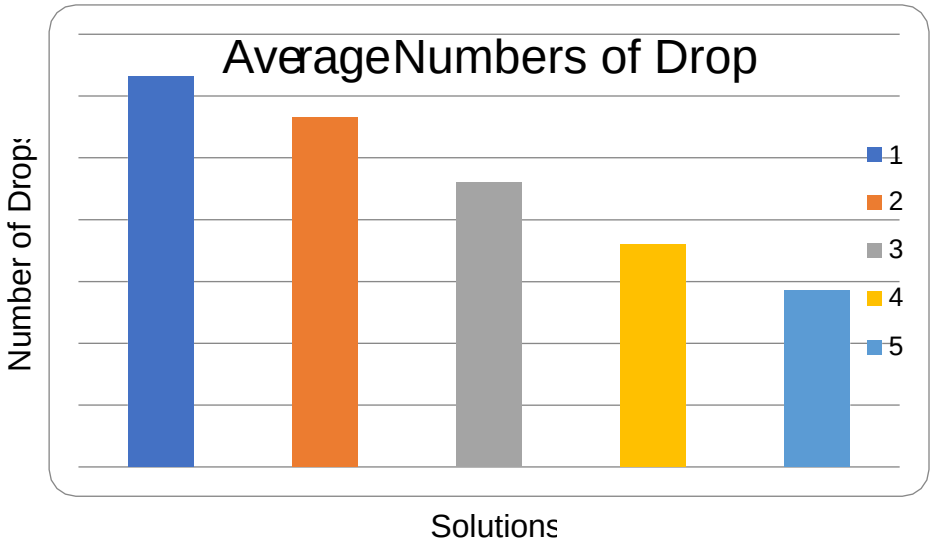
Some students did an experiment that tested for which solution enabled the penny to hold the most drops. They repeated the experiment 3 times and counted the number of drops the penny held.

Number of Drops a Penny Holds

Solution	Trial 1	Trial 2	Trial 3
Water (1)	32	30	33
2	29	29	27
3	25	21	23
4	19	17	18
5	15	15	13

4) What should the students do to analyze their data? /TT0 1 Tf 10.432 Tc 0.9885 0 0 1 54 437.92 Tm (4) Tj ET 13T Q04/TT0 10. /T -0.0422 Tc 0.9885 0 0 1 54 437.92 Tm 34)
   a. Find the lowest number of drops.
   b. Find the median number of drops.
   c. Find the average number of drops.
   d. Find the highest number of drops.

Use the bar graph below to answer questions 7-9 about this experiment.



7) What conclusion can BEST be reached about the number of drops and the different solutions?
   a. You cannot conclude anything from this graph
   b. Solution 1 holds the most amount of drops
   c. Solution 3 holds the least amount of drops
   d. The penny holds the same amount of drops no matter the solution.

8) In this experiment, which is the independent variable?
   a. The amount of soap in the solution
   b. The penny
   c. The number of drops a penny can hold
   d. The size of the eye dropper

9) Open Ended Question: What are two possible sources of error that might have occurred during the experiment? Explain
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