Solutions: Group Experiment Sign Up

SIGN UP FOR **ONE** EXPERIMENT THAT YOU WOULD BE MOST INTERESTED IN LEARNING MORE ABOUT. THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. **MAXIMUM OF 4 PEOPLE PER GROUP**.

THIS WILL BE **WORTH A TEST GRADE**. CHOOSE A GROUP THAT YOU CAN AND WILL WORK WELL WITH.

# What is the Saturation Point of Lemonade at a given temperature?

**1.**

**2.**

**3.**

**4.**

Your young neighbor has decided to have a lemonade stand to earn money for ice cream. Your neighbor wants thinks that dissolving as much lemonade mix as possible into water will make the best lemonade, but they do not want to pour too much and waste the mix. Being the expert chemistry student and nice person that you are, you help your neighbor determine the saturation point of lemonade. Using experimentation, determine the maximum amount of lemonade mix required in 100 mL glass of water at specific temperatures. Construct a solubility curve for Lemonade and compare it to the other curves in Table G.

# How does the body break down Vitamin A as compared to Vitamin C?

**1.**

**2.**

**3.**

**4.**

Vitamin A and Vitamin C are two important components for a healthy diet. Vitamin A is important for healthy skin and eyes, and prevents many different diseases from forming inside the body. Vitamin C is necessary for growth and repair of tissue that is damaged from wounds or torn ligaments. These two vitamins are broken down by the body in different ways. In terms of polarity and through experimentation, explain why Vitamin C is water-soluble and Vitamin A is fat-soluble.

# What body of water is best for burying treasure in?

**1.**

**2.**

**3.**

**4.**

You are a pirate looking to bury your chest of gold under water. Because you took chemistry, you know that the cloudier the water, the more difficult it will be for deep sea divers to find your chest of gold. In terms of particles, explain why it is more difficult to shine a light through cloudy water. Through experimentation, determine the relationship between concentration of a solution and the absorbance of light.

# How can you remove permanent ink from a white board?

**1.**

**2.**

**3.**

**4.**

Your non-chemistry student friend accidently writes on the white board with permanent marker. Realizing her mistake, she quickly wets a tissue with water to wipe it off, but to no avail, it does not come off. Being the brilliant chemistry students that you are, help your friend come up with a solution to this problem. In terms of polarity, why won’t water mix with the ink of the permanent marker? Through experimentation, determine what substances could remove the permanent ink from the white board.

# Why does soap make things clean?

**1.**

**2.**

**3.**

**4.**

Your non-chemistry student friend tries to wash a pan coated in chicken grease without soap. Big mistake! Being the smart chemistry students you are, you suggest using soap and water to wash the grease, and gee-golly-gosh, it works! Why doesn’t water mix with the grease? Why does the soap mix with the grease AND also the water? Think about polarity of molecules for all substances involved in your experiment and discussion.

# How do factories affect fish in the Genesee River? (p. 441)

**1.**

**2.**

**3.**

**4.**

The cooling system of a factory in downtown Rochester uses water from the river to run its turbines. This water that the factory uses releases the water back into the Genesee River at a higher temperature than the rest of the river water. This has negatively affected the fish population in the Genesee River with regard to the concentration of oxygen in the water. Explain why these factories are negatively impacting the fish population by comparing temperature with the solubility of gases in water.

Solutions: Group 1 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# What is the Saturation Point of Lemonade at a given temperature?

**1.**

**2.**

**3.**

**4.**

Your young neighbor has decided to have a lemonade stand to earn money for ice cream. Your neighbor thinks that dissolving as much lemonade mix as possible into water will make the best lemonade, but they do not want to pour too much and waste the mix. Being the expert chemistry student and nice person that you are, you help your neighbor determine the saturation point of lemonade. Using experimentation, determine the maximum amount of lemonade mix required in 100 mL glass of water at specific temperatures. Construct a solubility curve for Lemonade and compare it to the other curves in Table G.

## Project Guidelines:

* Experiment: In 100 mL of distilled water, measure the maximum amount of Lemonade mix that can be dissolved, 1 gram of mix at a time. Record the temperature of the mix. Do at least three trials to verify data.
  + Conduct this experiment in at least two other temperatures and compare amounts of Lemonade mix required for saturation at different temperatures. Think about the best way to keep the temperature constant at different temperatures.
* In alignment with all rubric components, be sure to: Explain how saturated, unsaturated, and supersaturated solutions relate to your experiment. Explain the dissolving process in terms of intermolecular forces. Explain the relationship between temperature and solution concentration.

Solutions: Group 2 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# How does the body break down Vitamin A as compared to Vitamin C?

**1.**

**2.**

**3.**

**4.**

Vitamin A and Vitamin C are two important components for a healthy diet. Vitamin A is important for healthy skin and eyes, and prevents many different diseases from forming inside the body. Vitamin C is necessary for growth and repair of tissue that is damaged from wounds or torn ligaments. These two vitamins are broken down by the body in different ways. In terms of polarity and through experimentation, explain why Vitamin C is water-soluble and Vitamin A is fat-soluble.

## Project Guidelines:

* Experiment: Determine what solvents are best suited for dissolving vitamin A and vitamin C. Try at least 3 different solvents, all with the same volume. Do more than one trial to verify results.
  + Try dissolving the vitamins as a whole and crushed.
* In alignment with all rubric components, be sure to: Explain the dissolving process in terms of intermolecular forces. Describe the polarity of Vitamin A and Vitamin C and why these vitamins dissolved in the solvents that they did. Determine the relationship between particle size and solubility of the vitamins.

Solutions: Group 3 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# What body of water is best for burying treasure in?

**1.**

**2.**

**3.**

**4.**

You are a pirate looking to bury your chest of gold under water. Because you took chemistry, you know that the cloudier the water, the more difficult it will be for deep sea divers to find your chest of gold. In terms of particles, explain why it is more difficult to shine a light through cloudy water. Through experimentation, determine the relationship between concentration of a solution and the absorbance of light.

## Project Guidelines:

* Experiment: Using copper (II) sulfate, make a 1 M stock solution in 40 mL of distilled water. Use this stock solution to make at least 4 different solutions of varying concentrations. Using the spectrophotometer, measure the % transmittance for each solution. The percent transmittance is a measure of the amount of light that can pass through a solution. Make a graph of concentration vs % transmittance.
* In alignment with all rubric components, be sure to: Explain how saturated, unsaturated, and supersaturated solutions relate to your experiment. Explain the dissolving process in terms of intermolecular forces. Explain and diagram the relationship between solution concentration and the absorbance of light in terms of particles.

Solutions: Group 4 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# How can you remove permanent ink from a white board?

**1.**

**2.**

**3.**

**4.**

Your non-chemistry student friend accidently writes on the white board with permanent marker. Realizing her mistake, she quickly wets a tissue with water to wipe it off, but to no avail, it does not come off. Being the brilliant chemistry students that you are, help your friend come up with a solution to this problem. In terms of polarity, why won’t water mix with the ink of the permanent marker? Through experimentation, determine what substances could remove the permanent ink from the white board.

## Project Guidelines:

* Experiment: Draw a few small line on a transparency sheet with permanent marker. Test at least three different solvents to try and remove the permanent ink. Does the brand of the ink affect your results? Repeating the original experiment, test at least one other brand of permanent ink.
* In alignment with all rubric components, be sure to: Describe the polarity of all substances used, including the permanent marker. Explain why some substances were able to “dissolve” the permanent ink and why others weren’t. Draw a particle diagram to represent all substances that you tried to mix with the permanent ink. You will likely need the Internet to help you see the structure of the molecules.

Solutions: Group 5 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# Why does soap make things clean?

**1.**

**2.**

**3.**

**4.**

Your non-chemistry student friend tries to wash a pan coated in chicken grease without soap. Big mistake! Being the smart chemistry students you are, you suggest using soap and water to wash the grease, and gee-golly-gosh, it works! Why doesn’t water mix with the grease? Why does the soap mix with the grease AND also the water? Think about polarity of molecules for all substances involved in your experiment and discussion.

## Project Guidelines:

* Experiment: Create a mixture of soap and water, a mixture of soap and oil, and a mixture of oil and water. Record your observations and the amount of each substance you used. Take pictures and draw particle diagrams of each mixture.
* In conjunction to all rubric components, be sure to: Explain the dissolving process in terms of intermolecular forces. Explain your observations. Are these mixtures homogeneous or heterogeneous and explain in terms of polarity of the substances. Do some research to find out what makes soap molecules so special and useful in cleaning.

Solutions: Group 6 Guidelines

THIS EXPERIMENT WILL BE CONDUCTED AND PRESENTED BY YOUR GROUP TO APPLY AND ASSESS YOUR UNDERSTANDING OF THE SOLUTIONS UNIT. THIS WILL BE **WORTH A TEST GRADE**.

DECIDE WHICH GROUP MEMBERS WILL TAKE WHICH ROLE AND AGREE TO THE RESPONSIBILITIES OF THAT ROLE WITH YOUR INITALS. ALL ROLES NEED TO BE FILLED, EVEN IF SOMEONE TAKES ON MORE THAN ONE ROLE.

|  |  |
| --- | --- |
| **Initials** | **Roles and Responsibilities** |
|  | **Group Leader**: Responsible for making sure that all group members have equal parts in the project and all contribute equally. Takes initiative for the completion of the experiment and presentation, as outlined in the rubric, and keeping group on task. |
|  | **Group Scribe**: Responsible for documenting all lab data and results in writing and through pictures. Writes/types out components necessary for the presentation display, as outlined in the rubric. |
|  | **Group Reporter**: Responsible for communicating with the teacher and other groups as necessary. The Reporter is the one who will represent the group and ask questions of the teacher. |
|  | **Group Lab Technician**: Responsible for the set up and cleanup of experiments. This does not mean that you are the only one who cleans up, but makes sure that all members do their part. |

# How do factories affect fish in the Genesee River? (p. 441)

**1.**

**2.**

**3.**

**4.**

The cooling system of a factory in downtown Rochester uses water from the river to run its turbines. This water that the factory uses releases the water back into the Genesee River at a higher temperature than the rest of the river water. This has negatively affected the fish population in the Genesee River with regard to the concentration of oxygen in the water. Explain why these factories are negatively impacting the fish population by comparing temperature with the solubility of gases in water.

## Project Guidelines:

* Experiment: Test the amount of dissolved oxygen in water at different temperatures using a handheld probe. Graph your results to see the effects of temperature on the solubility of oxygen. You can even go above and beyond to compare your results to the water in the Genesee River by getting samples from the river. You should do some research to determine what the ideal amount of oxygen is for fish to live. Is the Genesee River a sufficient environment for fish to live in?
* In conjunction to all rubric components, be sure to: Explain how saturated, unsaturated, and supersaturated solutions relate to your experiment. Explain the dissolving process in terms of intermolecular forces. Explain the relationship between temperature and solution concentration.