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The Creation and Implementation of a Free Day Camp for Children

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Day One Lesson Plan

Grade Level: 1-5

Title: Day One: Kalamazoo River Oil Spill/Hydrophobic materials

Goals: Students will learn the events that led to the Kalamazoo River Oil Spill, how it impacted the environment, and how it was cleaned up.
Students will be able to better understand the process of cleaning up oil spills, specifically in the case of the Kalamazoo River oil spill.
Students will be able to distinguish the difference between hydrophobic and hydrophilic materials.

Objectives:
Students will compare the oil spill in Kalamazoo with others in the U.S. for a broader understanding of the environmental impact oils spills have.
Students will identify objects that are hydrophilic.
Students will identify objects that are hydrophobic.
Students will experiment with different materials and water, observing how each material reacts with the water, and communicating their observations to their classmates.
Students will recap their activities and share something they learned with the class.

GLCE:
Science: E.ES.03.52 Describe helpful or harmful effects of humans on the environment (garbage, habitat destruction, land management, renewable, and non-renewable resources).
Science: E.ES.07.42 Describe the origins of pollution in the atmosphere, geosphere, and hydrosphere, (car exhaust, industrial emissions, acid rain, and natural sources), and how pollution impacts habitats, climatic change, threatens or endangers species.
Science: S.IA.00.13 Communicate and present findings of observations.
History: 2 – H2.0.5 Identify a problem in a community's past and describe how it was resolved.
History: 2 – G5.0.2 Describe positive and negative consequences of changing the physical environment of the local community.

Materials:

- Waterproof sand (i.e. Magic Sand)
- Dish soap
- Vegetable Oil
- Clear Plastic Cups
- Plain Sand
- Spoons
- Plastic Water Bottles
- Pictures of Oil Spill in Kalamazoo and other spills (to compare)

- Ziploc Bags
- Permanent Marker
- Paper Towels

Safety:

1. Remind students that materials are not to be used as weapons.
2. The materials used in the experiments are to be handled with care.

Anticipatory Set:

1. Students will be asked to share any knowledge they have about the Kalamazoo Oil Spill.
2. The teacher will then give an overview of what caused the spill, when it happened, and how long it took to clean up.
3. The students will be shown the pictures of the Kalamazoo Oil Spill and of other spills in the nation, including pictures of animals and workers cleaning up the spill.
4. Students will then discuss, as a class, what kind of impact an oil spill has on the environment.
5. Students will then be asked what methods could be used to clean up oil spills.
6. The teacher will then add any other ways that the students missed.
7. The teacher will then introduce the terms hydrophilic and hydrophobic.
8. Once, the students are given the definitions of the terms they are asked to share examples of what they think hydrophilic materials are and what hydrophobic materials are.
9. The teacher will then explain how the students will be experimenting with the two different kinds of materials.

Procedure:

1. The students will work in pairs for the first part of the experiment.
2. Each pair will receive a water bottle that is half filled with water.
3. The teacher, and her helpers, will then go around to each pair and fill a quarter of the water bottle with vegetable oil and closing the bottle tightly.
4. The students will then take turns shaking the bottle as hard as they can and discuss how the oil looks to have mixed with the water.
5. The students will then be instructed to leave the bottle alone while the class moves onto the next experiment.
6. Each student will then be given a plastic cup filled halfway with play sand, and two cups filled halfway with Magic Sand.
7. The helpers will then assist the teacher in handing out two spoons to each student, and filling each cup with water.
8. The students will then be instructed to take a spoon and stir the cup with the play sand.
9. The teacher will then ask the students to share their observations with the class.
    a. “Is the sand mixing with the water?”
    b. “Is the sand wet?”
    c. “Do you think the play sand is hydrophobic or hydrophilic? Why?”

10. The students will then be asked to move that cup aside, take one of the cups with Magic Sand, and stir it around.
11. The teacher will then ask the students to observe the sand's reaction with the water, asking them the same questions as above.
12. The teacher will then explain why this sand is hydrophobic and the play sand was not. The teacher will also explain that the coating that is put on the sand is similar to what is put on jackets that are "waterproof" and acts like oil does with sand.
13. The teacher will then walk around the room with dish soap and explain how dish soap is used to help clean animals that are covered in oil. The teacher will also ask the students if they think dish soap is hydrophobic or hydrophilic.
14. The students will then be asked what they think will happen to their Magic Sand when dish soap is added to the water, now that they know what dish soap can do to oil.
15. The teacher will add dish soap to their cup and the students will stir watching the dish soap react to the Magic Sand, turning it back to regular sand.
16. The students will then be asked to put aside the ruined Magic Sand and pick up the last cup of Magic Sand and stir it around.
17. The teacher will then instruct the students to return to the water bottle that they mixed up earlier, and observe what they see. "Is the water and the oil still mixed?" "Do you think the water is heavier than the oil or visa versa?"

Closure Activity:

1. Once the students are done with their experiments the students will recap which materials were hydrophobic and which were hydrophilic.
2. The teacher will then explain how Magic Sand is used to clean up oil spills and its uses in the artic and other cold places.
    a. Teacher: "Is there anything else that you can think of that Magic Sand could be used for?"

Assessment:

1. The students will be asked to tell the class what they learned today about the Kalamazoo Oil Spill and the difference between hydrophobic and hydrophilic materials.

Clean Up:

1. The students are told to clean up any water or sand that has spilled during the experiments.
2. The students will be told to throw away the cups with regular sand, ruined Magic Sand, and the bottles with the oil and water mixture.
3. Students will then take the cups with the Magic Sand in them to the front of the classroom where they will have the water dumped out and the sand put into a bag for them to take home.

Day Two Lesson Plan

Grade Level: 1-5

Title: Day Two: Gibson Guitars in Kalamazoo/How guitars are made and work

Goals: Students will be able to understand the impact that Gibson Guitars had on the history of Kalamazoo, and feel pride in their city.
Students will develop a basic understanding of the history of Gibson Guitars and the process they used to build guitars.
Students will be able to understand how a guitar makes sound.

Objectives:
Students will identify famous guitar players who played Gibson Guitars.
Students will discuss their own experiences with instruments.
Students will create their own guitars from Kleenex boxes and rubber bands.
Students will experiment with their own guitars to make different sounds.
Students will share with the class observations they made while moving the rubber bands to different positions.

GLCE:
History: 2 – H2.0.3 Use an example to describe the role of the individual in creating history.
Science: S.IA.00.13 Communicate and present findings of observations.
Science: P.EN.03.31 Relate sounds to their sources of vibrations (for example: a musical note produced by a vibrating guitar string, the sounds of a drum made by the vibrating drum head).

Materials:

- Rulers
- Empty Kleenex boxes
- Rubber bands
- Tape
- Washable markers

Safety:

1. Remind students that art materials are not used as weapons.
2. The art materials are to be handled with care and the markers are to only be used on the art project, not on the tables or others.

Anticipatory Set:

1. Students will be asked is they have ever played an instrument, or currently do.

2. Students will discuss their experiences with playing an instrument or watching someone else play one.
3. Students will be asked if they have ever heard of Gibson Guitars.
4. Students will be asked what Elvis Presley, Jimi Hendrix, and Paul McCartney have in common.
5. The teacher will explain that all three of these men, as well as many more, played on Gibson Guitars, and all three had ones specifically made for them. The teacher will also explain that Gibson Guitars was started in Kalamazoo.
6. Students will be asked if they know any history about the factory or Mr. Gibson, and to share that knowledge with the class.
7. The teacher will then give a brief overview of how the Gibson factory started, where it was located, how important it was to Kalamazoo, and when it moved to Tennessee.
8. The teacher will then answer any questions that the students have.
9. The teacher will then ask the students if they know how the guitar makes the sounds that it does.
10. The students will discuss how they think the guitars are able to make sound and the teacher will guide them with questions like:
    a. "What role do you think the strings play?"
    b. "Why do some guitars have hollow spaces under the strings and some do not?
    c. "Do you think the shape and size of the hollow spaces in some of the guitars makes a difference to the sound?
11. The students will then be instructed that they will be able to make their own guitars and experiment with the different sounds that they can make with the strings.

Procedure:

1. The students will each receive an empty Kleenex box, and a ruler.
2. The students at each table will share a variety of rubber bands and washable markers (used to decorate the guitar).
3. The teacher and the helpers will come around to each student and help the student securely tape the ruler onto the back of the tissue box.
4. The students will the be given time to decorate their guitars before putting on the rubber bands.
5. After the guitars are decorated, the students will be instructed to place the rubber bands on the Kleenex boxes.
6. Once all the students have rubber bands on their guitars the students will be asked to play their guitars and listen to the sounds, then experiment with more rubber bands, or placing the rubber bands on different parts of the guitar.
7. Once the students have had time to try a few different options, they will be asked to put their guitars on the table and not touch them for a few minutes.

Closure Activity:

1. The teacher will then ask the students to answer some questions about the guitar experiment:
    a. "Were you able to make your guitar make different sounds?"

b. “Do you think it matters where the rubber bands are placed for which sound you want the guitar to make? Why?”
c. “Imagine you had to make a real guitar, do you think that you would be able to make one? What kind would you make? Electric or Acoustic?”

Assessment:

1. Each student will be asked to tell the class what they learned today about Gibson Guitars in Kalamazoo and how guitars work.

Clean Up:

1. Students will be instructed to put markers back into the boxes, and put any left over rubber bands in a pile on the table.
2. The students are able to take home their guitars.

Day Three Lesson Plan

Grade Level: 1-5

Title: Day Three: Kalamazoo's history as the "Paper City"/Making Recycled Paper

Goals: Students will be able to describe the reasons Kalamazoo was called the "Paper City" and the impact papermaking had on the city.
Students will be able to feel pride in their city's past and present with regard to papermaking.
Students will be able to understand the process of making paper and recycled paper.

Objectives:
Students will describe the effect the paper industry had on Kalamazoo.
Students will describe the process of how paper and recycled paper is made.
Students will compare & contrast paper and recycled paper and share these observations with the class.
Students will create their own recycled paper.
Students will reflect upon what they have learned and share these thoughts with the class.

GLCE:
Science: E.ES.03.43 Describe ways humans are protecting, extending, and restoring resources (recycle, reuse, reduce, renewal).
Science: E.ES.03.44 Recognize that paper, metal, glass, and some plastics can be recycled.
Science: S.IA.00.13 Communicate and present findings of observations.
History: 2 – H2.0.4 Describe changes in the local community over time (e.g., types of businesses, architecture and landscape, jobs, transportation, population).

Materials:

- Sifting Screens
- Scrap paper
- Blender
- Felt
- Sponges
- Buckets/bins
- Washable Markers
- Tarps
- Corn Starch
- Paper towels
- Clorox wipes

Safety:

1. Remind students that materials are not used as weapons.

2. The materials are to be handled with care and the paper pulp is to stay above the tarps.

Anticipatory Set:

1. Students will be asked if they have ever made their own paper or learned how paper is made.
    a. If they have, those students will be asked to share what they have learned about the process with the other students.
2. The teacher will explain the history of the paper industry in Kalamazoo, its ideal location for the industry, and its effect on the city.
3. Students will be asked if they have ever learned about the paper industry in Kalamazoo.
4. The teacher will explain that the paper mills are no longer used and that the machines were donated to Western Michigan University so that the college could teach students from all over the world how to make paper.
    a. Fun Fact for students: WMU is the only university in the world that has the ability to turn pulp into finished paper!
5. Students will then be asked if they have ever used recycled paper before and to share with the class any differences they noticed between the recycled paper and regular paper.
6. The teacher will then ask if the students have any questions about the paper making process, and will inform the students that they will be making their own recycled paper.

Procedure:

1. The students will each get to make their own sheet of recycled paper.
2. The students will be asked in small groups (4-5 students) to come to the tarp to make the paper
    a. The other students will be given both white computer paper and recycled construction paper and asked to draw on both, observing the way the markers write on each piece.
3. They will then be given a sifting screen to hold over the bin, while the teacher puts some of the scrap paper, which was soaked over night in water, in a blender to turn the paper to pulp.
4. The teacher will then pour some of the pulp into the sifting screen.
5. The student will then take the sponge and push down on the pulp, squeezing as much water as possible out and creating a flat piece of paper.
6. The helpers will then assist the student in transferring the recycled paper onto a piece of felt.
7. The student will then put their name on the felt and place it a designated table, where it will stay until the next day.
8. The student will then return to their seat and start the other activity previously mentioned, while another student will take their turn making the recycled paper.
9. When everyone has had a chance to make the paper, the teacher will ask the students to stop drawing and will direct the students into a discussion about the experiments.

Closure Activity:

1. The teacher will ask the students a few questions about the experiments.
    a. “What did you think about the process of making recycled paper? Do you think it is difficult?”
    b. “What do you think is different between how we made recycled paper and how it is made in a factory?”
    c. “What did you notice was different between the recycled paper you drew on and the white computer paper? Did the markers draw on them the same?”
2. The teacher will also ask the students to think about what Kalamazoo would have been like if the paper industry was never around.
    a. “Do you think another industry would have come to Kalamazoo?”

Assessment:

1. Each student will then be asked to tell the class something that they learned today about the paper industry in Kalamazoo and the process of making recycled paper.

Clean Up:

1. Students will be instructed to put the markers back in the boxes and pile up the paper that was not used on the tables.
2. The students will be able to take their drawings home.

Day Four Lesson Plan

Grade Level: 1-5

Title: Day Four: Kalamazoo as the "Celery Capital USA"/Celery Experiment

Goals: Students will be able to understand the importance of the celery industry in the creation of Kalamazoo.
Students will be able to understand how plants absorb water and send it to all parts of the plant through osmosis.

Objectives:
Students will describe the importance of celery on the creation of Kalamazoo.
Students will describe how plants absorb water and spread it to all parts of the plant.
Students will describe how celery is grown.
Students will describe the process of osmosis.
Students will run an experiment with celery.

GLCE:
Science: S.IA.00.13 Communicate and present findings of observations.
Science: L.OL.02.14 Identify the needs of plants.
Science: L.OL.07.63 Describe evidence that plants make, use and store food.
History: 2 – H2.0.1 Demonstrate chronological thinking by distinguishing among years and decades using a timeline of local community events.
History: 2 – H2.0.4 Describe changes in the local community over time (e.g., types of businesses, architecture and landscape, jobs, transportation, population).

Materials:

- Cups
- Celery
- Food Coloring
- Spoons
- Washable markers
- Clorox wipes
- Paper towel

Safety:

1. The materials for the experiment are to be handled with care and the food coloring is to be used only by the teacher and the helpers.
2. The colored water is to stay in the cups on the tables.

Anticipatory Set:

1. Students will be asked if they have ever tried celery.
    a. If the students answer yes, ask them to share with the class what celery looks like and what it tastes like.
2. The teacher will then pass around a stalk of celery to each student, and will ask them what they notice about the stalk.
    a. Teacher: “are there many leaves on it?” “Look at the bottom, what does it look like?” “How do you think the celery absorbs water and how does it get everywhere in the plant?”
3. The students will then be asked if they have hear of the process of osmosis
    a. If so, the students who said yes will try to explain the process.
4. The teacher will then further explain the process of osmosis.
5. The teacher will then answer any questions that the students might have.
6. The teacher will then ask if any students know how celery is grown.
    a. Once again, if any students know, they will share with the class.
7. The teacher will then explain in more detail how celery is grown in celery flats, and what celery flats are.
8. The teacher will then explain how important celery was to the creation of Kalamazoo and how the decline of the celery industry was during the rise of the paper industry, referencing what the students learned the day before.
9. The students will then be able to ask any questions.
10. The teacher will then inform the students that they will be conducting an experiment that will show how the water moves throughout the stalk.

Procedure:

1. The students will each receive a large, clear plastic cup filled three-fourths of the way with water.
2. The teacher will come around with blue and red food coloring to put into the water and the students will stir the water.
3. The students will then be instructed to place their celery stalks that they received earlier into the cup with the leaves on top.
4. The students will then be instructed to put the cup to the side for a little.
5. The students will then be able to pick up their recycled paper from the previous day, observing and sharing with the class those observations.
6. The students will then be able to draw on their paper while snacking on some celery.
7. After the students have had a chance to eat their celery and draw on their paper, the students will return to their celery experiment.
8. The students will be instructed to carefully lift up the celery stalk and take a look at the bottom of the stalk.
9. The teacher will then ask the students to share what they see.
10. The students will then place the celery back in their cups and walk the cup to the designated table where it will sit overnight.

Closure Activity:

1. Once the cups are all put away the students will be asked a few questions by the teacher about the experiment.
    a. "What do you think will happen to the celery overnight?"
    b. "If we cut open the celery stalk tomorrow what do you think we will see?"

Assessment:

1. The students will be asked to tell the class what they learned today about the importance of celery in the creation of Kalamazoo or about the process of osmosis.

Clean Up:

1. Students will be instructed to return the markers to their boxes.
2. The students are told to clean up any spilled water with paper towel and Clorox wipes.
3. The students are able to take home their recycled paper.

Day Five Lesson Plan

Grade Level: 1-5

Title: Day Five: The Process of Making Homemade Ice Cream/Ice Cream Socials in Kalamazoo's past

Goals: Students will be able to understand the process of making homemade ice cream. Students will be able to understand the place ice cream held in the social life of Kalamazoo citizens before freezers were common.

Objectives:
Students will identify the ingredients needed to make ice cream.
Students will observe and analyze the chemical reaction between salt and ice.
Students will describe the place ice cream socials held in the social life of Kalamazoo history.
Students will compare & contrast the process of making ice cream by hand, in the past, and by machines, used today.
Students will make their own homemade ice cream.
Students will discuss with the class their observations made while making the ice cream in regards to the ice and salt reaction.

GLCE:
Science: S.IA.00.13 Communicate and present findings of observations.
History: 2 – H2.0.4 Describe changes in the local community over time (e.g., types of businesses, architecture and landscape, jobs, transportation, population).

Materials:

- Sugar
- Half & half
- Vanilla Extract
- Ice
- Rock Salt
- Ziploc Bags (small and large)
- Cups
- Spoons
- Tarps
- Bins
- Measuring spoons
- Measuring cup
- Paper towels
- Clorox wipes
- Construction paper

- Washable markers

Safety:

1. Remind students that materials are not used as weapons.
2. The materials used in the activities are to be handled with care and used only for the purpose that they are designated for.

Anticipatory Set:

1. Students will be asked to pick up their celery from the day before.
2. The teacher will come around to each student and cut the celery so the students are able to see a cross section of the celery.
3. Students will be asked to share with the class their observations.
    a. Teacher: "Is this what you predicted would happen?"
4. Students will be asked if they have ever made homemade ice cream
    a. If they have, they will be asked to share how they made it with the class.
5. Students will then be asked if they have ever been to an ice cream social.
    a. Those who have are asked to share what an ice cream social is.
6. The teacher will then ask students to brainstorm what they would need to make ice cream.
    a. "Would you need ice?" "How about a freezer?"
7. The teacher will then inform students that before there was electricity to every house in Kalamazoo, people had to make their ice cream each time they wanted some because there was no way to keep ice cream frozen.
8. The teacher will then proceed to explain to students the process by which people used to make ice cream.
9. The teacher will then ask if they think that making ice cream back then would be hard work.
10. The teacher will then inform the students that people in the neighborhood would gather together to make ice cream so they could share the work and all enjoy the benefits of ice cream, and while the ice cream was being created, everyone could socialize.
11. The students will then be able to ask any questions that they may have about ice cream socials.
12. After discussing the ice cream socials the students will be told that they will be able to make their own ice cream, in a similar process of how those in the past made theirs.

Procedure:

1. The students will be asked to form a single file line in the front of the classroom where they will receive from the teacher and the helpers their supplies..
2. Each student will be given a small Ziploc bag with the right amount of sugar, half and half and vanilla.
3. The student will then put the closed bag into a larger Ziploc bag that is filled halfway with ice and rock salt.

4. The students will then be instructed to go back to their seat with their bag and shake their bag as much as possible to mix the cream and make it cold.
5. While the students are shaking the bags the teacher will ask the students to observe what they are noticing and share it with the class.
   Q: What is happening to the ice when the salt is mixed with it? Does it melt faster? Does it make the ice colder?
   Q: Can you feel the cream in the small bag? What seems to be happening to the cream?

Closure Activity:

1. Once the students have managed to turn the cream into ice cream the students will be able to enjoy it.
2. While eating their ice cream, the students will be asked some questions about the experiment and to share their thoughts with the class.
   a. "Was the process of making the ice cream difficult?"
   b. "Now that you know how much hard work it takes to make homemade ice cream, would you have made ice cream very often in the past?"
   c. "Would you want to attend the ice cream socials in the neighborhood so you could take turns making the ice cream with your neighbors?"

Assessment:

1. Each student will be asked to tell the class what they learned today about how ice cream is made, the reaction ice and salt have when mixed, or what role ice cream socials played in the social lives of those living in Kalamazoo when freezers were not around.

Clean Up:

1. Students will be instructed to wipe down their tables with paper towels and Clorox wipes.
2. The students will need to make sure all the cups, spoons, and bags are in the trash.
3. The students will also need to make sure that all parts of the celery experiment are cleaned up and put in the trash.
4. The students are told to finish all the ice cream before leaving the room.