

2013

UI-Micron STEM Education Research

INTRODUCING STEM EXPERIENCES TO HEAD START CHILDREN IN JEROME COUNTY

Ana Isabel Alcocer Arreguin
Jacqueline (Jackie) Maximillian

Acknowledgments:
Irina Kappler-Crookston, M.A.
Debbie Storrs
Susan Stauffer

University
of Idaho

ENGLISH VERSION

LESSON 1

WHO HAS BIGGER FEET AND TALLER BODY?

Procedure:

1. Tell the children that they are going to determine who has bigger/longer feet and body, and how big/long are the feet and the body.
2. Ask the children to tell you how they can determine the size of the foot and the height of the body. {Some of the children may already know how traditional measuring tools while others may not}
3. Have each child trace one foot on cardboard, using a non-toxic marker. Let the children do the tracing. Make sure all the children trace the same foot, either right or left.
4. Help the children cut out the shapes of their feet with scissors.
5. Ask the children to compare their cut-out feet with that of other children, and tell you which one is bigger. The children can also identify other dimensions of the paper feet, such as width and compare their feet.
6. Identify certain items in the classroom and have the children measure them. Determine how many feet each item has, and which item has more feet. The children will notice that each child has slightly different measurements. Brainstorm with the children on how to solve this problem.
7. Have a pair of children draw an outline of their bodies on large sheet of butcher paper.
8. Help the children cut-out their cardboard bodies.
9. Have the children use their traced/cut-out feet to measure their “traced bodies.” Help the children mark the feet on the “traced bodies.”
10. Have the children tell you how many feet each “traced body” measures.
11. Record all the measurements on the “traced body.”
12. Have the children decide which body has more feet and thus is bigger or taller.

Materials required:

- Scissors
- Colored cardboard papers
- Non-toxic markers

Investigation:

Measuring the length and height of an object

Processing Skills:

Measuring, inferring, communicating

Questions to guide the children’s participation:

1. How can we tell who has a bigger/longer feet?
2. How can we tell who has a longer body?
3. Which foot do you think is bigger?
4. Why do you think each child is getting different numbers of feet on the same items?
5. How can we make sure we arrive at the same measurement?
6. How many feet is the longer body?

Teaching tips:

Some children may know how to measure objects using traditional measuring tools and units. Depending on the children’s level, you can measure the actual size of the feet and body using a ruler or tape measure. Let the children who understand the measurements work with other children or pair them together.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, communicating, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 2

HOW BIG IS OUR CLASSROOM AND DOORS?

Procedure:

1. Have each child take their calibrated “traced/cardboard bodies” made in Lesson Plan 1.
2. Ask the children how we can measure the size of the classroom and the classroom door.
3. Have the children measure the classroom by laying the traced body on the classroom floor and marking each measurement with a chalk or tape.
4. Have each child say how many “bodies” the classroom is. Help them count.
5. Have children measure the classroom doors using the cardboard bodies.
6. Help the children figure out how many feet are in the classroom and doors since their traced bodies are already calibrated in “feet.”
7. Have the children discuss how they can arrive at the same measurement of the classroom and the door.

Materials required:

Children traced bodies
Chalk or tape
Recording paper

Investigation:
Measuring length and height

Processing Skills:
Measuring, inferring, communicating

Questions to guide the children’s participation:

1. How are you going to measure the size of the classroom or door?
2. Why do you think each person is getting different number of bodies in the same classroom?
3. How big is the classroom? How big is the door?
4. Can you figure out the size of this classroom using your feet?
5. It looks like there are different measurements for the classroom, what should we do to have the same measurement?

Teaching tips:

If the children understand measurement units, they can convert their measurements into actual units.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON

3

SIZE LINE-UP

Procedure:

1. Cut the straws into four to five different sizes. Make sure some of the straws are similar sizes but different colors.
2. Set out the straws on a table and ask the children to identify the similarities and differences among the straws.
3. Have the children take turns placing the straws in order according to their length.
4. Have the child find the largest piece of straw first and place it at the bottom.
5. Have the children find the next largest straw and place it on top of the largest piece.
6. Continue until the straws are stacked up or laid down in order by size.
7. Ask the children to tell you different ways they could classify the straws apart from their length.
8. Ask the children to sort the straws by size and color.

Materials required:

Straws of different colors and sizes

Investigation:

Classifying objects according to size and color

Processing Skills:

Observing, comparing, classifying

Questions to guide the children's participation:

1. What is the different or similar about the straws?
2. What do you think is the longest straw?
3. Which one is longer the blue or the red straw?
4. Which straw follows after the longest one?
5. Which straw is the shortest, the green one or the red one?
6. In what ways can we classify the straws?

Teaching tips:

The children may mention color, size, and pattern. Let the children that mention all the difference help in this activity.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of comparing and classifying straw by size and color?

- 25
- 50
- 75
- 100

Comments

LESSON 4

IS IT WARM OR COLD? WHICH ONE IS THE COLDEST OR WARM-

Procedure:

1. Put water of various temperatures into the three to five different bowls.
2. Give each child the sun and snowflake stickers.
3. Tell the children that they are going to determine how warm or cold the water was.
4. Ask the children to predict which bowl has warm or cold water.
5. Dip the cotton balls into the bowls and squeeze out the excess water.
6. Give the wet balls to the children and let them rub the balls over their skin.
7. Tell the children to decide which bowls have the coldest and the warmest water. Or ask them to put the stickers on the outside of the bowls; sun stickers for the warmest water and snowflakes for the coldest water.
8. Ask the children to tell if it is easy or difficult to tell the temperature of the water by the look of it.
9. Explain to the children that to be sure that we know how hot or cold the water is we use an instrument known as a thermometer. Pass the thermometer to the children and let them ask questions.
10. Ask the children if they have seen a thermometer before, other than in a doctor's office.
11. Dip the thermometer alternatively in each bowl, and record the temperature.
12. Explain the numerals to the children and tell them that the lower numerals mean colder temperatures.

Materials required:

Three to five bright colored bowls, cotton balls, water with varied temperatures [very cold, mildly cold, warm and very warm], digital thermometer, sun and snowflake stickers, and a scoring board

Investigation:

Discovering and measuring temperatures of liquids

Processing Skills:

Discovering, measuring, communicating

Questions to guide the children's participation:

1. How does the water feel, cold or warm?
2. Which bowl is the coldest? Which one is warmer?
3. Can we tell how cold or warm the water is by just looking at it?
4. What other cold things do you know?
5. What other warm things do you know?

Teaching tips:

Most likely children have seen a thermometer at the doctor's office but they might not be aware of other uses apart from taking body temperatures.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, detecting, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 5

TEMPERATURE OF DIFFERENT SURFACES

Procedure:

1. Give each child a number of sun and snowflake stickers.
2. Ask the children to go around the class and touch various surfaces [wooden tables, walls, glass windows, computers, metal objects] with the back of their hand.
3. Tell the children to feel which surfaces are colder and which ones are warmer and put the sun stickers on the warmer surfaces and the snowflake stickers on the cooler/ colder surfaces.
4. Go around the classroom and record all the objects identified by the children as warm and those identified as cold.
5. Ask the children to see if there are any similarities between cold and warm objects.
6. Tell the children that “metal feels colder than wood since metals carries away heat quickly.”
7. Ask the children to arrange the objects from the coldest to the warmest.

Materials required:

Various objects in the classroom with varied temperatures, sun and snowflake stickers

Investigation:

Comparing temperature of various objects in the classroom

Processing Skills:

Observing, comparing, classifying

Questions to guide the children’s participation:

1. What objects in this class are warm?
2. Which items in the class are cold?
3. What object is the coldest?
4. What object is the warmest?

Teaching tips:

Depending on how children respond to the activity, you could also mention that our bodies have different “inside” (internal), such the inside stomach and “outside” (external) temperatures. For example, our fingers may be cold, but our tummies stay warm.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of observing, comparing, classifying objects according to temperature?

- 25
- 50
- 75
- 100

Comments

LESSON 6

MEASURING MARSHMALLOW AND JELLY BEANSEST?

Procedure:

1. Ask the children whether a jelly bean or a marshmallow is heavier.
2. Place the marshmallows in one bowl and the jelly beans in another bowl of the same size.
3. Ask the children to predict which bowl is heavier. The bowl of marshmallows or the bowl of jelly beans.
4. Ask the children to place a small sticker on the lighter bowl and the larger sticker on the heavier bowl.
5. Place the bowls on the balance scale. Tell the children that the heavier bowl will be on the bottom and the lighter one high up.
6. Tell the children that the jelly beans are heavier because they are tightly packed (density).
7. Tell the children the importance of using a measuring instruments [a scale].
8. Ask the children to go around the classroom and identify two objects where one is heavier than the other.

Materials required:

Balance scales,
Jelly beans, marshmallows
Bowls
Stickers [small and large]

Investigation:

Predicting and measuring weights of different objects

Processing Skills:

Predicting, measuring, comparing, communicating

Questions to guide the children's participation:

1. Which bowl is heavier?
2. Is the marshmallow bowl heavier than the jelly bean bowl?
3. Is the jelly bean bowl heavier than the marshmallow bowl?
4. Is the larger object always the heavier one?
5. Is the small object always the lighter?

Teaching tips:

You could ask the children what other things they know that look bigger but weigh less, and those that weigh more but appear small.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of predicting, measuring, comparing, and communicating weight?

25
50
75
100

Comments

LESSON 7

VOLUME AND CAPACITY MEASUREMENTS

Procedure:

1. Take two measuring containers of the same capacity but different shapes, put them on the table and fill each container with water.
2. Ask the children to predict which container holds more water.
3. Pour water from the short container into a measuring jar and mark the water level.
4. Dump the water from the measuring jar into the sink.
5. Pour the water from the taller container into the measuring jar, and notice the water filling up to the marked level.
6. Ask the children to state again which of the two containers has more water.

Materials required:

Water, two transparent measuring containers of different shape and equal volume [short and tall], a measuring jar

Investigation:

Observing how different measuring jars hold the same capacity of water

Processing Skills:

Observing, measuring, communicating

Questions to guide the children's participation:

1. Which one contains more water, the tall one or the short one?
2. Do the same for bowls, pots, etc.

Teaching tips:

Whichever response the children give when you ask them which container holds more water, ask them why.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 8

LEAF IDENTIFICATION

Procedure:

1. Ask the children to tell you what is similar or different about the leaves. Encourage children to use magnifying glasses. Explain to children what the magnifying glass does.
2. Encourage the children to tell you specific attributes about the leaves (texture, apex, edge, etc.)
3. Have the children sort leaves according to their similarity and differences.
4. Brainstorm with the children on how to measure leaves.
5. Have the children measure the leaves and figure out the size the biggest leaf, and the size of the smallest leaf.
6. Ask children to identify their favorite leaf/leaves.
7. Ask them to explain why they like a particular leaf.

Materials required:

Magnifying glasses
Various leaves

Investigation:

Identifying shapes, color and size of leaves

Processing Skills:

Sorting, compare, contrast, classification and identification

Questions to guide the children's participation:

1. Which leaves do you think are similar?
2. What make these leaves similar?
3. What make these leaves different?
4. Which leaves belongs together?
5. Which leaf(s) is your favorite?
6. What do you like about this leaf(s)?
7. How can we tell how big the leaf is? How can we measure the leaf?

Teaching tips:

Use a ruler to measure the length of the leaves. You can also explain to the children why leaves have difference surface area, texture, etc.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 9

OUTSIDE ACTIVITIES - NATURE DETECTIVES

Procedure:

Leaf sorting

1. Give children 60 seconds to collect as many leaves as they can.
2. Ask the children to sort the leaves into as many different categories as they can -color, shape, size, etc.
3. “Challenge the children to discover as many ways that they can categorize the leaves. This is a good activity before children know how to identify many types of leaves as it teaches them to notice characteristics about leaves” (Susan C. McCarthy).

Identifying Leaves by Touch

1. Each child picks a leaf from the same type of tree. [This would be depended if there would be leaves off the trees in June otherwise, we will have to pick the leaves and lay them on the ground].
2. The children examine their leaves for bumps, nibbles, and other identifying marks. Encourage the children to use magnifying glasses.
3. Then, they put these leaves, along with a few others, into a pile.
4. Spread out the leaves.
5. Have the children sit or stand in a circle around the leaves. One at a time, each player claims a leaf, explaining how he knew it was his.

Materials required:

Magnifying glasses

Investigation:

Identifying leaves of different shapes, color and size

Processing Skills:

Observing, classifying, identifying

Questions to guide the children’s participation:

1. Which leaves do you think are similar?
2. What make these leaves similar?
3. What make these leaves different?
4. How could you tell which leaf belongs to you?
5. Is any part of the leaf missing? Where do you think it went?

Teaching tips:

You could ask the children to show you two or more leaves that came from the same tree.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 10

WHERE GERMS LURK ON OUR HANDS

Procedure:

1. Ask the children to tell you what is similar or different about the leaves. Encourage children to use magnifying glasses. Explain to children what the magnifying glass does.
2. Encourage the children to tell you specific attributes about the leaves (texture, apex, edge, etc.)
3. Have the children sort leaves according to their similarity and differences.
4. Brainstorm with the children on how to measure leaves.
5. Have the children measure the leaves and figure out the size the biggest leaf, and the size of the smallest leaf.
6. Ask children to identify their favorite leaf/leaves.
7. Ask them to explain why they like a particular leaf.

Materials required:

A4 blank paper
Markers

Investigation:

Evaluating germs location in the hand

Processing Skills:

Predicting, identifying, communicating

Questions to guide the children's participation:

1. What do you know about germs?
2. Where do the germs hide in our hands?
3. How many fingers are there on each hand? How many in total?

Teaching tips:

Key areas to highlight are fingernails, fingertips, thumbs, palms (especially crevices) and wrist.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of hand locations where germs hide?

- 25
- 50
- 75
- 100

Comments

LESSON

11

T-ZONE

Procedure:

1. Explain to children apart from washing their hands, another effective way of reducing illness is to keep their hands away from certain parts of the body.
2. Ask the children to name parts of the body that they should keep their hands away from.
3. Explain to children the T-Zone. Keeping fingers away from the eyes, nose and mouth.
4. A good way to show children where to find the T-Zone is to cut out the letter 'T' from an A4 sheet of paper and hold it near to the face so the eyes, nose and mouth are visible.

Materials required:

A 4 paper, scissors
Yarn

Investigation:

Reducing illness from germs

Processing Skills:

Predicting, communicating

Questions to guide the children's participation:

1. Why don't you think it is good to touch your face or the face of others?
2. Why don't you think it is good to place objects such as pens and pencils in your mouth?
3. Why don't you think it is good to bite your fingers or fingernails?
4. Why don't you think it is good to wipe your nose with your hand or fingers?

Teaching tips:

Explain to the children that another effective way of reducing illness from germs is to keep their fingers away from their eyes, nose and mouth. This is because germs can linger on fingers and when we rub our eyes or nose, or put our fingers in our mouth or bite our nails, the germs can jump across and make us sick.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of reducing illness from germs?

25
50
75
100

Comments

LESSON 12

SNEEZE AND COUGH ON THE ELBOW AND TISSUE

Procedure:

1. Ask the children to try and remember the last time they had a cold or cough - did they miss out on anything - school, a party, etc.?
2. Ask them how they felt? Ask them if anyone in their family also had the cough/cold?
3. Tell the children that they are going to learn about how germs can be passed from one person to another.
4. Ask the children different ways germs can be passed from one person to another [sneezing and coughing].
5. Ask the children to tell you different ways to prevent the spread of germs.
6. Ask the children how people develop coughs and colds.
7. Explain that people develop coughs and colds because of germs and not because it's cold outside!

Materials required:

Tissues

Investigation:

Demonstrating how to prevent the spread of germs

Processing Skills:

Observing, communicating

Questions to guide the children's participation:

1. How do you think germs are spread from one person to another? [Sneezing and coughing].
2. How can we prevent the spread of infection by coughing or sneezing?
3. What will you do if there is not tissue to cover your mouth? (coughing in elbow)

Teaching tips:

You might want to ask the children to demonstrate how to use the tissue and discard it in the trash can or ask them to demonstrate how to sneeze in their elbow.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of preventing the spread of germs using tissues and elbow?

- 25
- 50
- 75
- 100

Comments

LESSON

13

GERM SPEED

Procedure:

1. Ask children to tell you what happen when a person sneezes.
2. Explain to children that when a person sneezes or coughs, the germs come out of the nose/ mouth in lots and lots of little germ-containing droplets really fast - even faster than a car driving on a motorway.
3. Get the children to name things that travel really fast
4. Explain to the children that germs are tiny and can't be seen, but that they are going to use confetti/hole punch pieces to demonstrate how germs can be spread.
5. Using the funnel, fill the balloon up with confetti or hole-punch disks of paper. Once full, remove the funnel and inflate using the pump.
6. Explain to the children that the balloon is going to demonstrate how we sneeze or cough and that the confetti/disks represent the germs.
7. Ask the children to indicate how far and wide they think the germs will travel. (You could mark these distances using the children or markers).
8. When ready, let go of the opening of the balloon, whilst still holding onto the tip of the balloon.
9. Ask the children about how far the germs went and what the germs landed on. Was it further/wider than they expected?

Materials required:

Balloons, confetti or hole-punch disks, funnel and balloon/bicycle pump

Investigation:

Demonstrating how germs are spread in the air

Processing Skills:

Observing, predicting, communicating

Questions to guide the children's participation:

- What happens to the germs when a person sneezes?
- How far will the germs go?
- What things travel really fast?
- How far did the germ go? Did the germ go further or closer than you expected?

Teaching tips:

- A single sneeze produces more than 40,000 droplets of moisture and millions of germs, propelled over a distance of 32ft.
 - The fastest recorded sneeze was 103.6mph. The average speed is between 80mph and 100mph.
- Source: Telegraph Newspaper website: <http://www.telegraph.co.uk/news/uknews/1568919/Sneezing-into-sleeve-stops-germs-spreading.html> (last accessed 9th July 2009)
- Using a larger balloon and holding the balloon opening in a downward direction (so the paper discs/glitter are near the entrance), gives the best results.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of how germs are spread in the air?

25
50
75
100

Comments

LESSON 14

GERM CONTACT SPREAD

Procedure:

1. Ask the children to tell you how germs are spread in contact from one person to another.
2. Mix the petroleum jelly and glitter together. Put a blob of it on a surface where activity one germs have landed - ideally a small wipe-clean toy, or a ball.
3. Put your hand on the glitter blob - transferring some of the glitter to your hands in the process.
4. Pass the toy/throw the ball to a child and ask them to pass/throw it onto the next child.
5. Repeat this passing process five times. In the meantime, put your hand on the classroom door handle.
6. Ask the children how we could stop the spread of germs.

Materials required:

Petroleum jelly
Glitter
Small toy or ball

Investigation:
Demonstrating cross contamination

Processing Skills:
Predicting, observing, communicating

Questions to guide the children's participation:

1. How far the germs spread on the toy/ball?
2. How far the germs might spread if everyone touched the door handle?
3. What might happen if you coughed or sneezed into your hand?
4. Do you have any idea how the germs could be caught to stop them spreading?

Teaching tips:

After the children touch the blob do not let them wash their hand as this will lead to the next activity of demonstrating which hand washing method is more effective.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of how germs are spread in contact from one object to another?

25
50
75
100

Comments

LESSON 15

WHY WE USE WARM WATER, SOAP AND LOTS OF FRICTION!

Procedure:

1. Divide the class into 4 groups and give the groups a number from 1-4.
2. Get four bowls and in
 - Bowl 1 add cold water [no soap]
 - Bowl 2 add warm water [no soap]
 - Bowl 3 add cold water with soap
 - Bowl 4 add warm water with soap
3. Ask the children to predict which bowl will result in cleanest hand.
4. Get each child to wash their hands thoroughly for 20 seconds (about the same time it takes them to sing happy birthday twice). Group 1 will wash their hands in bowl 1, group 2 in bowl 2, group 3 in bowl 3, and group 4 in bowl 4
5. After 20 seconds, get the children to look at each other's hands to see which method gave them the cleanest hands.
6. Ask the children to explain how they can tell there are no more germs on their hands.

Materials required:

Dirt children hands from lesson 5, bowls for water, warm water, cold water, soap

Investigation:
Demonstrating effective hand-washing method

Processing Skills:
Predicting, observing, communicating

Questions to guide the children's participation:

1. Which method of hand-washing will make hands cleaner?
2. How could you tell if your hands are clean?

Teaching tips:

The children should see that the best result for getting hands clean is in warm water with soap and lots of friction/rubbing.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of effective hand-washing method?

25
50
75
100

Comments

LESSON 16

GERM SCANNING

Procedure:

1. Ask the children to tell you which hands will be cleaner, the ones washed with paper towels or the ones washed in warm water?
2. Tell the children that a clean hand will have no germs and dirty hand will have germs.
3. Tell them you are going to use a scanner to see which hand has germs since we cannot see them with naked eyes.
4. Explain to the children what the scanner does.
5. Scan the children's hands using the iPhone camera to reveal a cool animated image of germs that might be on them.
6. Ask the children again which method of "washing hands" kills the germs and which one does not.
7. Dive deeper with the Scan Analysis mode to see close-ups of different types of germs that are common culprits of food-borne illness, plus some facts and tips on prevention.

Materials required:

Children's hands are washed with four different hand-washing methods in lesson 7, cell phone with camera

Investigation:

Demonstrating the effectiveness of different "hand washing" methods

Processing Skills:

Observing

Questions to guide the children's participation:

1. Will clean hands have germ or no germs?
2. What kind of germs could be on your hands?

Teaching tips:

Remember the scanner does not really scan the germs.
Explain to the children how good hand washing technique is important in preventing disease!

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of using scanner to detect the presence of germs?

- 25
- 50
- 75
- 100

Comments

LESSON 17

MATCH THE GERMS

Procedure:

1. Mix up the cards and spread them on the table face down
2. Tell the children that an objective of the game is to turn over pairs of matching germs.
3. Ask one child at a time to flip a card face up over each turn. Each time a child flips a card, ask them to describe the germ's attributes.
4. Tell them each time they flip a card they should try to match them. If they make a match, they take both cards. The children will keep going until all the cards are matched.

Materials required:

Henry-the-Hand memory cards

Investigation:

Identifying matching germs, identify different kind of germ

Processing Skills:

Observing, comparing, communicating

Questions to guide the children's participation:

1. Does your card have a match?
2. Can you describe your germ on the card?
3. How does your card differ or is similar to the other card [point to the card]?

Teaching tips:

You can increase the difficulty level by using cards that have no matching pairs.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of matching different kind germs?

- 25
- 50
- 75
- 100

Comments

LESSON 18

OUTSIDE ACTIVITY COVER THE SNEEZE WITH THE ELBOW

Procedure:

1. Take children outside and ask children what they have to do when they are going to sneeze.
2. After hearing their answers, explain to the children why covering the sneeze with your elbow is the best.
3. Demonstrate how to cover your sneeze with the elbow and show them how this way the germs won't spread as much as if we covered our mouth with our hands.
4. Demonstrate both ways and show them how you spread the germs with your hands because you are touching everything.
5. After demonstrating them how to cover their mouth with the elbow start a game of covering their mouth with the elbow when we sneeze. Say Aaa aaaaa aaaaa chooooo and children have to cover their mouth when they hear chooo.

Materials required:

Children's hands are washed with four different hand-washing methods in lesson 7, cell phone with camera

Investigation:
Demonstrating how germs spread

Processing Skills:
Observing, predicting

Questions to guide the children's participation:

1. What do you do when you are about to sneeze?
2. Will germs spread more if you sneeze in your hands or in your elbow?
3. What happens if I sneeze in my hand and then touch somebody else's hand?

Teaching tips:

By sneezing or coughing into your elbow you help to minimize the spreading of germs to other surfaces. Since your elbow is less likely than your hands to come into contact with other objects, fewer areas become contaminated.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of using canner to detect the presence of germs?

- 25
- 50
- 75
- 100

Comments

LESSON 19

COMPOSITE COLOR MAKING

Procedure:

1. Fill four cups with water and in each add a different primary color.
2. Ask the children to name the colors of the liquids in the cup (yellow, blue, red and white).
3. Tell the children you are going to mix two colors [name the colors] and ask them to predict the name of the secondary color that will be formed.
4. Take an empty cup and ask the children to tell you what happens if you mix two colors together. Mix in,
 - a. Cup 1 red and blue = Purple
 - b. Cup 2 red and yellow = Orange
 - c. Cup 3 red and white = Pink
 - d. Cup 4 blue and yellow = Green
 - e. Cup 5 yellow + red = Orange
 - f. Cups 6 - 9 primary colors + white = Light colors
5. Ask the children to name the colors of the rainbow and try to make them.

Materials required:

Basic liquid color gel (red, blue, white, and yellow),
Clear plastic glasses

Investigation:

Demonstrating the producing of secondary color using primary colors

Processing Skills:

Predicting, observing, communicating

Questions to guide the children's participation:

1. What is the name of this color?
2. What color will be formed if you mix blue and red?
3. What colors does the rainbow have?

Teaching tips:

Try to introduce tertiary colors to the children by mixing

1. Blue (primary) + green (secondary) = Brown (tertiary)
2. Red, yellow and blue = Black

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of producing secondary colors

25
50
75
100

Comments

LESSON

20

ABSORBENCY

Procedure:

1. Ask the children what happens when you wipe up spilled water with a paper towel. (Tell the children that if you spill water and clean it up with a paper towel they will see the water disappearing into the paper).
2. Tell them the action is called absorption-the paper towel is absorbing water and there are times when we need absorption to take place.
3. Tell the children that some things absorb water, and some do not.
4. Put different items on the table; make sure all the items are of equal size.
5. Ask them to predict which materials on the table absorb more water. Ask them to explain their reasoning.
6. Pour water inside a container, dip one material in the water, remove it, and squeeze out the water into the small cup (make sure to label the cups with the names of the materials).
7. Repeat step 5 with different materials, making sure you squeeze the water into a different cup.
8. Ask the children to observe the water in the small cups and tell them to arrange the cups with more water first and the one with least water last.
9. Ask the children why do some of the cups have more water than others?
10. Discussed why some items like the sponge did a great job of absorbing water and the foam letter absorbed very little water.
11. Ask the children to tell you other things that need to absorb water. Ask them if soil absorbs water.
12. Pour water in the container full of soil and watch the water disappear.

Materials required:

Sponges, socks, paper towels, small caps, napkin, plain paper, foam letter, water absorbing test area/bento lunch container, container with dry soil.

Investigation:

Demonstrating absorption capacity of different materials

Processing Skills:

Predicting, observing, communicating

Questions to guide the children's participation:

1. Which material do you think will absorb more water than others?
2. Which material absorbed more water?
3. Why do you think some of the cups have more water?
4. What others things can you think of that need water?

Teaching tips:

Ask the children to discuss various things they know that are usually in contact with water but do not absorb water, such as raincoat, umbrella, tent and house roof.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of what materials absorb water and what materials do not?

25
50
75
100

Comments

LESSON 21

CELERY STALK ABSORBENCY

Procedure:

1. Ask the children to bring the celery experiment from home.
2. Ask the children what has happened or what did they observe. Let the children tell you where they think the water has gone and what has happened to the celery.
3. Ask them if they think the whole plant gets water for food and help to guide them to see that the whole plant did get the water for food, since all parts of the plant have now turned red (from absorbing the red water that was in the cup the day before).
4. Ask the children to draw a picture of what happened (or write a sentence if they can write) to sum up their findings.

Materials required:

A celery stalk in red colored water from home

Investigation:
Demonstrating how plants absorb water

Processing Skills:
Predicting, observing, communicating

Questions to guide the children's participation:

1. What did you observe when you woke up this morning?
2. What happened to the celery stalk?
3. Why do you think the plant needs water?
4. What is the difference between the picture you drew yesterday at home and the picture you drew today at the camp?

Teaching tips:

The water has been absorbed into the celery stalk, tinting the stem and leaves red.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of how plants absorb water

- 25
- 50
- 75
- 100

Comments

LESSON

22

SINK AND FLOAT

Procedure:

1. Fill the bowl with water.
2. Ask the children to predict which items on the table will sink and which ones will float.
3. Ask the children to tell you why they think specific items will sink and others will float.
4. Drop one item at a time in the water and ask the children to observe and communicate.
5. Talk to children about buoyancy and how the larger one likely had more space in the underside to keep it afloat.
6. Ask the children to go around the classroom and identify the items that will float and those that will sink.
7. Put the float and sink item on separate piles and ask the children to discuss the similarity.

Materials required:

Big bowl with water,
Items with different densities

Investigation:

Predicting and observe what fruit will sink or float

Processing Skills:

Predicting, observing, communicating

Questions to guide the children's participation:

1. Which of the following items do you think will float?
2. Which of the following items do you think will sink?
3. Why do you think the item will sink or float?

Teaching tips:

Sink or float depends on the weight, how heavy an object is, and volume, which is how much space it takes up.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of fruits that sink or float

- 25
- 50
- 75
- 100

Comments

LESSON 23

FLOAT AND SINK: BUOYANCE

Procedure:

1. Ask the children to predict what will happen if you put an empty container with a lid in the tub/bowl of water
2. Take an empty container with a lid and put it in the water.
3. Sometimes the container floats. Sometimes it sinks. Sometimes it drifts in between.

Materials required:

Big bowl with water,
A container with a lid
Marbles

Investigation:

Identifying objects that will float or sink

Processing Skills:

Predicting, observing, communicating

Questions to guide the children's participation:

1. What happens when the empty container is placed in the water?
2. What happens when you add weight {by adding marbles} to the container?
3. What happens if you take out marbles?
4. What happens if you add more marbles?

Teaching tips:

1. "Density - the amount of matter in an object, buoyancy - the force that makes something float, and Gravity - a force that causes two objects to pull together."
(Holly (July 3, 2012). Sinking Ships at <http://kidsactivitiesblog.com/16046/buoyancy-experiemment-for-kids>)

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

- 25
- 50
- 75
- 100

Comments

LESSON 24

OUTSIDE ACTIVITY: WATER PAINTING AND EVAPORATION

Procedure:

1. On a sunny day give children buckets of water and wide paintbrushes.
2. Let the children experiment with painting the tables and benches, steps, sidewalk, shed, or anything else outside.
3. Watch what they do and listen to what they say before asking questions.
4. Children love to water paint. Encourage them to notice the changes as the water dries. Ask them to paint something that is in the shade.
5. Ask them to notice if it dries as fast as something in the sun.
6. Have each of the children paint a big water spot on the ground and then outline the spot with chalk.
7. Have them all sit back and watch what happens. If some spots are in the shade, ask children to predict which will dry faster. After a few minutes have children draw around the spot that is still wet. (Some spots will have disappeared altogether.)
8. Ask children where they think the water went. Tell them it is in the air even though they can't see it. (NSTA 2007, p217)

Materials required:

Wide paints brushes
Water in containers
Pail

Investigation:

Discovering that water evaporates into the air

Processing Skills:

Observing, comparing, communicating

Questions to guide the children's participation:

1. What does the (bench) look like when it's wet?
2. Is it still wet?
3. Where do you think the water is going?

Teaching tips:

Let the children repeat this activity several times.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of evaporation?

- 25
- 50
- 75
- 100

Comments

LESSON 25

THE MAGNETIC CONTEST: DO THEY STICK OR NOT

Procedure:

1. Give each child two different kinds of magnets.
2. Ask them if they know what it is and what it does.
3. Ask the children what will happen if you place a magnet close to the pile of paper clips.
4. Ask the children what will happen if you place a magnet close to non-magnetic items [you will have identified an object].
5. Ask the children to go around the classroom and collect objects that they think will attract magnet and those that will not. The children will bring the objects to the table and make two piles, magnetic and non-magnetic.
6. Tell the children to use the magnet on the objects they identified as magnetic and non-magnetic.
7. Ask the children to classify which objects are attracted, and which are not.
8. Ask the children to analyze the material each object is made of.
9. Summarize the children's discoveries (all were metals but not all metals are magnetic - a soda can is aluminum and not magnetic; most keys are not magnetic; coins are not magnetic).

Materials required:

Different types of magnets (magnet wands and large horseshoe shaped magnets), a pile of paper clips, non-magnetic object

Investigation:

Experimenting with magnets and various objects

Processing Skills:

Observing, classifying, analyzing, communicating

Questions to guide the children's participation:

1. Are magnets attracted to everything made of metal?
2. How can we find out?
3. Why does a paper clip stick to the magnet? (Do they stick or not? Lesson 25)

Teaching tips:

1. Magnets are pieces of metal that have the power to attract other pieces of metal.
2. Magnets attract objects made of iron or steel.
3. Magnets have a 'N' and 'S' pole. Like poles push away or repel. Different poles pull together or attract.
4. The ends of magnets are called poles. Each magnet has a north pole and a south pole. A magnet is strongest at its pole. Sometimes the letters N and S are stamped into the magnets to label the poles. Look at the various magnets and find the North and South Pole of some of them. (<http://teachers.net/lessons/posts/2240.html>) (Source: <http://www.teachpreschoolscience.com/MagneticAttraction.html>)

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25
50
75
100

Understanding

Are the children demonstrating an understanding of magnetic and non-magnetic items?

25
50
75
100

Comments

LESSON 26

WHICH MAGNET IS STRONGER?

Procedure:

1. Tell the children that magnets come in many sizes, shapes, and strengths.
2. Ask the children what they think a stronger magnet would look like. Wait for their ideas, and then ask.
3. Ask them how we could find out if one magnet is stronger than another.
4. Put out a pile of paper clips for each to experiment with.
5. “Children will begin picking up paper clips with their magnets. They will see that some magnets can pick up more paper clips than others. They may also notice that they have to move some magnets closer to the paper clips than others in order to attract the paper clip. Encourage them to discuss their ideas.”(National Science Teacher Association (NSTA) 2007, p 123)

Materials required:

Different types of magnets (try to provide at least one larger magnet that is weaker than a smaller one), a pile of paper clips.

Investigation:
Demonstrating which magnet is stronger

Processing Skills:
Observing, classifying, analyzing, communicating

Questions to guide the children’s participation:

1. Which magnet is strongest? How do you know?
2. How close does your magnet have to get to a paper clip in order to pick it up?
3. Is a larger magnet always stronger than a smaller one? (p113)

Teaching tips:

“Ask children to share their strongest magnet and how they know it is the strongest. Ask one or two to demonstrate what their magnets pick up. Either count with the children or weigh the paper clips to compare which magnet picked up more.” (NSTA 2007, p 123)

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of different magnetic strength?

- 25
- 50
- 75
- 100

Comments

LESSON 27

PARENT-CHILD MAGNETIC DEMONSTRATION

Procedure:

1. Give each child two magnets.
2. Tell the children to demonstrate what they have learned about magnet to their parents.
3. Cue the children to go around the room and find objects that will attract or stick to their magnet.
4. Ask the children if they can remember what the magnetic items they found last time had in common (all were metals).
5. Ask the children to tell their parent examples of objects that are magnetic - that is, that attract or stick to a magnet.

Materials required:

Two [stronger and weaker] magnets

Investigation:

Demonstrating magnet to parents by children

Processing Skills:

Observing, classifying, communicating

Questions to guide the children's participation:

1. Are magnets attracted to everything made of metal?
2. How can we find out?
3. Why does a paper clip stick to the magnet? (Do they stick or not? Lesson 25)

Teaching tips:

You could discuss with parents about how their children had worked in the camp.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

- 25
- 50
- 75
- 100

Understanding

Are the children demonstrating an understanding of different magnetic strength?

- 25
- 50
- 75
- 100

Comments

Procedure:

1. Before any meal or after going to the bathroom model hand washing to your child and help him/her observe and wash their hands correctly
2. Wet your hands and apply liquid or bar soap. If using a bar of soap, be sure to place it on a rack and allow it to drain after use.
3. Rub your hands vigorously together and scrub all surfaces of hands and wrists.
4. Continue for 20 seconds, or about the time it takes to sing the song twice.
5. Rinse well and dry your hands.

SONG

Tops and bottoms
Tops and bottoms
In between
In between
All around your hands
All around your hands
Makes them clean
Makes them clean

Materials required:

Liquid or bar soap
Water

Investigation:

Use the duration of a song to wash hands correctly

Processing Skills:

Observing, modeling

Questions to guide the children's participation:

1. When should I wash my hands?
2. Do I have to use soap?
3. Is it better to wash my hands with hot or cold water?

Procedure:

1. Tell your child she/he is going to observe how plants absorb water.
2. Help your child fill a tall, clear glass or jar half-full with water.
3. Add a few drops of red food coloring and mix well.
4. Trim the bottom of a large stalk of celery, leaving the leaves on the stalk.
5. Place the celery stalk in the glass or jar. Leave overnight in order for the stalk to “drink” the water.
6. Have your child draw a picture of the celery stalk “before” it drinks the red water and then write a sentence to describe what he/she sees.
7. Bring the experiment and your child’s picture to the camp the next day.

Materials required:

Tall clear glass or jar, water, red food coloring, scissors, and celery stalk with leaves

Investigation:

Demonstrating plant absorbency

Processing Skills:

Predicting, observing, communicating