Lesson 3 – Mystery Box

Overview

This lesson is about the concept of **classification.** Classification involves categorizing objects together based on the similarity of their characteristics. Classification is important because it allows scientists to study the similarities and differences between objects. Scientists can notice patterns and relationships within and between groups by plotting the results of classification on a graph. Classification also helps people organize things in everyday life, such as organizing books on a shelf.

UQUEST scientists will complete an activity about sorting pictures and then discuss the importance of observing similarities and differences among various items and classifying items into categories. UQUEST scientists will then complete an activity that involves classifying various health-related items into categories. Having students engage with health items in an interactive way that requires critical thinking to classify items may also promote the use of health items and engaging in health behaviors. Finally, UQUEST scientists will make a graph that illustrates how item(s) can be classified under various categories.

Eye health is a health category emphasized in this lesson. Consuming Vitamin A, using glasses if you have poor eyesight, using sunglasses in the sun, resting your eyes after using a screen for too long, and reading with appropriate light are all great behaviors to promote healthy eyes.

Science Objectives:

UQUEST scientists will

- understand that classifying is a process of categorizing objects based on the similarity of their characteristics.
- practice classification by observing similarities and differences in the characteristics of objects and then placing objects in categories.

Health Message:

- We have a lot of options of tools that keep us healthy. Anything from sunscreen, to carrots, to knee pads, to tennis balls.... all have a way of maintaining our health. We should use these tools as frequently as we can to stay healthy and safe.

Reinforcement of previous lessons:

- Observation (Lesson 1) - Scientists observe characteristics of items.
- Graphing (Lesson 1) - Scientists use graphs to organize, communicate, and describe information about the observations they collect.

Vocabulary:

1. **Classification**: Is when we observe similarities and differences, and then put things or people in categories based on certain characteristics or variables.

Materials:

- UQUEST kit (includes lab notebooks, camera, paper towels, crayons, and more)
- 2 bags of baby carrots and 2 ranch bottles (for eating)
- Paper plates
- Napkins
- Painter's tape
- Glue sticks
- Scissors for children
- Laminated cut-outs of grain and dairy items (each set of 10 items paper clipped together; total of 8 sets)
- A box (to put the mystery items in): one per group that is covered with a panty hose
- Panty hose
- Health items (two sets PER CLASSROOM
    1. jump rope (x4)
    2. tennis ball (x4)
    3. Baseball (x4)
    4. tooth brush (x4)
    5. Sunscreen (x4)
    6. Tissue or tissue pouch (x4)
    7. Hat (x4)
    8. Sun glasses (x4)
    9. Cheese stick (x4)
    10. Baby carrot (x4)
    11. Little water bottle (x4)
    12. swimming goggles (x4)
    13. sweat bands (x4)
    14. knee pads (x4)
    15. eye mask for sleeping (x4)
    16. Ear plugs (x4)
    17. tablespoon (x4)
    18. thermometer (x4)
    19. Covid face mask (x4)
    20. hand sanitizer bottle (x4)

Preparation:

- At UM:
    - Gather all necessary items
    - Each guide has a set of laminated food items from page

- At OYC
    - Place one set of health items on each group's table

Introductory Script:

Welcome UQUEST scientists.

Remember the lab notebook is an important tool that scientists use to record their observations and the results of their experiments.

Let's open up your lab notebooks to the second page. Like all scientists, UQUEST scientists pay attention to the world around them. They create an environment that helps them to learn about the world. They listen to each other. They communicate with each other. And they treat each other with respect.

Let's review the values of a UQUEST scientist. Each UQUEST scientist reads OUT LOUD one value.

1. **Pay attention** when others are talking.
2. **Speak in a low voice**. Do not scream.
3. **Respect each other.** Do not push or shove each other.

Be sure to praise the students when they do well and tell them why

Relaxation

Before we begin the lesson, we'd like to start off by doing a relaxation activity. When scientists are relaxed, they do better science.

For today's relaxation activity we will practice playing Scientist says

In Scientist says, one of you will be the scientist and tell the group what relaxation exercises to do. For example, stretch your arms, close your eyes, or take 10 deep breaths.

- Guide the UQUEST scientists, through relaxation for ~1 minute.

Instructions for UQUEST Guides

1. **Introduction**
    a. *Today, we are going to practice classifying items.*
    b. *To classify is a way to group things. ---- You could group items based on their similarities. For example....* **guide identifies three things at arms-length and on the spot, finds a way that all three items are similar.**
        i. **Example: this desk, this chair, and this pencil are all hard.**
    c. *Today, we will classify items into categories that you create. Classification is when we observe similarities and differences, and then put things or people in categories based on certain characteristics or variables.*

2. ***Activity #1***
    a. **Note: this activity will be done in small teams**
    b. **Have scientists turn to page 3C and cut out the food items**
    c. *What types of foods did you cut out? What do you see?*
        i. **Explain** that dairy comes from a cow. Grains are a form of seed that comes from the ground.

d. On page 3B in their lab notebooks, each scientist will now classify their own cut outs into the two brown bags that read "dairy" and "grains"

e. When we observed the food items and decided which category to put them in, dairy or grain, that was classification!

f. Classification is when we observe similarities and differences, and then put things or people in categories based on certain characteristics or variables.

g. To classify the pictures, we observed their characteristics using our eyes. Then we compared the similarities and differences and categorized the food items into two bags.

***h.* Once the scientist has the correct food items in the correct brown bag on page 3B, they will glue the pieces to the page.**

i. Using laminated cut outs of grains and dairy, guide classifies the cut-outs into two groups Scientists guess how the guide classified the items

i. Sweet or not sweet
   - Sweet: chocolate milk, honey nut cheerios, strawberry yogurt, ice cream
   - Not sweet: popcorn, bread, butter, cheese, rice, oats

ii. **Hint for scientists:** *What is similar about all of these items (point) that is different from all of the other items (point)?*

iii. Once scientists identify that classification is sweet v not sweet, everyone writes "sweet" and "not sweet" on the second row of page 3C (first row is already filled out as an example).

iv. Try to identify about 3-4 new classification systems (there are 7 examples below)

j. Every classification guessed by the scientists in the group will be written down on page 3E.

k. Examples for how guides can classify items:

i. 1: boxy/square vs not boxy/square
ii. **2: Contain the color red vs. Do not contain the color red**
iii. **3: For breakfast vs. Not for breakfast**
iv. **4: with words on it vs. without words**
v. **5: Goes in the fridge/freezer vs. Can be left at room temperature**
vi. **6: Things you can cut with a knife vs. Things you cannot cut with a knife (everything else)**
vii. **7: Things you can eat with a spoon vs. Things you cannot eat with a spoon (everything else)**

***3.* Activity #2**

a. Note: this activity will be done as a class

b. Place the health items mystery box on the table.

i. This is today's mystery box; one at a time, scientists will take turns taking stuff out of the mystery box so that we can all observe together.

c. One at a time, one scientist from the group will blindly select an item from the "mystery box" located in the center of the group table.

d. Scientists in the group observe the items. Once all items are removed from the mystery box, one at a time, one scientist gets access to all 20 items and can place whichever items they want into two groups. All items need to be classified into one of the two squares.

e. **Health message:** *Is there a general category that all these things fall into? How are all of these things similar? They all fit into one category, any idea what they may be?*

i. ***State some examples if they are unsure: physical activity, vitamin A, protection in sports....***

ii. **Answer:** *They are all health items*

f. Now we are going to play the "Call the Classification" game again! The first person that identifies how the items were classified wins a point! The scientist with most points wins!

i. **If a scientist has a new idea for how to classify the items, they can do it for the group and the group guesses the classification. If a scientist can't think of ways to classify the items, guide will whisper to the interested scientist one of the examples below.**

ii. **Scientists then guess how the scientist classified the health items**

iii. **If scientists are having difficulty:**

- ***Hint:*** *What is similar between these items that x selected?*

iv. **Scientists then write the two classification categories on the chart on page 3E.**

g. Have each scientist classify the items at least one time.

- **Example 1 – things that we only use in sports (balls, knee pads, jump rope, sweat bands, water bottle) vs not related to sports (everything else)**
- **Example 2- things you can wear (shoes, eye mask, knee pads, ear plugs, hat, sunglasses, goggles, face mask) vs things you cannot wear (everything else)**
- **Example 3- things you can eat (cheese, carrot) vs things you cannot eat (everything else)**
- **Example 4- things that are good for your eyes (carrots, sun glasses, sleep mask, goggles) vs things do not really affect your eyes (everything else)**
- **Example 5- things to protect against the sun (sun glasses, sun screen, hat) vs. Things that don't protect against the sun (everything else)**
- **Example 6- Items that are related to COVID and being sick (face mask, sanitizer, thermometer, tissues) vs things not related to covid (everything else)**
- **Example 7- things that are circular/spheres (balls) vs things that are not circular/spherical (everything else)**

- **Example 8- things we use to sleep (eye mask, ear plugs) vs things we don't use to sleep (everything else)**
- **Example 9- measuring items (tablespoon, thermometer) vs items that do not measure (everything else)**
- **Example 10- things you can put on your head or face (sunscreen, hat, sunglasses, goggles, eye mask, ear plugs, face mask) vs things that you do not belong there (everything else)**
- **Example 11 – things that are soft/smooth (tennis ball, baseball, tissues) vs things that are hard/rough/not smooth (everything else)**

h. Every classification discovered will be written down on page 3E to make a list of all the ways to classify health items.

4. Documentation

a. *Today, we're making a graph about classification of items.*

b. Scientists turn to page 3F.

c. In last week's Lesson 2: Grapeful for Science, we talked about bar graphs. Today, we are going to make another bar graph.

i. What is the title?

- *How many dairy and grain items are there?*
- **Scientist will circle the title with a crayon.**

ii. What is the X axis telling us?

- *"Categories" of dairy and grain*
- **Scientist will outline the X axis with a different color crayon. The X axis goes side to side.**

iii. What is the Y axis telling us?

- *Number of items*
- **Scientist will outline the Y axis with a different color crayon. The Y axis goes up and down.**

d. Scientists count how many dairy items and grain items they glued onto page 3B.

e. Scientists complete the bars to show how many dairy items and grain items there were.

5. Discussion

a. Now let's discuss what we did today. I will ask some questions, and if you answer, you get a sticker. At the end, the stickers can be traded in for a special prize. Let's GO!

i. Award sticker for every question answered.

ii. Note: below are example questions. You can ask additional questions not listed.

b. What did we do today?

i. We classified items

ii. We discussed how things are similar and different within and across categories

c. We classified these (show) health items. If you look around the room, what else could we classify?

i. Can you think of other things in your everyday life that you can classify?

d. **How many food items from the first activity were grains? Look at the graph you just made on page 3D.**

i. [Number]

e. **What are 3 important parts of the graph?**

i. The title, Y axis, X axis

f. Which axis is the Y axis and which one is the X axis?

i. Y axis is vertical, or up and down. X axis is horizontal, or side to side.

g. **What is the label of our Y axis?**

i. Number of items

h. **What is the label of our X axis?**

i. Grains or dairy

i. **What was the title of our graph?**

i. How many grains and dairy items do we have?

j. What does the graph tell you?

i. That there are [Number] dairy items and [Number] grain items

k. What surprised you today?

i. **Go in a circle and every UQUEST scientist in the group answers**

l. What is one thing you learned about health items or classification today?

i. **Go in a circle and every UQUEST scientist in the group answers**

m. What does it mean to classify objects?

i. To classify items means to put similar items together.

ii. Classification first requires that we use our observation skills. Once we observe, we look at the similarities and differences across different variables- like texture, color, and size.

n. What else can we classify inside of this room?

i. **Example:** Books on a shelf, the clothes people are wearing, colors of writing utensils

6. **Wrap-up**
   a. *What did you learn today? Write that down on the lines on page 3G.*
   b. *How much did you like today's lesson on scale from strongly agree to strongly disagree.*
   c. **Award prize at the end based on number of stickers.**

References:

1. https://www.nei.nih.gov/learn-about-eye-health/healthy-vision/keep-your-eyes-healthy
2. https://www.webmd.com/eye-health/fact-fiction-myths-about-eyes
3. https://www.powerfulmothering.com/free-printable-food-sorting-activity/

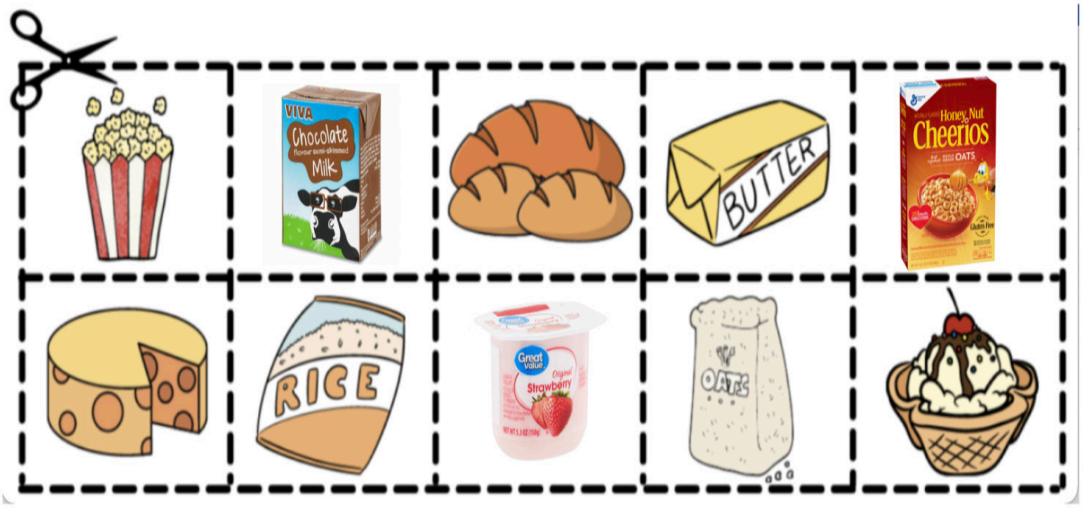
Lesson 3
Mystery Box

Date: _____

Variables

Instructions: Cut out the food items on the next page and glue them in the appropriate paper brown bag.

Date: _____



This page of the lab notebook can be removed if desired.

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Date: _____

Classifying

Instructions: Use the chart below to classify any examples that you and the other scientists come up with today with the ***food*** items.

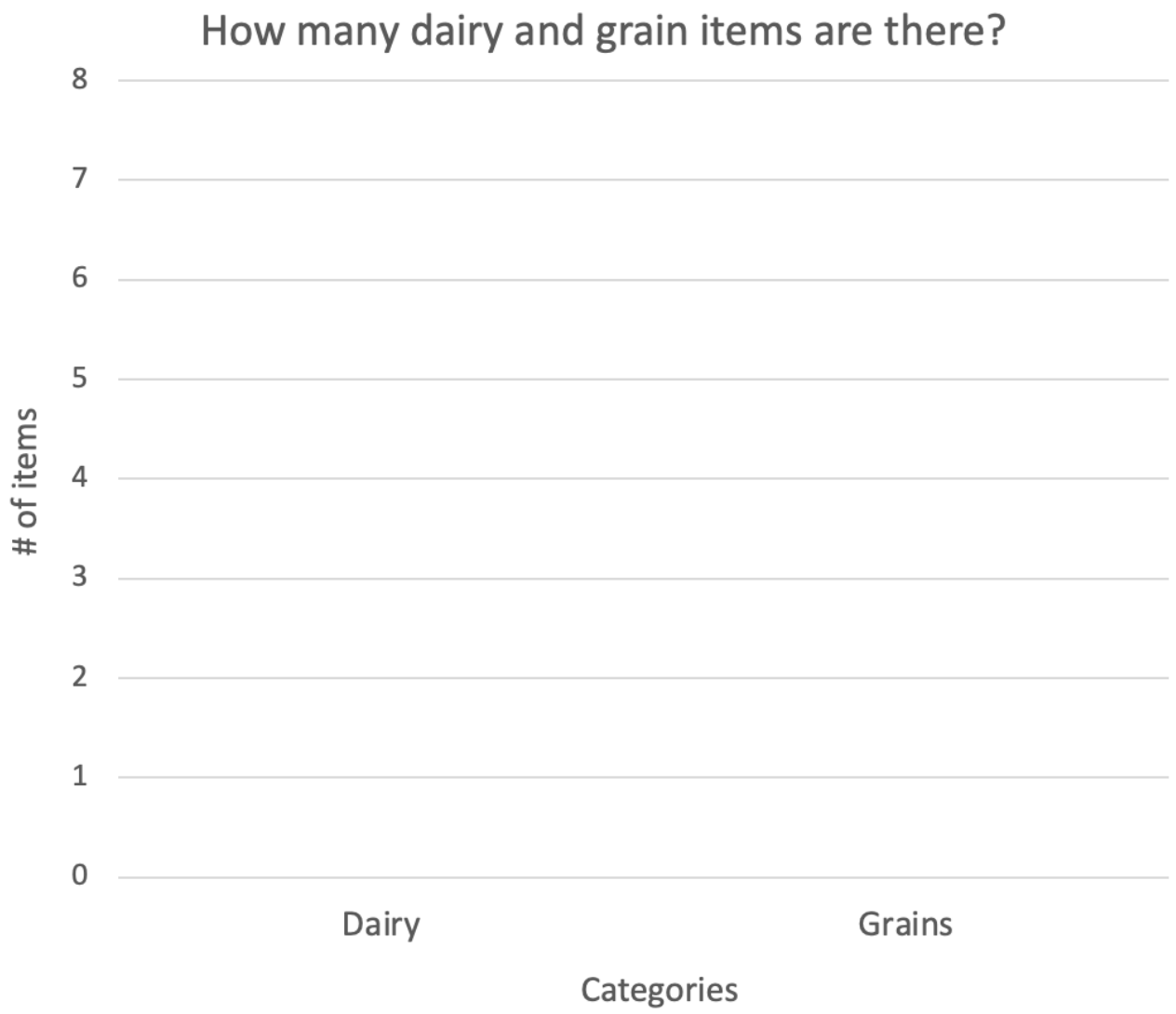
Classification categories: Food			
1.	Dairy	vs	Grain
2.		vs	
3.		vs	
4.		vs	
5.		vs	
6.		vs	

Instructions: Use the chart below to classify any examples that you and the other scientists come up with today with the ***health*** items.

Classification categories: Health items		
1.	vs	
2.	vs	
3.	vs	
4.	vs	
5.	vs	
6.	vs	
7.	vs	
8.	vs	

Date: _____

Graphing



Date: _____

Lesson 3

What did I learn today?

_____

_____

_____

I liked this lesson (circle one):

Strongly Agree	Agree	Disagree	Strongly Disagree