Lesson 1 – That Makes Sense

Overview

This lesson is about **observation**. Observation is the foundational science practice of detecting, noticing, measuring, or collecting information about a phenomenon. Scientists use their observation skills when they collect data. Observation can involve one or more of the senses. When people use their senses to make observations, it can help keep them safe and healthy.

To learn about observation, UQUEST scientists will engage each of their senses, one at a time, to guess the mystery contents of several bags. Some of their guesses will be documented and used to create a bar graph. After completing the lesson, UQUEST scientists will be able to understand how their senses can be used to help them collect data, and how to construct a bar graph.

Science Objectives:

UQUEST scientists will:

- use some of their senses to make observations about phenomenon.
- understand that graphs are tools to organize, describe, and communicate information about the observations that scientists collect.

Health Messages:

- When people use their senses to make observations, it can help keep them safe and healthy.

Reinforcement of previous messages:

N/A (first lesson)

Vocabulary

- **Observation** - The practice of detecting, noticing, or measuring a phenomenon
- **Graph** - Graphs are diagrams used to present data and communicate information for one or more variables. Data are presented within a pair of axes at right angles.
- **Bar graph** - A type of graph that uses the height of a bar to represent the amount of a group of a variable and can be used to compare groups.

Materials

- UQUEST kit
- Lab notebook
- 1 Magnetic dry-erase easel with markers and magnets
- Paper bags
- Lemons (for visual stimulus)
- Paper plates
- Materials for senses activity:

    - Touch – 1) feathers, 2) cotton balls, 3) Legos
    - Hearing – 1) cotton, 2) bells, 3) coins
    - Smell – cotton balls soaked in flavored extract - 1) lemon, 2) almond, 3) mint
    - Sight – leaves and marbles
    - Taste – blueberries and raspberries
- 4 laminated posters of the 4 QFT rules
- 4 printed pages (8x11 approx) of the Lesson 1 Question Focus

Preparation

- At UM:
    1. Prepare bags with items
        i. Touch – 1) Feathers, 2) cotton balls, 3) Legos
        ii. Hearing – 1) cotton balls, 2) bells, 3) coins
        iii. Smell – cotton balls soaked in flavored extract - 1) lemon, 2) almond, 3) mint
        iv. Sight – prepare bags with leaves and marbles
        v. Taste – prepare Ziploc bags with blueberries and raspberries
    2. Label each bag with the appropriate sense
    3. Ensure bags are folded closed
    4. Place smaller brown paper bags into one large bag to have ready for each team.
- At OYC:
    1. Re-create graph from lab notebook page 1C on a white board
    2. Place materials on desks for each team
    3. Distribute plates for "taste" activity when scientists get to that point in the lesson.

Introductory Script:

Welcome UQUEST scientists.

Lab notebooks are 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. E*ach 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. **Question Formulation Technique**
    a. Question focus
        i. *Hi everyone! To start off our Quest for today, we are going to play the question game. The question game has 4 rules. I will say each rule and ask you to repeat after me. Here is a little poster of the rules.* ***Show poster.***
            1. *First rule is: Ask many questions*
                a. *Everyone repeat after me. "Ask many questions"*
            2. *Second: Do not discuss or answer questions.*
                a. *"Do not discuss or answer questions."*
            3. *Third: Take turns asking questions*
                a. *"Take turns asking questions"*
            4. *Fourth: Change statements into questions*
                a. *"Change statements into questions"*
        ii. *Alright, is everyone ready to play?!*

        i. *Look at this picture... (pause about 10 seconds)*
            1. *What are you curious about when you see this picture?*
            2. *What would you like to know?*
            3. *Is there anything confusing you?*
        ii. *Now, I would like to know all of your questions. When you have a question, raise your hand and I will call on you. Please state your question slowly so I can write it down exactly how you said it.*

iii. **Set a timer for approximately 5 minutes**
iv. **REMEMBER the rules for the scribe/guide:**
1. **Write questions word for word, numbered, and (in discussion only), with scientist initials**
2. **Monitor student adherence to the process**
3. **Do not give examples**
4. **Do not get pulled into group discussion**
5. **Acknowledge all contributions equally: "thank you"**

b. *Thank you for all your questions! We will go back to your questions at the end of the day today. Think if you can answer these questions as we go through the activity.*

2. Intro Activity

a. **Place 'secret mystery' sight bag on table.**
b. *This is a 'secret mystery' bag that has something inside.*
   i. *How can you figure out what is inside the bag?*
c. **Direct scientists to shake, smell, and feel the bag**
d. **Sight**: *Let's use our eyes and our sense of sight find out what's in this bag.*
e. **Show inside of the bag to each UQUEST scientist. Don't take lemon out of bag.**
   i. **Ask scientists what they see in the bag** (lemon)
   ii. **Ask color of lemon** (yellow)
   iii. *You just did something that scientists do. Like a scientist, you used a very important skill called* ***observation*** *to collect information. By observing with your eyes, you got a lot of information about the lemon.*
f. **Explain how scientists use not only their eyes to make observations, but also other senses too.**
   i. *Scientists can use their seeing* (**point to eyes***), hearing (***point to ears***), taste (***stick out tongue or point to mouth***), smell (***point to nose***), and touch (***wiggle fingers***) to collect information.*
g. *You are a scientist because you observe with your senses.*
h. **Explain health benefits of using our senses to keep us safe and healthy.**
   i. **Ask for examples of ways that we use our sense to keep safe**
      1. **Example***: If you touch a hot stove, your sense of touch would send a signal to your brain to tell your hand to quickly move off the stove.*

I Spy Activity

i. *Now we're going to do play I Spy!*
j. **Explain rules of the game. Guide and scientists will locate objects around the classroom that have different sounds, smells, textures, and shapes.**
   i. **<u>Examples:</u>**
      1. *I spy...something red*
      2. *I spy...something soft*
      3. *I spy...something that makes a quiet sound*
      4. *I spy...something in the shape of a circle*
      5. *I spy...something that smells good*

ii. **Note: Take turns so that each scientist has the opportunity to state something that they "spy."**

3. **Activity**
   a. **Reintroduce that we will be using all five senses: see, hear, smell, taste, touch**
   b. **Instruct scientists to use lab notebook to write down predictions and/or draw pictures in their lab notebooks of what they observe for each of the 5 senses activity.**
      i. **<u>Note:</u> If you are running low on time, have the scientists only write their predictions as drawing may take more time.**
   c. **For hearing, smell, and touch, there will be three brown paper bags with various objects inside.**
      i. **Bags will be shared and passed around the scientists within a team.**
      ii. **Carefully pass around bags while making sure scientists cannot see inside them.**
   d. **Hearing**
      i. **Shake the bags with the 1) cotton balls, 2) bells, and 3) coins.**
         1. *Use your ears to observe. Listen carefully to observe what is making the sound.*
      ii. **Have scientists write down their observation on page 1B of lab notebook**
         1. **Instruct scientists to NOT circle "Yes" or "No" just yet. They will do that at the end to show if their guess was correct or not.**
      iii. **Ask what kind of sound did it make?** (example: crinkly)
   e. **Smell**
      i. **Have students smell inside the bag with cotton balls soaked in 1) lemon, 2) almond, and 3) mint extract**
      ii. *Smell carefully to observe what the smell is.*
      iii. **Have scientists write down their observations**
      iv. **Ask what kind of smell it had?** (example: sweet)
   a. **Touch**
      i. **Give each UQUEST scientist their own wipe.**
         1. **Instruct scientists to close eyes and place hand inside of bag to use their sense of touch.**
         2. **Make sure they do not feel the outside of the bag, only the inside.**
      ii. **Each UQUEST scientist will take turns putting their hands inside the paper bags filled with 1) Feathers, 2) cotton balls, 3) Legos.**
         1. **Wipe hands with wipe after touching**
      iii. **Have scientists write down their observations**
      iv. **Once all scientists are done writing, ask:** *what did it feel like?*
   b. **Taste**
      i. **Two types of berries: raspberries and blueberries**
      ii. **Instruct scientists to taste each berry on their plate and describe what they observe.**

1. *What did it taste like?*
    a. *Describe the taste*
    b. *Did it taste sweet or sour? Was it soft or rough? Was it bumpy or smooth?*

iii. **Have scientists write down their observations**

c. Sight

i. Use magnifying glasses to observe objects around us with our eyes.

1. *Magnifying glasses will help us view details of objects by making the object appear larger.*

ii. Observe leaves and marbles on the plate.

1. **Ask scientists what they notice and observe.**
2. *How does the magnifying glass help you see things you could not see with just your eyes?*
3. **Have scientists write down their observations**

REVEAL TIME

d. **Hearing reveal**

i. First, you observed by listening with your ears. Now use your eyes to see what is inside.

1. **Remove the 1) cotton balls, 2) bells, and 3) coins from the bags.**
2. *One page 1B of your lab notebook, circle "Yes" underneath your guess if you were correct. If you were wrong, circle "No."*

ii. Ask what led them to their guesses of what was in the bag

e. **Smell reveal**

i. Next, you observed by smelling with your nose. Now use your eyes to see what is inside.

1. **Remove the cotton balls soaked in 1) lemon, 2) almond, and 3) mint extract. State we are using eyes to see what is actually inside.**
2. *Circle "Yes" underneath your guess if you were correct. If you were wrong, circle "No."*

ii. Ask what led them to their guesses of what was in the bag

f. **Touch reveal**

i. Next, you observed by touching with your hand. Now use your eyes to see what is inside.

1. **Remove the 1) feathers, 2) cotton balls, and 3) Legos from the bag. State we are using eyes to see what is actually inside.**
2. *Circle "Yes" underneath your guess if you were correct. If you were wrong, circle "No."*

ii. Ask what led them to their guesses of what was in the bag

*iii. Now observe with your eyes AND ears AND hands by picking up one of these items and feel it with hand next to your ear***.**

1. *We can use more than one sense to give us more information. We can be sure about our observation now that we can see, hear, and touch the item.*

4. Documentation

a. **Explain purpose of a graph (help summarize data through picture or drawing)**

b. **Make a bar graph.**

i. *A bar graph is used to display groups of data. A bar graph can be used to compare data by using columns or solid bars to represent groups.*

ii. *Today we're going to graph data to show whether our guesses for the coin bag were correct or not.*

iii. *Let's make one to see how it works! Turn to page 1C.*

iv. *There are several parts to a graph.*

v. *First, we have the title of the graph that goes along the top.* **(point to the title)**

1. *We want the title to represent what we are trying to communicate with our data.*
2. *For today's graph we want to see how many UQUEST scientists' guesses were correct about the coins bag.*
3. *So, our title will be Was your guess correct?*
   a. *Take a crayon and circle the title on the graph.*

vi. *Next, we have this line that goes from side to side.*

1. *The label says "Did you guess correctly?"* **(point to the x-axis and move along it)** *This is where our answer choices will go.*
2. *For the question on whether your guess was correct we have two answers: Yes or No.*
   a. *Take another color crayon and draw a line on the x-axis here.*

vii. *Last, we have this line which goes up and down.*

1. *The label says "Number of UQUEST scientists"* **(point to y-axis and move finger up and down)**
2. *This represents the number of UQUEST scientists that will answer either Yes or No.*
   a. *Take another color crayon and draw a line on the y-axis here.*

viii. *We have the same graph on this white board for all teams to use.*

ix. *Look at 1B on your lab notebook to see your responses about the coins bag; yes or no.*

x. **Hand out one magnet to each scientist.**

xi. *One team at a time: Go up to the board and take turns putting your magnet on top of either the Yes or No group based on your answer.*

xii. *Now that every team has come up to the board and placed a magnet, we will draw a bar around the magnets to make a bar graph.*

xiii. *Now copy the white board graph onto your lab notebook page.*

xiv. *Did most people guess correctly that the hearing bag had coins in it?*

c. **UQUEST Leader will take a picture of the magnetic dry-erase easel for documentation.**

4. **QFT discussion**

a. *Now that have used our five senses, we are going to play the question game AGAIN! As a reminder, the question game has 4 rules.*

i. *First rule is: ask many questions*
ii. *Second: do not discuss or answer questions.*
iii. *Third: take turns asking questions*
iv. *Fourth: change statements into questions*

b. *Alright, is everyone ready to play?! If you had any questions during the activity, now is a great time to raise your hand and ask.*
c. *I want to know what questions you have about today's activity.*
d. *When you have a question raise your hand and I will call on you.*
e. *For every question that you ask, you will get a sticker.*
f. *Let's GO! Question time!*
g. **REMEMBER the rules for the scribe/guide:**

a. **Write questions word for word, numbered, and (in discussion only), with scientist initials**
b. **Monitor student adherence to the process**
c. **Do not give examples**
d. **Do not get pulled into group discussion**
e. **Acknowledge all contributions equally: "thank you"**

h. **Once the time to produce questions ends, guide circles the questions from both lists (introduction and discussion) that can be answered**

a. **Once all questions are selected, present one question at a time to the scientists for them to try to answer on their own.**
i. **If scientists cannot answer, guide answers to the best of their ability.**

i. **Hand out to the scientists one sticker per question *asked***

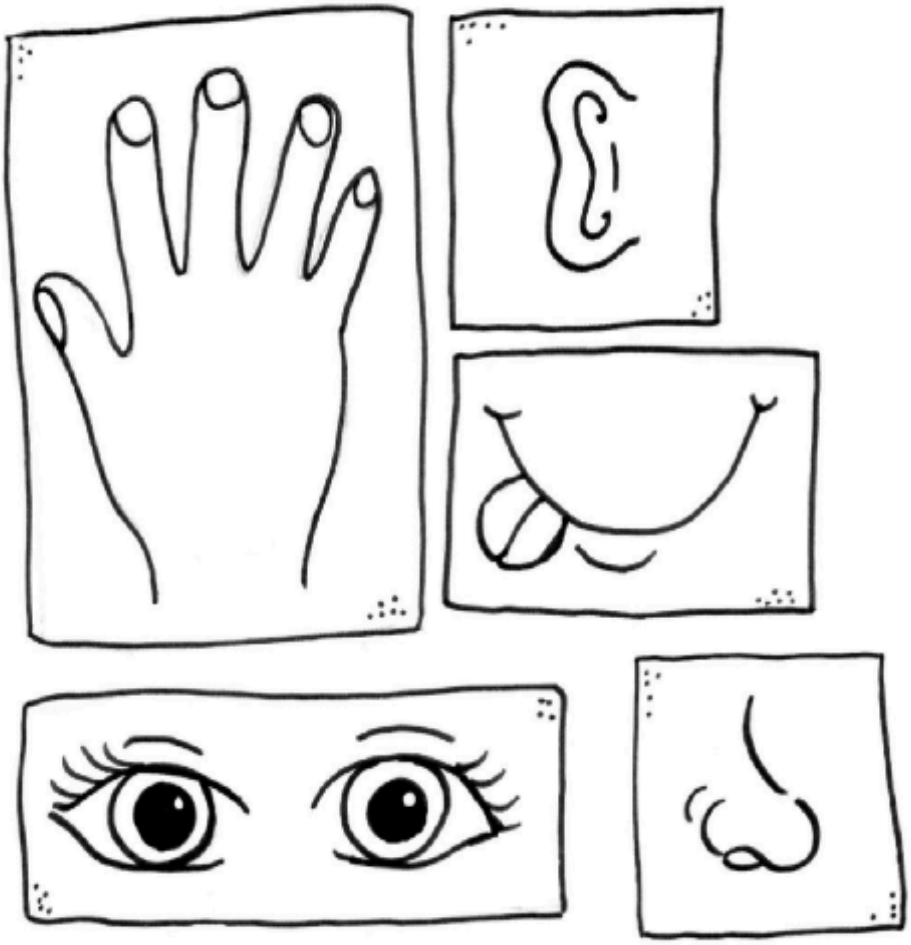
Wrap-up

a. What did you learn today? Write that down on the lines on page 1A.
b. How much did you like today's lesson on scale from strongly agree to strongly disagree. Fill out the bottom of page 1C.

Resources

Adapted from/Inspired by:
https://www.generationgenius.com/videolessons/five-senses-video-for-kids/

Lesson 1
That Makes Sense



What did I learn today?

_____

_____

_____

Date: _____

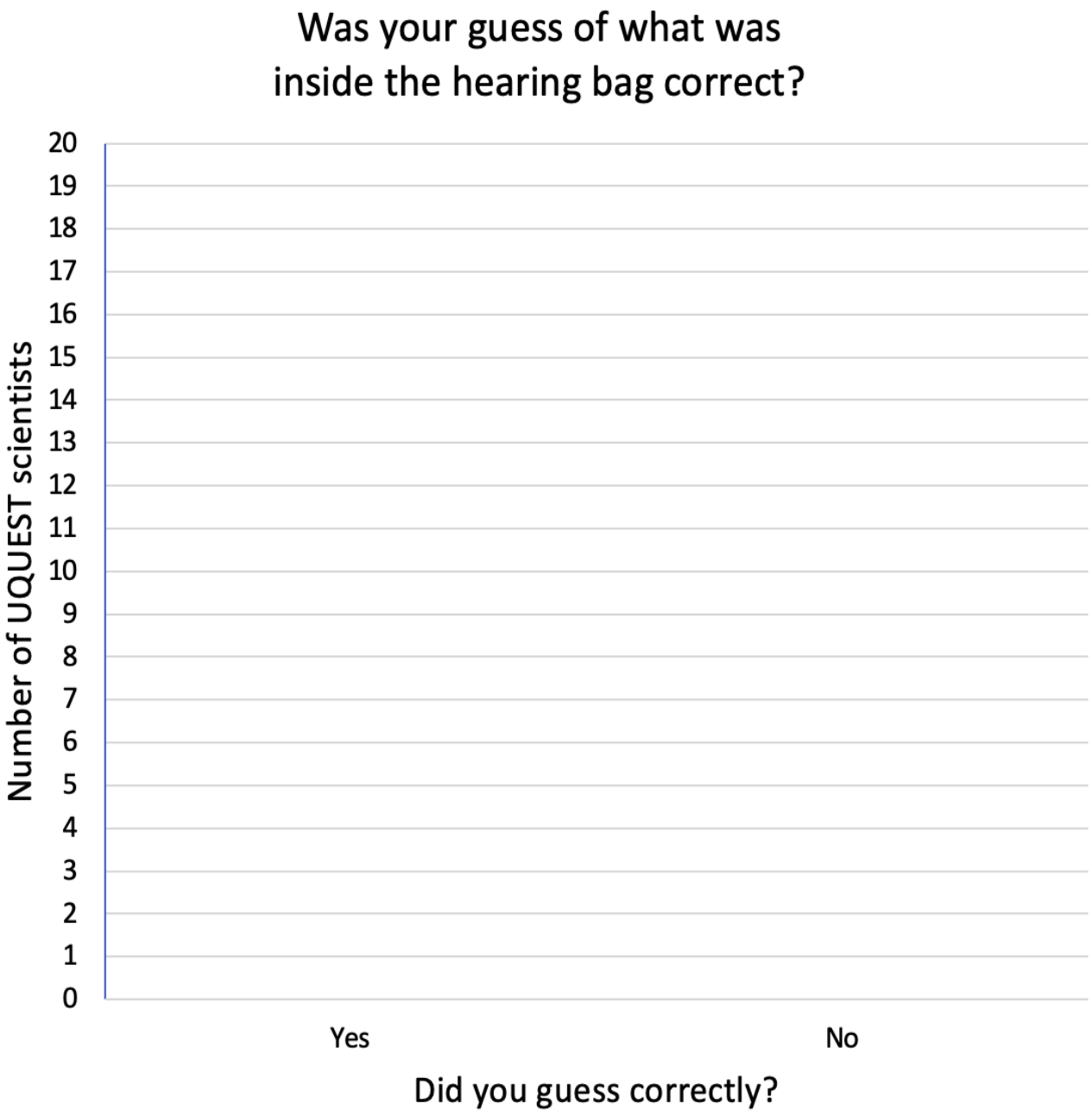
Observation

Instructions: Record your predictions and draw pictures of what you observe at each of the 5 stations. Once the contents of the bag are revealed, indicate whether your guess was correct by circling Yes or No.

Hearing	1 Yes or No	2 Yes or No	3 Yes or No
Smell	1 Yes or No	2 Yes or No	3 Yes or No
Touch	1 Yes or No	2 Yes or No	3 Yes or No
Taste			
Sight			

Date: _____

Graphing



I liked this lesson (circle one):

Strongly Agree	Agree	Disagree	Strongly Disagree

Question Game Rules

1. Ask many questions about the lesson
2. Do not discuss or answer questions
3. Take turns asking questions
4. Change statements into questions

<u>DON'T FORGET YOUR QUESTION WORDS!</u>

WHO? WHAT? WHERE?

WHEN? WHY? HOW?