Name_____ Period___ Date_____

Science as a Way of Knowing

Making and Communicating Observations: Exercise 1

Good science depends on good observations. This exercise is about careful observations and accurate descriptions. You should also be aware that scientists work together more often than they work alone. Because life is so complex, it is impossible for any one person to figure out everything about anything. As a scientist, you need to be able to communicate with scientists as well as everyone else.

In front of you is a dish of peanuts. *Please don't eat them because then we would not be able to collect the data we need.*

Describing a peanut is hard. A **qualitative** description might include things like "it's tan" or "it's big" or "it smells." Qualitative is nice, but qualitative words mean different things to different people. How big is a big peanut? **Quantitative** information is better. "The peanut is 35mm long" or "it has two nodes (the part that holds the nut)" are statements that can be verified by anyone.

Take a peanut and look at it. Write down a description of it that would allow you or your classmate to find your peanut if it were put back in the dish. ***Do not mark on your peanut!*** Write down all the things that can help identify that peanut. Be as clear as you can: measure things about it (e.g. how long is it? How much does it weigh?), note if it has any unusual markings, count the number of nodes, etc.

1. **Description of your peanut:**

Put you peanut back in the dish and mix them all up again. Try to find your peanut.

2. **Were you able to find your peanut again based on the description you wrote?**

Now, trade your bowl of peanuts with the table next to you. Pass along your descriptions with the peanuts. Take someone else's description from the table you traded with and try to find that peanut in the dish they gave your table. Make sure, by talking to the person who wrote the description, that you have found the right peanut.

3. **Was your classmate's description clear enough for you to find their peanut?**

4. **Why?**

Looking for Patterns: Exercise 2-1

Science is all about patterns and the ability to predict things by recognizing patterns.

Look at the line of cards in the teacher's example: A♠ 2♥ 5♣ 6♦ 9♠ 10♥

5. **What patterns do you see?**

We are looking for the one "true" pattern. A common problem in science is not having enough information to detect a pattern.

Imagine that we get the next card: A♠ 2♥ 5♣ 6♦ 9♠ 10♥9♣

6. **Which patterns are still patterns?**

7. **Which pattern were you able to eliminate?**

We still need more information to decide what the "true" pattern is.
What if we get one more card: A♠ 2♥ 5♣ 6♦ 9♠ 10♥9♣3♥

8. **What is the "true" pattern?**

Looking for Patterns: Exercise 2-2
Now look at the piece of cardboard and worksheet on your table. The two cards at the end of the sequence have little covers over them. *Do not flip the covers over until the directions on your worksheet ask you to "consider" the next card.*

9. **What <u>code</u> is written at the top of your cardboard and worksheet?**
   Make sure the code on your cardboard and worksheet are the same!

10. **Answer the questions on this worksheet.** *Do not write on the worksheet on your table!*

    1. ____ ____ ____ ____ (four choices are correct)
    2. ____ (only one choice is correct)
    3. ____ (only one choice is correct)
    4. ____ (only one choice is correct)
    5. ____ (only one choice is correct)
    6. ____ (only one choice is correct)

Adapted from <u>Principles of Biological Science Laboratory Manual</u>, 5th edition, by Aimee T. Lee
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