Hands-on-Activities Examples

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Sedentary Stan: Vascular Complications of Type 2 Diabetes

Full activity can be found at: http://teachhealthk-12.uthscsa.edu/activity/activity-5c-sedentary-stan-vascular-complications-type-2-diabetes

Studying Our Senses

We enjoy the flavors of the food we eat, and we identify the things we see easily, without even thinking about how we do it. But scientists have discovered that these sensory processes are amazingly complex and sophisticated.

In this lab, you will explore two types of sensory processes. First, you will investigate how you identify different flavors of jellybeans. Then, you will explore the surprising ways your brain interprets the visual images that reach your eye.

How Do We Identify Different Flavors of Food?

What part or parts of your body do you use to identify different flavors of jellybean?

Presumably, everyone agrees that you use your mouth to identify different flavors. But, do you use any other senses to identify different flavors of jellybeans?

What experiments could you do to determine if you use any other parts of your body besides your mouth to identify different flavors of jellybean?

Experiment

Precautions

Normally, no eating is allowed in a laboratory in order to avoid the risk that someone might eat something harmful and also to prevent the experiments from being contaminated by food.

The first set of experiments today involves eating jellybeans. To ensure that these experiments are done safely, observe the following precautions.

1. Clean your lab bench thoroughly with a disinfectant cloth.

2. Wash your hands before you begin the experiments.

3. Do not touch any jellybeans which will be eaten by someone else. Use a plastic spoon to place a jellybean in the person's hand.

4. If you are diabetic or have food allergies, please let your instructor know, so we can decide together whether it is safe for you to participate.

Explain why each of these precautions is necessary.

Investigation

[1] Teachers are encouraged to copy this student handout for classroom use. A Word file (which can be used to prepare a modified version if desired), *Teacher Preparation Notes, comments, and the complete list of our hands-on activities are available at* http://serendip.brynmawr.edu/sci_edu/waldron/.

This investigation will demonstrate the difference between flavor with and without the sense of smell. To discuss the results of this investigation, it is useful to make the following distinctions. We commonly say that we taste the flavor of food in our mouths. However, scientists use the word taste to refer just to the sensations produced by food in contact with the taste buds on the tongue. Smell refers to the sensations produced by food molecules or other odors in contact with the lining of the nose. How important do you think the sense of smell will be for identifying the flavor of a jellybean?

1. Close your eyes, hold your nose tightly, and have someone use a plastic spoon to give you a jellybean.

2. Chew this jellybean for 15 seconds and try to identify the flavor.

3. Then let go of your nose and continue chewing the jellybean and try again to identify the flavor.

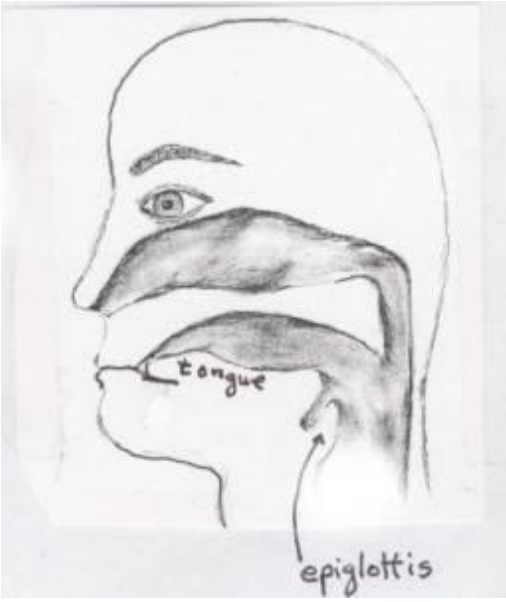
Describe the flavor sensations while holding your nose and after you let go of your nose. What happens when you let go of your nose?

Use the diagram of the mouth and nose to understand how odors from food get up into your nose. How does holding your nose prevent the sense of smell from contributing to your ability to identify the flavor?

Discussion

1. Why does food often seem tasteless when you have a cold?

2. Scientists have concluded that the taste buds on our tongues can distinguish five basic taste sensations -- sweet, sour, bitter, salty, and savory (sometimes called umami or hearty; responds to substances such as monosodium glutamate).



Would the five basic taste sensations be sufficient to distinguish all the different flavors of food? Could you identify the different flavors of jellybeans just by taste? Or do you need additional characteristics to distinguish the different flavors?

Scientists believe that we can distinguish thousands of different odors. The many different odors combined with the five basic tastes allow us to distinguish the many different flavors of food.

Seeing Is Believing -- Or Is It?

If you look at a picture, do you see the same thing each time?

1. Look at the first page of pictures. For each picture, describe what you see.

Do you see the same thing each time you look at it?

If you see different images at different times, can you see the two different images at the same time?

Does everyone in your group see the same thing when they look at the picture?

How do you interpret these results?

How can you see different images while you are looking at the same pattern of black and white on the page?

2. Now look at the picture on the top of the second page of pictures. This is a picture of a mammal. What is it?

After you have figured out what mammal is shown in this picture, look at the picture again and try to not see this mammal.

How do you interpret these results?

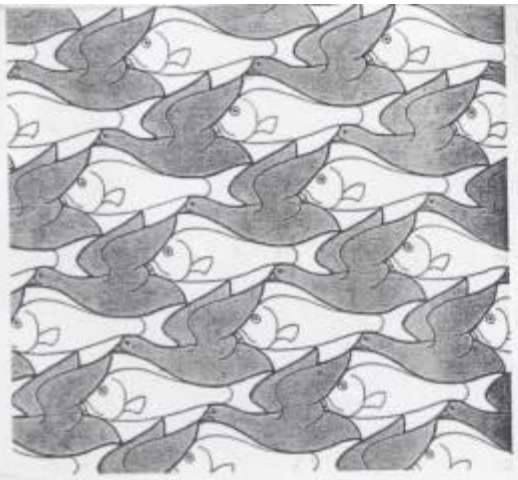
3. Now look at the bottom of the second page of pictures, which has two pictures which show the same two women, but in different positions.

In the picture on the left, do the two women look approximately the same size or different? In the picture on the right, do the two women look approximately the same size or different?

What accounts for the difference in apparent relative sizes in the picture on the left vs. the picture on the right?

These examples illustrate some of the many complex processes your brain uses to interpret visual stimuli. You know that the eyes play a crucial role in vision, but these examples illustrate that the brain is also crucial for vision.

Do you have any questions about how vision works?



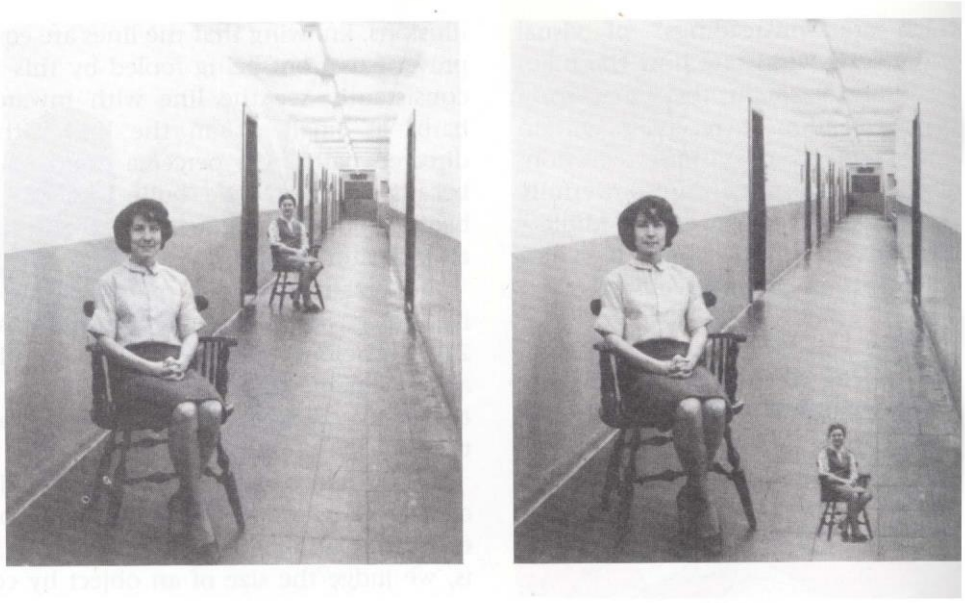
↑ from Kandel et al., 1995,
↓ Essentials of Neural Science and Behavior

8.5 Images are not pictures The rabbit-duck figure, first used in 1900 by Joseph Jastrow

from Gleitman et al., 1999, Psychology

SOURCE: Boring, 1930, p. 42.

from Westen, Psychology



(From Brown and Herrnstein, 1975.)

T--Shirt Chromatography

This is a fun and easy activity that can serve to introduce or reinforce the concept of chromatography to students.

This activity was adapted using the following website, which includes instructional videos: http://chemmovies.unl.edu/chemistry/beckerdemos/BD038.html

**Note: 91% isopropyl works best, but 70% will also work

T-•-Shirt Chromatography

Background Information:
Chromatography is a technique that uses physical methods to separate and analyze the components of mixtures, and it can be used to separate and purify almost any soluble substance! This separation is based on the tendency of each component to travel across the surface of another material at different speeds, depending on the polarity of the molecules. This powerful technique is used regularly in the real world and has many applications including testing water pollution levels, determining the presence of bombs at airports, and testing for pesticides.

Materials:

- White cotton t-•-shirt
- Rubbing alcohol/isopropyl alcohol
- 1 mL pipette/eye dropper
- Beakers of various sizes
- Assortment of colored permanent markers
- Rubber bands
- Goggles

Procedure:

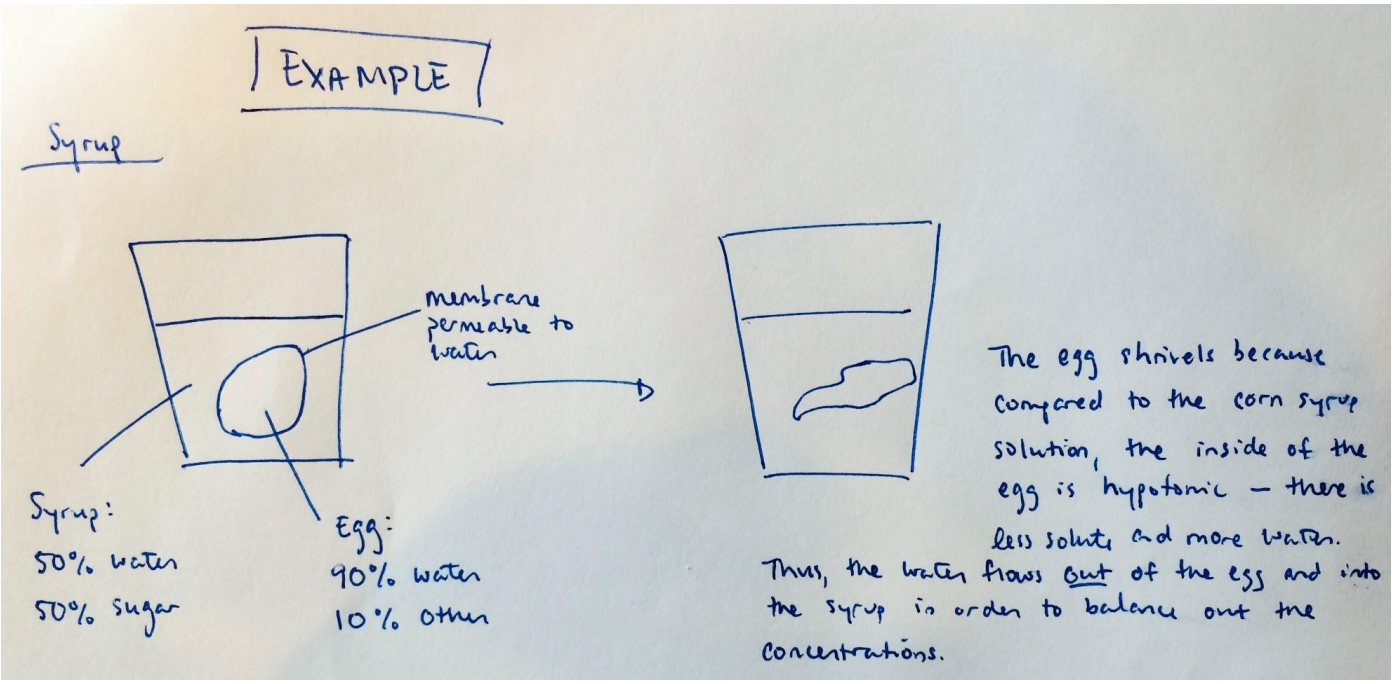
1. Pour 10 mL of rubbing alcohol into beaker.
2. Use 2 different colored permanent markers to place 5 or 6 dots in a circle on the shirt wherever desired, alternating dot colors. **DO NOT LET DRY
3. Place large-•-sized beaker inside the t-•-shirt wherever design was created. Secure beaker in place using rubber band, making sure t-•-shirt is tight over the beaker.
4. Using a pipette, draw up small amount of isopropyl alcohol.
5. Place pipette over center of design and SLOWLY dispense alcohol onto shirt, making sure that the excess alcohol that runs through the shirt collects in the beaker below.
6. Repeat steps 2-•-5 all over the shirt, experimenting with new patterns, dot size, and colors as desired.
7. Let dry before wearing, and use an iron to help the colors stay longer.
8. Dispose of used alcohol.

Osmosis Egg Lab

This lab takes multiple days and also STINKS so prepare your laboratory space (and warn your neighboring teachers) accordingly.

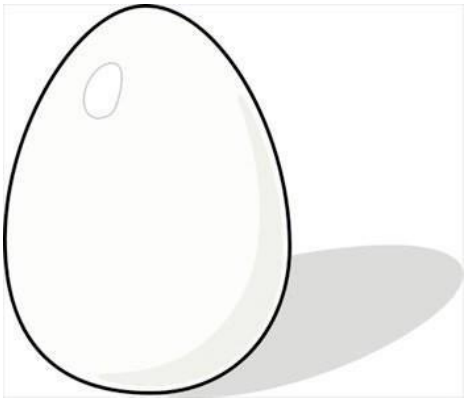
Students often have a lot of fun with this lab because they've never seen or handled an egg with the shell off. These eggs are VERY fragile, so it is important to stress this to students before they weigh or measure the eggs. It is best to prepare a number of spare eggs in the event students break theirs during the lab.

As for analysis question 4, this is the kind of answer expected in my class, but it depends on how you teach your students about diffusion. This is a VERY big---picture understanding of the concept.



Lab: Observing Osmosis in Cells

****CAUTION**** You will be handling raw eggs and using different chemical solutions. Be gentle with your eggs and take care of them. Breaking an egg will result in your lab grade being lowered by one whole letter grade. Also, be sure to wash your hands with soap and water upon completion of the lab each day.



Background Information

Osmosis is the process by which water enters our tissues through passive transport. This means that it will travel from an area with a high water concentration to an area with a lower water concentration across a cell membrane until both areas have the same concentration. A solution that has a higher concentration of solute in comparison to another solution is said to be hypertonic, while a solution that has a lower concentra tion of solute in comparison to another solution is said to be hypotonic. If the concentration of solute is the same for two solutions, they are said to be isotonic solutions.

Chicken eggs are examples of single cells. While most parts of the cell are too small to see, the membrane and the yolk can both be seen. In this example, there are two membranes on a chicken egg – an outer one that is hard and an inner one that cannot be seen without removing the shell. The yolk of a chicken egg is like a vacuole and stores food for the growing chicken. Like all cell membranes, the membrane of a chicken egg is selectively permeable. It allows materials the cell needs to come in but prevents unwanted molecules from entering.

The first step of this experiment is to soak the egg in vinegar, which will make the shell of the egg disappear. Vinegar contains acetic acid, and this reacts with calcium carbonate, which makes up the eggshell. This reaction gives off carbon dioxide so if you pay attention you will see bubbles coming off the egg as soon as they are added to the vinegar.

Answer the following questions based on the passage above:

1. What does it mean when the cell membrane is described as being “selectively permeable”?

2. What is the difference between a hypertonic, a hypotonic, and an isotonic solution?

3. What does vinegar do to eggs, and what will we observe that will let us know that the reaction was happening?

Procedures:

Day 1:

1. Obtain two cups. Using a marker and tape, label one cup “Cup A” and another “Cup B”.
2. Obtain two eggs and note which one is “egg A” and “egg B”.
3. Using a balance, find the initial masses (in grams) of both eggs.
4. Using a ruler and string, find the initial sizes (in centimeters) of both eggs.
5. Record this data under “Initial Observations” section.
6. Using a beaker, fill each cup with_____mL of vinegar.
7. Write the names of your group members on the cups and place in designated area.
8. Let sit for 24 hours.

Day 2:

1. Remove eggs from vinegar. Place on paper towel and observe.
2. Find the mass of the eggs in grams.
3. Find the size of the eggs in centimeters.
4. Record this data in appropriate table.
5. Rinse vinegar cups out and make sure they are still labeled “Cup A” and “Cup B”.
6. Measure out_____mL of distilled water using a graduated cylinder. Pour into Cup A and add Egg A to cup.
7. Measure out_____mL of corn syrup using a graduated cylinder. Pour into Cup B and add Egg B to cup.
8. Let sit for 24 hours.
9. Clean up lab area and materials.

Day 3:

1. Carefully remove eggs from cups. Place on paper towels and observe.
2. Make observations about the contents of the cups and the eggs.
3. Find the mass and size of each egg.
4. Pop the eggs and observe the material inside.
5. Clean up lab area and materials.

Purpose Question: What are you trying to find out in this activity?

Based on what you know and the list of possible materials presented to you, come up with a solid purpose question. It must have an independent and a dependent variable and be in the following format: What is the effect of (the independent variable) on (the dependent variable)?

Independent variable and specific conditions: Dependent variable:

Purpose question:

Hypothesis: What do you think is going to happen and why?

Please make a prediction about what is going to happen to each of the eggs in the separate solutions. Incorporate the terms hypertonic, hypotonic, or isotonic into your predictions.

Initial Observations: Pre-•-Vinegar

Egg	Drawing and Description	Mass (g)	Size (cm)
Egg A			
Egg B			

Second Observation: Post-•-Vinegar

Egg	Drawing and Description	Mass (g)	Size (cm)
Egg A Water			
Egg B Syrup			

Third Observations: Water or Corn Syrup

Egg	Drawing and Description	Mass (g)	Size (cm)
Egg A			
Egg B			

*Name:*_____*Date:*_____

Analysis

1. Determine the percent increase/decrease in the mass and size of your egg after EACH day. You should have 2 calculations for each egg. Show your work. Use the following formula:

% Change = 100 x (New Value – Original Value) / Original Value

Example:

Mass before vinegar = 100 g, Mass after vinegar = 120 g

% Change = 100 x (120 – 100) / 100 = 20% increase in mass between Day 1 and Day 2

2. Which of the solutions used is an example of a hypertonic solution? Use your QUANTITATIVE observations to support your answer.

3. Which of the solutions used is an example of a hypotonic solution? Use your QUANTITATIVE observations to support your answer.

4. Draw two pictures that represent what you have investigated in this experiment. Your drawing should be similar to the class osmosis problems that we completed. You should create numbers that are representative of the type of solutions that distilled water and syrup are.

5. A line graph is used to demonstrate change over time. Using your data, make one line graphing showing the change in the mass over time and the change in size over time. Include a title, labels, and a key. The time points you should be using are before vinegar, after vinegar, and after solution.

Conclusion

In the space below, write the conclusion paragraph to this experiment. Be sure to answer your purpose question, tell if your hypothesis is right or wrong and why, and state what you could do in the future to further this experiment. Additionally, explain how this lab reflects what you have already learned in class.

Photosynthesis Lab

This lab was adapted from the following website: http://www.elbiology.com/labtools/Leafdisk.html.

Please refer to this site for how to prepare the baking soda and soap solution, how to properly remove the air from the spinach discs, etc.

This lab can easily be modified in a variety of ways. The following are examples of purpose questions that are appropriate for this lab. The first example is what this lab handout is designed for, while the second is another way you could approach it. You could also have students develop their own experiment related to this as an extension of this experiment.

1. What is the effect of colored light on the time it takes the discs to float? IV: colored light
   DV: time (proxy for photosynthetic activity)
2. What is the effect of light intensity on the time it takes the discs to float? IV: light intensity
   DV: time

Name:_____Date:_____Period: _____

Photosynthesis Lab

Materials:

- Syringe
- Baking soda/soap solution
- Spinach leaves
- Hole punch
- Lamp
- Colored cellophane
- Clear cups or beakers
- Timer
- Ruler

Procedures:

1. Collect materials.
2. Punch out_____spinach discs using hole---punch.
3. Put_____discs into syringe barrel.
4. Fill syringe with enough baking soda/soap solution to cover discs.
5. Hold finger over tip of syringe and pull back on the plunger (not all the way!!). Release finger and repeat until none of the discs are floating.
6. Empty discs into cup.
7. Fill cup with_____mL of solution.
8. Repeatsteps3---7twomoretimes.
9. Create stations with 3 lamps, one with natural lighting, one with a_____colored light, and another with a colored light.
10. Set one cup_____away from the bottom of each lamp, respectively.
11. Turn lamp on and start timer.
12. Record the number of floating discs in each cup after each minute that passes until all 10 discs are floating or 20 minutes has passed.
13. Observe leaf discs in the solution in all cups. What evidence do you see of photosynthesis?
14. Turn lamp off. Empty cups into sink. Throw away spinach. Clean tables and put supplies back.

Purpose Question:

Based on what you know and the materials and procedures presented to you, come up with a solid purpose question for this experiment. It must have an independent and a dependent variable and be in the following format: What is the effect of (the independent variable) on (the dependent variable)?

Independent variable and specific conditions: Dependent variable:

Purpose question: Control group:

Hypothesis:

Explain what you think is going to happen and why.

Data:

Look at your experimental findings. Which type of graph would be appropriate for your data? Explain in the space below and then create your graph.

Analysis:

1. We will use the time when 50% of discs were floating to determine how the different conditions were affected by the color of light. The larger the number is, the slower the plants performed photosynthesis. Using your graph, interpolate to find these values.

Lighting Condition	Time when 50% of discs were floating

2. Based on the table above, which condition allowed for the fastest photosynthesis? Which caused the slowest photosynthesis? Why?

3. Name three sources of error for your experiment.

4. The experiment you just performed has to do with photosynthesis. Describe what you observed happening in this lab using your knowledge of photosynthesis. Your answer should BE DETAILED enough to explain WHY you observed what you did.

5. For your experiment you tested three colors of light. Find another group in the class that used DIFFERENT colors. Compare your results. With this new information, which color of light is the best for photosynthesis, and which is worst? Explain your answer using QUANTITATIVE evidence.

6. Imagine at the end of your experiment when all of the discs are floating you put foil on top of the cups. Predict what would happen over time, and explain your thinking.

Conclusion: In the space below, write the conclusion paragraph to this experiment. Be sure to answer your purpose question, tell if your hypothesis is right or wrong and why, and state another experiment you could do in the future to further this experiment. Additionally, explain how this lab reflects what you have already learned in class.

Writing Procedures

**** You may adjust how you do this activity, just remember th**e objective is to show students how important procedures are. You may want to include other tasks like wrapping a Christmas present or washing hands. At the end of this activity is a handout on writing procedures.

Objectives: Students will…

- learn the importance of writing clear and accurate procedures
- write a procedure for making a PB&J sandwich

Materials:

- PB&J Sandwich
  - 1 loaf bread
  - 1 jar peanut butter *
  - 1 jar jelly
  - paper plates
  - Knife, spoon
  - Standard clean-up equipment
- Christmas Present
  - Box
  - Wrapping Paper
  - Tape
  - Scissors
  - Name Tag
  - Pen
- Washing Hands
  - Soap
  - Towel
  - Sink

*Find out if any students have allergies to peanuts before beginning.

Introduction

Review with students the steps of the scientific method as they have studied them. Focus on the importance of the experiment and the set of directions for how to do the experiment, called the procedure. One of the reasons procedures are important is because other scientists must be able to do the same experiment in the same way to see if they get the same results. Today they will be writing procedures for a very important, very difficult task.

Procedure

1. The problem

Assign students to working pairs. Explain to students that you (the instructor) have just arrived on this planet. You have discovered the greatest thing in the entire universe and want to take it back to your planet, but don't know how to make it, so you need their help. They will work in pairs to write the procedure, the set of directions, for making a peanut butter and jelly sandwich.

Show them the materials that you have to work with - a loaf of bread, a jar of peanut butter, a jar of jelly, and a knife. Give students 10 minutes to work on writing the procedure.

2. Making a peanut butter and jelly sandwich

At the end of the time, have volunteers read the directions they have written, as you follow them to the letter. Be extremely literal, for example if they say, "put the peanut butter on the bread" as their first step, place the unopened jar of peanut butter on the unopened loaf of bread. If they say, "open the peanut butter," struggle with pulling the cap off.

Have students verbally change directions to make them more precise as you go along. Always give the person who gave you the directions the first crack at improving the wording. Give students a chance to rewrite their procedures, then go through a few together.

Conclusion

When you have successfully made a few sandwiches, split them up for all the members of the class to eat. As they eat, discuss the importance of clear directions. The key to clear directions is to imagine that the person has never seen any of the equipment and has no idea what to do with it.

Materials and Methods

- In the Materials and Methods section you explain clearly how you conducted your study in order to: (1) enable readers to evaluate the work performed and (2) permit others to replicate your study.
- You must describe exactly what you did: what and how experiments were run, what, how much, how often, where, when, and why equipment and materials were used.
- You should maintain a balance between brevity (you cannot describe every technical issue) and completeness (you need to give adequate detail so that readers know what happened).
- Ethics training. Why they need to include it in the procedures? Even if they have completed this training - trainings are good for three years - they still need to include it as a procedure step. It needs to be first on the procedure slide for everyone who is doing a human subject study. This shows that they were trained how to complete a human subject experiment/intervention without harm to the human subject, ETC. Names on list - The training list hasn't been updated since September 4th, so if students completed this after this date let your teacher know so that he/she can tell the CRA. This is a safety produce.
- Safety produces need to be included in the main procedures. They are not separate from the other procedures they need to be included as a step and as you complete them.
- Order your procedures chronologically or by type of procedure and then chronologically within type of procedure using sub-headings, where appropriate, to clarify what you did. Number the procedures as steps, don't write the procedures like you would in a research paper, i.e. paragraph form.
- Use the past tense and the third person to describe what you did. For example: “The sample was incubated at 37ºC for 3 days.” - NOT: “I incubate the sample at 37ºC for 3 days.” This is very important for the final presentation, remember when you present the final presentation you have already completed the whole project.
- Describe your experimental design clearly, including the hypotheses you tested, variables measured, how many replicates you had, controls, treatments, etc.
- Explain why each procedure was done.
- Identify the source of any specific type of equipment, tool, ETC which is critical to the success of the experiment. Describe in detail any modifications to equipment if needed.
- Identify treatments using the variable or treatment name, rather than an ambiguous, generic name or number (e.g., use "healthy donors" rather than "group 1").
- Describe statistical tests and the comparisons made; ordinary statistical methods should be used without comment; advanced or unusual methods

may require a literature citation.

- Show your Materials and Methods slides to other students, teachers, parents, ETC and ask whether they would have difficulty in understanding and/or repeating your study.
- Don't mix results with procedures.
- Omit all explanatory information and background - save it for the discussion.

References:

Scientific, Medical and General Proofreading and Editing. "Twelve Steps to Writing an Effective Materials and Methods." Retrieved Nov 2013from http://www.sfedit.net/methods.pdf

Example Data Questions

- You can use sets of data or run through examples where students collect their own data.
- You can place the problems on note cards and have students identify variables, hypotheses and correct stats test.

Problem #1

- Research Question: Is there a difference among gender and if they have the HPV shot?
- Independent Variable:
- Dependent Variable:
- Hypothesis:
- Null:
- Stats Test:

Problem #2

- Research Question: Is there a difference among seniors in WV and VA when their SAT scores are compared?
- Independent Variable:
- Dependent Variable:
- Hypothesis:
- Null:
- Stats Test:

Problem #3

- Research Question: Among residents in Raleigh, Braxton and Monongalia which county has the healthiest BMI?
- Independent Variable:
- Dependent Variable:
- Hypothesis:
- Null:
- Stats Test:

Problem #4

- Research Question: Is blood pressure influenced by race?
- Independent Variable:
- Dependent Variable:
- Hypothesis:
- Null:
- Stats Test:

Problem #5

- Research Question: How does height relate to someone's vertical jump score?
- Independent Variable:
- Dependent Variable:
- Hypothesis:

- Null:
- Stats Test:

Problem #6

- Research Question: Does blood pressure influence weight?
- Independent Variable:
- Dependent Variable:
- Hypothesis:
- Null:
- Stats Test:

Homeostasis Lab: The Effects of Exercise on Homeostasis

A: Purpose

To discover the effect that various levels of exercise have on specific body parameters.

B: Hypothesis

How do you predict the 6 observed and measured parameters will change as the subject exercises?

C: Materials

Automatic blood pressure cuff, thermometer, stopwatch, rubbing alcohol, cotton balls.

D: Introduction

Exercise causes many homeostatic factors to kick in, in an effort to maintain internal homeostasis. How exercise affects some of these homeostatic factors can be determined by measuring and observing certain parameters such as:

blood pressure

change in skin color on arms and

face perspiration level

external body

temperature heart rate

breathing rate

In the following lab 1 member of your lab group will exercise for 8 minutes by skipping in place over increasing intervals. The parameters listed above will be recorded at rest, after 2 minutes, 3 more minutes, 4 more minutes and 5 more minutes, and 2 minutes after exercise has stopped. The subject should stop just long enough for the needed measurements to be taken. Record all data in the table provided. The final lab report you turn in should follow the format that I have provided to you. In addition, your report is to include a graph for each of the 5 measured parameters (i.e. blood pressure, body temperature, heart rate, and breathing rate). The questions at the end of the lab should be a part of your result and discussion sections.

E: Procedure

1. Each group should obtain: an automatic blood pressure cuff, thermometer and a stopwatch.

2. Record the resting observations and values of your subject for each of the 6 parameters.

Record normal skin color of hands and face (i.e. pale, pink,

red, etc.) Record normal perspiration level (i.e. none, mild,

medium, high, etc.)

Record blood pressure (systolic and diastolic) using the automatic blood pressure cuff. Make sure the subject is still while this reading is taken (it is suggested that the subject have the cuff on while exercising, although it should be detached from the automatic pump to avoid pulling it off the table – and just attached during the break to take readings).

Record external body temperature by placing the thermometer under the subjects arm pit for one minute (note: measurements should be taken directly from the skin).

Determine the breathing rate by counting the number of breaths taken in one minute.

3. Have your subject begin to skip in place. Please note your subject should be sure to exercise at a level they can maintain for the entire 15 minutes.

4. Take your subjects parameter readings using the same techniques described above at the 2 minute mark, after 3 more minutes of exercise, after 4 more minutes, and once more after 5 minutes of exercise. Be sure to take final readings 2 minutes after your subject has stopped exercising.

5. Record all of your parameter readings in the table provided.

6. After cleaning your thermometer with ethanol, return it along with the other lab materials to the front of the room.

F: Observations

	Body Color/ Perspiration	Blood Pressure	Body Temp (Celsius)	Heart Rate (beats/min)	Breathing Rate
REST					
2 min of exercise					
3 more min of exercise					
4 more min of exercise					
5 more min of exercise					
2 min after exercise					

G: Analysis

1. Plot your measured data on 3 graphs. You should plot 1 graph each for body temperature, heart rate, and breathing rate versus the duration of exercise (i.e. rest, 2, 4, 6, 8, 9 min).

2. Describe your results for each of the 5 parameters.

H: Discussion Questions

1. What are the changes you observed in body color and perspiration level in response to? How do these changes contribute to the maintenance of homeostasis?

2. Why do you think a change in body temperature occurs? What mechanisms does your body use to maintain its homeostatic temperature?

3. Why does an increase in heart rate and breathing rate accompany exercise?

4. By studying your parameter measurements after exercise has stopped, what conclusions can you make about your body's ability to maintain homeostasis?

Lab Scavenger Hunt

HSTA Club Lab Equipment Scavenger Hunt

Something to protect your eyes during lab. _____

Something to protect your clothes during lab. _____

Something to measure temperature _____

Something to measure mass. _____

Something to measure volume. _____

Something to cut paper. _____

Something to pour neatly into a small opening _____

Something to mount a specimen on for microscope viewing _____

Something to place or measure small drops of liquid _____

Something to heat materials _____

Something hold test tubes _____

Something to handle hot items _____

Something to hold a test tube over heat _____

Something to scoop dry chemicals from stock container_____

Something to view small objects _____

Thinking about My Career Goals

THINKING ABOUT MY CAREER GOALS

What I Already Know:

My career of choice is: _____

I think I will earn approximately per year: _____

I will need to go to college for _____ years and attain these degrees or technical trainings:

_____

The college I plan to attend is: _____--

Classes I need to take in high school are _____

_____

I will need at least the ACT score _____ or this SAT score _____ for admission.

My education will cost:

Tuition/Fees: _____

Room/Board: _____

Textbooks: _____

Now: Use the internet to compare what you have written above to actual information that you found about your career path.

What I Found Out:

The average yearly salary is: _____

I will need to go to college for _____ years and attain these degrees or technical trainings:

_____

The college I plan to attend is: _____--

Classes I need to take in high school are _____

_____

I will need at least the ACT score _____ or this SAT score _____ for admission.

My education will cost:

Tuition/Fees: _____

Room/Board: _____

Textbooks: _____

Cooking Candy

Check out this activity at http://www.exploratorium.edu/cooking/candy/candy-links.html

- Science of butter and sugar ensures butterscotch success
- The Physical Chemistry of Making Fudge

Coding

Get students excited about computer science! Check out https://code.org/ and https://studio.code.org/courses for free courses, games, apps, ETC!

Check out their global event Hour of Code: https://hourofcode.com/us

Science and Giving Back

Community Service and Hands-on-Activities… how much more fun can you have! Students last spring did a sheep eye dissection with their local 2nd grade class. The practiced during a club meeting and then lead the activity with 2nd graders. Connect with your local elementary teacher to make this experience the best!

Need another activity? Make Moon Sand, Homemade Ice Cream and anything that makes a mess!

Making Graphs

Making graphs isn't always fun make an important skill to have. Mix it up with graphing different colored candies, different types of candies, birth dates of friends in Facebook, etc. Important skills to take away: how to record data in excel, create a graph in excel, label y-axis, label x-axis, title, key and how to explain the graph.

Roller Coaster

Challenge students to create a 'roller coaster/slide' for a marble using only the materials given. For example you can give them tape, paper plates, straws, and paper towel rolls. You can even give a small lecture on how roller coaster work.

Students like physics and engineering? Do the egg drop and/or pumpkin drop challenge!

Salsa Time

Grow a classroom mini garden. Invite the local 4H Extension person in as a guest speaker to talk about gardening. Then grow everything you need for a salsa garden! Onions, tomato, garlic, peppers, cilantro, jalapeno!

Physical Activity

Physical activity time? Take a walk around the school or near a park. Bird Calls? It's a real thing, learn how to identify different bird calls. Take blood pressure measurements before and after a walk. Challenge students get to 10,000 steps in a day, start a walking club and measure health outcomes (project idea).

Projects

Have students doing different projects? Turn them into hands-on-activities. Group 1 doing a plant project – have other students help with the set up, data collection, run their own mini experiment. Group 2 have a human experiment project – practice with the HSTA club first. Group 3 have a survey project – do a club activity with entering data, graphing and stats.