

Lab Framework

Text: CORD

Unit number and title: Unit 36 – Logic

Short Description: Students are given snack foods with nutritional labels on them, and daily dietary guidelines. They are then asked what snack options are available for a variety of scenarios and to create a truth table for one of the scenarios.

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Lab Title **Snack Time**

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
Solve problems using logical reasoning to determine an answer based on specific and adjustable restrictions and variables.
- **Statement of pre-requisite skills needed**
Basic math skills: adding/subtracting/multiplying/dividing/graphing
Basic algebra skills: solving for one unknown
- **Vocabulary**
Deductive Reasoning
Logic
Truth Table
- **Materials List**
 - Give each group:
 - 1 package of each of the following items: Skittles, Pop Secret Microwave Popcorn, Diet Coke, Honey Maid Low Fat Honey Graham Crackers, Kraft Original Corn Nuts, Tootsie Roll, Twinkie
 - Give each student:
 - An information sheet with the following information
 - Daily Recommendations for Nutrition
 - Fiber Sources - ranking
 - Conversion Values for grams to milligrams and calories
 - Worksheet to record data, calculations, and results
 - Truth Table Worksheet for visual representation of results
- **State Standards addressed**
 - **Math:**
 - G.1.A: Distinguish between inductive and deductive reasoning.
 - G.6.F: Solve problems involving measurement conversions within and between systems, including those involving derived units, and analyze solutions in terms of reasonableness of solutions and appropriate units.
 - G.7.A: Analyze a problem situation and represent it mathematically.
 - G.7.C: Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.

- G.7.E: Read and interpret diagrams, graphs, and text containing the symbols, language, and conventions of mathematics.
 - G.7.F: Summarize mathematical ideas with precision and efficiency for a given audience and purpose.
 - **Reading:**
 - EALR 2: The student understands the meaning of what is read.
 - EALR 3: The student reads different materials for a variety of purposes.
 - **Writing:**
 - EALR 2: The student writes in a variety of forms for different audiences and purposes.
 - **Communication:**
 - EALR 1: The student uses listening and observation skills and strategies to gain understanding.
 - EALR 3: The student uses communication skills and strategies to effectively present ideas and one's self in a variety of situations.
 - **Leadership Skills:**
 - 1.1 The student will analyze, refine, and apply decision-making skills through classroom, family, community, and business, and industry (work-related) experiences
 - 1.5 The student will be involved in activities that require applying theory, problem-solving, and using critical and creative thinking skills while understanding outcomes of related decisions
 - 2.1 The student will communicate, participate, and advocate effectively in pairs, small groups, teams, and large groups in order to reach common goals.
 - 2.8 The student will demonstrate the ability to incorporate and utilize the principles of group dynamics in a variety of settings
 - **Employability Skills**
 - 1.1 The student will demonstrate the ability to identify, organize, plan and allocate resources. This means that the student is able to demonstrate allocating time, money, materials, space and staff.
 - 1.2 The student will demonstrate the ability to acquire and use information in family, community, business and industry settings. This means that the students can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.
- **Set-up information**
 - Make copies of information sheet, data worksheet, and truth table worksheet
 - Set out calculators
 - **INTRODUCTION TO LAB GIVEN FIRST DAY**
Inform the students that they are picking a snacks based on logic using the information from 4 different scenarios. They will be given information on a person's dietary restrictions based on their specific health concerns. They will also be given information about what the person has already eaten during the day.

Provide them with one of each possible snack (along with the packaging). They must then use logic to determine which of the snacks would meet the dietary restrictions for each of the different scenarios.

Given the Daily Recommendations for Nutrition, they must compare the scenario to the snacks and determine what choices would be logical options for the eater.

They should create a truth table for the final scenario in order to help them determine which snack(s) would be the logical choice(s).

- **Lab organization** (-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)
 - This lab can be broken into 2 segments that may take 1/2 a week to complete.
 - In the first segment, students will be collecting data from the nutritional labels on the food and set up a truth table for the final scenario.
 - In the final segment, students will record their results and explain what factors lead to the selection of the option(s) they determined met the scenario requirements and what factors eliminated the other option(s).
- **Teacher Assessment of student learning** (scoring guide, rubric)
 - These items should be turned in for evaluation
 - Worksheet – data collection & calculations
 - Truth Table Worksheet
- **Summary of learning** (to be finished after student completes lab)
 - discuss real world application of learning from lab
 - opportunity for students to share/present learning
- **Optional activities**
 - You could have students create truth tables for all scenarios. You could also just provide a copy of the nutritional information panels for each food instead of the actual items.
- **Career Applications**
 - Dietitian
 - Nutritionist
 - Weight Loss Consultant
 - Physicians
 - Nurse

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Lab Information Sheet

Unit: 36 Logic

Lab Title: Snack Time

Daily Recommendations for Nutrition:

	<u>1500</u>	<u>2000</u>	<u>2500</u>
Total Fat	< 50g	<65g	<80g
Sat Fat	<15g	<20g	<25g
Cholesterol	<300mg	<300mg	<300mg
Sodium	<2400mg	<2400mg	<2400mg
Dietary Fiber	>20g	>25g	>30g

(According to the U.S. Department of Health & Human Services)

Fiber Sources:

- =>5 grams per serving is excellent source of fiber
- 2.5-4.9 grams per serving is good source of fiber
- <2.5 grams per serving is a poor source of fiber

(According to the American Diabetes Association)

Conversion Values:

- 1 gram = 100 milligrams
- 1 gram fat = 9 calories

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LAB TITLE: Snack Time

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
What are the valid snack choices given specific scenarios?
- **Grouping instructions and roles**
Students will work in groups of 3-4 and will be responsible for having their own work recorded. Each group will work together on data collection. Each individual will record the data and calculation results on their own data collection/calculation sheet.
- **Procedures** – steps to follow/instructions
Students will collect data on from the nutritional information labels of snack foods as groups, make calculations of available amounts in nutritional categories based on scenarios, select valid nutritional options for given scenarios, and create and explain truth table results for a scenario.
- **Outcome instructions**
Students should be able to see that it is helpful to use a truth table when multiple variables are changeable in the process of logical reasoning.
- **Assessment instructions** (peer-teacher)
Students will help each other within the group. Worksheets are collected and graded for completeness and detail in documentation and reasoning.

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Lab Data Collection & Calculations

Student: _____ **Date:** _____

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Criteria: Write the problem/objective in statement form
What are the valid snack choices given specific scenarios?

Data Collection: Record the collected/given data

Step 1: Collect the Following Per Serving Data from the Nutritional Labels on the Following Snacks:

	Calories	Total Fat	Saturated Fat	Sodium	Dietary Fiber	Sugar
Corn Nuts						
Diet Coke						
Tootsie Roll						
Graham Crackers						
Skittles						
Twinkies						
Popcorn						

Calculations: Calculate nutritional information for each scenario below to solve for an answer(s)

Step 2: Calculate how many calories, total fat, saturated fat, sodium, dietary fiber and sugar the person has available to eat in each scenario. Compare to the nutritional data chart from step 1 to eliminate invalid options.

Summary Statement:

Step 3: Select the final valid snack choices (from the options above) considering the scenarios below:

1. Scenario:

Snack choices available for someone who can eat a limit of 2000 calories a day and maintain current weight.

Already eaten:

2070mg sodium, 65g fat, 1885 calories, 6g saturated fat, 32 g fiber, 5 mg cholesterol

Check boxes next to choices that would meet restrictions:

- Corn Nuts why/why not?
- Diet Coke why/why not?
- Tootsie Roll why/why not?
- Graham Crackers why/why not?
- Skittles why/why not?
- Twinkies why/why not?
- Popcorn why/why not?

2. Scenario:

Snack choices available for someone who must eat 1500 calories a day to lose one pound per week.

Already eaten:

1350 calories, 40g fat, 12g sat fat, 2180mg sodium, 32g fiber

Check boxes next to choices that would meet restrictions:

- Corn Nuts why/why not?
- Diet Coke why/why not?
- Tootsie Roll why/why not?
- Graham Crackers why/why not?
- Skittles why/why not?
- Twinkies why/why not?
- Popcorn why/why not?

3. Scenario:

Snack choice available for someone who is diabetic has 1500 calorie a day limit, looking for snacks that are sugar free, and need good to excellent sources of fiber that will help them get the 25 grams of recommended fiber per day.

Already eaten:

21g fiber, 1250 calories

Check boxes next to choices that would meet restrictions:

- Corn Nuts why/why not?
- Diet Coke why/why not?
- Tootsie Roll why/why not?
- Graham Crackers why/why not?
- Skittles why/why not?
- Twinkies why/why not?
- Popcorn why/why not?

4. Scenario:

Snack choices available for someone who needs to focus on heart health by limiting amount of fat they eat to less than 30 percent of their total diet, saturated fat to less than 10% of total fat intake, and under 2.4 grams of sodium per day.

Already eaten:

42g fat, 2370 mg sodium, 1300 calories, 3g saturated fat

Check boxes next to choices that would meet restrictions:

- | | |
|--|--------------|
| <input type="checkbox"/> Corn Nuts | why/why not? |
| <input type="checkbox"/> Diet Coke | why/why not? |
| <input type="checkbox"/> Tootsie Roll | why/why not? |
| <input type="checkbox"/> Graham Crackers | why/why not? |
| <input type="checkbox"/> Skittles | why/why not? |
| <input type="checkbox"/> Twinkies | why/why not? |
| <input type="checkbox"/> Popcorn | why/why not? |

Other Assessment(s)

Create a truth table for scenario #4 to use as supporting evidence for your selection and reasoning.

Step 4: Create a truth table for #4. Using the data from the truth table, explain how you know that the option(s) you picked meet(s) the criteria?

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Truth Table Worksheet

Student: _____

Date: _____

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Create a Truth Table for Scenario #4:

Tip: Consider what data needs to be compared for each snack option & the amount available to eat in each category.

	Calories	Total Fat	Saturated Fat	Sodium	RESULTS
Corn Nuts					
Diet Coke					
Tootsie Roll					
Graham Crackers					
Skittles					
Twinkies					
Popcorn					

Using the data from the truth table, how do you know that the option(s) you picked meet(s) the criteria?

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Nutritional Information Labels

Kraft Corn Nuts - Original:

Nutrition Facts	
Serving Size: 48g	
Amount per Serving	
Calories 210	Calories from Fat 70
% Daily Value *	
Total Fat 8g	12%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 310mg	13%
Total Carbohydrate 34g	11%
Dietary Fiber 4g	16%
Sugars 0g	
Protein 4g	8%
<hr/> Vitamin A 0% Vitamin C 0% Calcium 0% Iron 4%	
Est. Percent of Calories from: Fat 34.3% Carbs 64.8% Protein 7.6%	

Tootsie Rolls:

Nutrition Facts	
Serving Size: 1 serving (40.0 g)	
Amount per Serving	
Calories 140	Calories from Fat 27
% Daily Value *	
Total Fat 3g	5%
Saturated Fat 0.5g	2%
Cholesterol 0mg	0%
Sodium 15mg	1%
Potassium 0mg	0%
Total Carbohydrate 28g	9%
Dietary Fiber 0g	0%
Sugars 20g	
Protein 1g	2%
<hr/> Vitamin A 0% Vitamin C 0% Calcium 2% Iron 4% Vitamin K 0%	
Est. Percent of Calories from: Fat 19.3% Carbs 80.0% Protein 2.9%	

Honey Maid Low Fat Honey Graham Crackers:

Nutrition Facts	
Serving Size: 2 full cracker sheets (31.0 g)	
Amount per Serving	
Calories 120	Calories from Fat 15
% Daily Value *	
Total Fat 2g	3%
Saturated Fat 0g	0%
Monounsaturated Fat 0g	
Polyunsaturated Fat 1g	
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 190mg	8%
Total Carbohydrate 25g	8%
Dietary Fiber 1g	4%
Sugars 8g	
Protein 2g	4%
<hr/> Calcium 15% Iron 6% Vitamin D 0% Vitamin E 0% Vitamin B6 0% Vitamin B12 0% Zinc 0%	
Est. Percent of Calories from: Fat 15.0% Carbs 83.3% Protein 6.7%	

Diet Coke:

Nutrition Facts	
Serving Size: 1 Can 355ml	
Amount per Serving	
Calories 0	Calories from Fat 0
% Daily Value *	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 40mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Protein 0g	0%
<hr/> Est. Percent of Calories from: Fat 0.0% Carbs 0.0% Protein 0.0%	

Skittles:

Nutrition Facts	
Serving Size: 1 bag (2.17oz.)	
Amount per Serving	
Calories 250	Calories from Fat 25
<hr/>	
	% Daily Value *
Total Fat 2.5g	4%
Saturated Fat 2.5g	12%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 10mg	0%
Total Carbohydrate 56g	19%
Dietary Fiber 0g	0%
Sugars 47g	
Protein 0g	0%
<hr/>	
Vitamin A	NULL
Vitamin C	50%
Calcium	NULL
Iron	NULL
Vitamin D	0%
Vitamin E	0%
Vitamin B6	0%
Vitamin B12	0%
Zinc	0%
<hr/>	
Est. Percent of Calories from: Fat 9.0% Carbs 89.6% Protein 0.0%	

Hostess Twinkies:

Nutrition Facts	
Serving Size: 1 cake / 43g	
Amount per Serving	
Calories 150	Calories from Fat 45
<hr/>	
	% Daily Value *
Total Fat 5g	8%
Saturated Fat 3g	15%
Cholesterol 20mg	7%
Sodium 220mg	9%
Total Carbohydrate 27g	9%
Dietary Fiber 0g	0%
Sugars 18g	
Protein 1g	2%
<hr/>	
Vitamin A	0%
Vitamin C	0%
Calcium	0%
Iron	2%
<hr/>	
Est. Percent of Calories from: Fat 30.0% Carbs 72.0% Protein 2.7%	

Pop Secret Microwave Popcorn:

Nutrition Facts	
Serving Size: 4 cups popped	
Amount per Serving	
Calories 160	Calories from Fat 100
<hr/>	
	% Daily Value *
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 5g	
Cholesterol 0mg	0%
Sodium 330mg	14%
Total Carbohydrate 17g	6%
Dietary Fiber 3g	12%
Protein 3g	6%
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Est. Percent of Calories from: Fat 67.5% Carbs 42.5% Protein 7.5%	