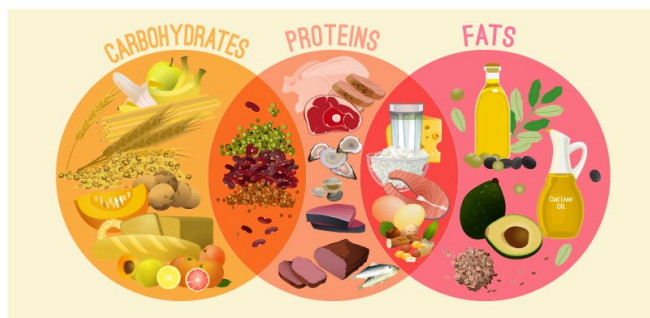# Using Code to Calculate Grams of Macronutrients to Consume Based on Caloric Intake

SUMMARY

In this lesson, AP Biology students will write code to analyze their daily diet and alter caloric intake and source of calories. Following a summer review assignment targeting the structure and function of macromolecules, students begin the year with Unit 1 of the College Board curriculum: The Chemistry of Life. This activity relates their diet to the curricular content of carbohydrates, lipids, and protein in food while focusing on the major scientific practices 4 and 5: representing & describing data and statistical tests & data analysis.

Major Requirements:
1) Discuss philosophical requirements to include coding as modeling tool; end-user vs creator. Introduce the scientific practices that drive the AP Biology course
2) Teach basic coding functions and commands and method (Colab functionality)
3) Review main ideas of calories, diet, nutrition requirements, calories per gram of each biomolecule (why do we eat…)
4) Students design code

STUDENTS WILL BE ABLE TO…
- Use Python in CoLab to Design a simple code to calculate grams of Biomolecules in diet based on daily calories
- Use the code made to analyze specific diets (i.e Keto, WW, DASH, mediterranean, etc.)

Teacher Notes:
Main Code Requirements:
- Begin with prompt to choose total calories (allows student choice; 2000 typical baseline)
- Define the % each macromolecule will take in the daily diet (allows student choice; all percents must add to 100%; alternatively, choose from various diets i.e. Atkins, Keto, etc)
- Define the energy/gram (i.e. 4 Cal/gram for each protein and carbs; 9 Cal/gram for lipids)
- Return calculation and print to show how many calories each of protein, carbs, and lipids the day's diet should include

Variables used in this code:
- t is the total calories. Students will be able to manipulate this number.
- p is protein calories. Students will be able to manipulate the % of calorie.

- c is carbohydrates.   Students will be able to manipulate the % of calorie.
- l is lipids. Students will be able to manipulate the % of calorie.
- a is protein grams recommended for diet.
- b is carbohydrate grams recommended for diet.
- d is lipids grams recommended for diet.

Sample Code:

```
t= float (input ("Enter your goal daily calorie intake: "))
def calculate_calorie_distribution(t):
    p= (t)* 0.3
    c= (t)* 0.4
    l= (t)* 0.3

    a= p/4
    b= c/4
    d= l/9

    return a, b, d

p, c, l = calculate_calorie_distribution(t)

print ("Protein:{:.2f} grams".format(p))
print ("Carbohydrates:{:.2f} grams".format(c))
print ("Lipids:{:.2f}: grams".format(l))
```

Follow-up:
Why would one individual want to alter protein, carbohydrate and lipid components of their diet?

Choose a diet from the list below. Read and summarize the recommendations for this diet. Use the python program you created to determine the breakdown of grams of each: carbohydrates, proteins and lipids, based on caloric intake.

ASSESSMENT:
- Completion of code
- Sharing of researched diet and use of the code to obtain macronutrient breakdown