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Precision Microbiome Engineering
NSF Engineering Research Center

This lesson plan was created by a teacher participating in the Research Experiences for Teachers program from the Precision Microbiome Engineering Research Center. Are you interested in spending part of your summer in a lab getting paid to do microbiome research and create lesson plans?
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Lesson plan written by April Hester

Lesson Plan: Analyzing Diet Data Return Report and Its Impact on Diet Decisions

Grade level: 12th Grade
Subject: Global Studies
Duration: 5 periods/5 days (45 minutes each)

Objective:
By the end of this lesson plan, students will be able to:

- Analyze and interpret a diet data return report (DDRR) based on plants and animal DNA sequencing from a stool sample.
- Write an explanation of the findings in the report and describe how this information will influence their diet decisions in the future.
- Design a balanced diet plan for a two-week period based on their analysis of the DDRR.
- Understand the impact of nutrition on chronic diseases

Materials:
Diet Data Return Report
Writing materials (paper, pens, or electronic devices)
Access to computers or tablets with internet for research purposes
Nutritional guidelines and resources
Food Diary
Charts or visuals representing the impact of diet on chronic diseases

Session 1: Engage
Introduction (5 minutes)

- Discussing the importance of diet in maintaining overall health and well-being.
- Students share and discuss their knowledge and opinions about the role of nutrition in their daily lives.

Diet Data Return Report (15 minutes)

- Present the DDRR to the students, explaining that it includes information on plants and animal DNA sequencing from a stool sample.
- Discuss the relevance of DNA sequencing to understanding dietary choices and their impact on health.
- Encourage students to brainstorm potential findings and implications of the report.

Engaging Activity: Questions and Predictions (10 minutes)

- Divide students into small groups and provide them with a set of questions related to the diet data return report.
- In their groups, students should discuss the questions and make predictions about how the information from the report will change their diet decisions in the future.
- Ask each group to share their predictions with the class.

Session 2: Explore
Exploring Diet and Nutrition (15 minutes)

- Provide videos that explain the basics of nutrition, macronutrients, and micronutrients.
- The class will participate in a group card sort activity. Students will have to match a card (picture or word on it) to the respective group, Micronutrients or Macronutrients.

Analyzing the Diet Data Return Report (20 minutes)

- Instruct students to read and analyze the DDRR carefully, paying attention to the specific DNA sequencing findings and their potential implications.
- Encourage students to make connections between the dietary findings and the food groups present in their diet. Students can infer if their diet include any macro and micronutrients.

Session 3: Explain
Writing an Explanation (15 minutes)

- Explain to students to write a one-page explanation of the findings in the DDRR.
- Instruct students to describe how the information from the report will influence their future diet decisions.
- Emphasize the importance of providing scientific reasoning and evidence to support their statements.

Sharing and Discussing Explanations (15 minutes)

- Ask volunteers to share their written explanations with the class.
- Facilitate a class discussion on the various ways the DDRR can impact individuals' dietary choices.
- Encourage students to ask questions and provide feedback to their peers.

Session 4: Elaborate
Designing a Balanced Diet Plan (25 minutes)

- Explain to students that they will now design a balanced diet plan for a two-week period based on the analysis of the DDRR.

- Provide students with nutritional guidelines and resources to help them create a balanced diet plan.
- Instruct students to justify their food choices based on the “Food You Ate: and “Food Rainbow” sections of the report.

Session 5: Evaluate

Presenting Balanced Diet Plans (15 minutes)

- Ask students to present their balanced diet plans to the class.
- Encourage students to explain the reasoning behind their food choices and how they addressed the findings from the DDRR.

Impact of Diet on Chronic Diseases (20 minutes)

- Complete the chart that shows chronic diseases and their relationship to nutrition.
- Facilitate a discussion on how nutrition plays a role in both positively and negatively affecting chronic diseases.

Reflection and Conclusion (10 minutes)

- Ask students to reflect on what they have learned throughout the lesson plan.
- Discuss the importance of making informed dietary choices based on scientific evidence.
- Summarize the key takeaways from the lesson and address any remaining questions.

Assessment ideas:

1. Written explanation of the findings in the DDRR and its impact on diet decisions.
2. Design and presentation of a balanced diet plan based on the analysis of the report.
3. Active participation in class discussions and activities throughout the lesson plan.

Bonus:

Choose 1 Unit from this academic year and explain the effects of nutrition positively and negatively

Units

Fixed Mindset Vs Growth Mindset
Professionalism
Educational Institutions
Credit, Credit score, Credit history
Taxes
Consumer Math
Budgeting

Rubric for Analyzing Diet Data Return Report and Its Impact on Diet Decisions

Criteria	**Points**
Session 1: Engage	
Participation and engagement in discussion |	10
Thoughtful predictions about the report |	10
Session 2: Explore |	
Understanding of nutrition concepts |	15
Analysis of the diet data return report |	15
Session 3: Explain |	
Quality of written explanation |	20
Scientific reasoning and evidence |	15
Session 4: Elaborate |	
Design of balanced diet plan |	25
Justification of food choices |	10
Session 5: Evaluate |	
Presentation of balanced diet plan |	15
Contribution to discussion on chronic diseases |	10
Total:	**100**

Grading Scale:
90-100: Excellent - Thorough understanding, clear explanations, well-designed diet plan, active participation.
80-89: Good - Solid understanding, mostly clear explanations, adequately designed diet plan, active participation.
70-79: Fair - Basic understanding, limited explanations, partially designed diet plan, some participation.

Below 70: Needs Improvement - Incomplete understanding, unclear explanations, inadequate diet plan, minimal participation.

Micronutrients

Macronutrients

Proteins Fats

Carbohydrates


OLD HOME
Real Madagascar
VANILLA
Yogurt
All Natural
NET WT 32 OZ


VITAMIN A


Vitamin B6

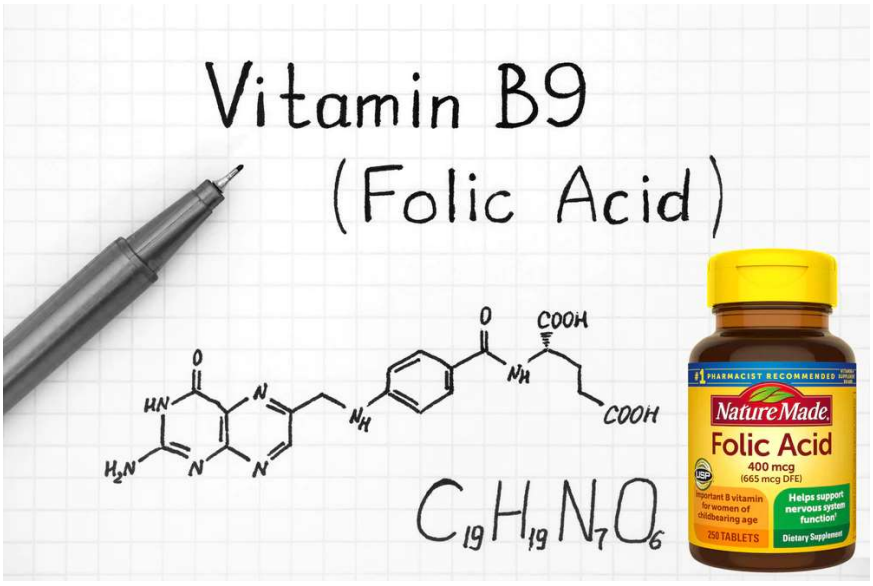

B12


VITAMIN
C

Minerals

Vitamins


VITAMIN
E
netmeds.com
India Ki Pharmacy

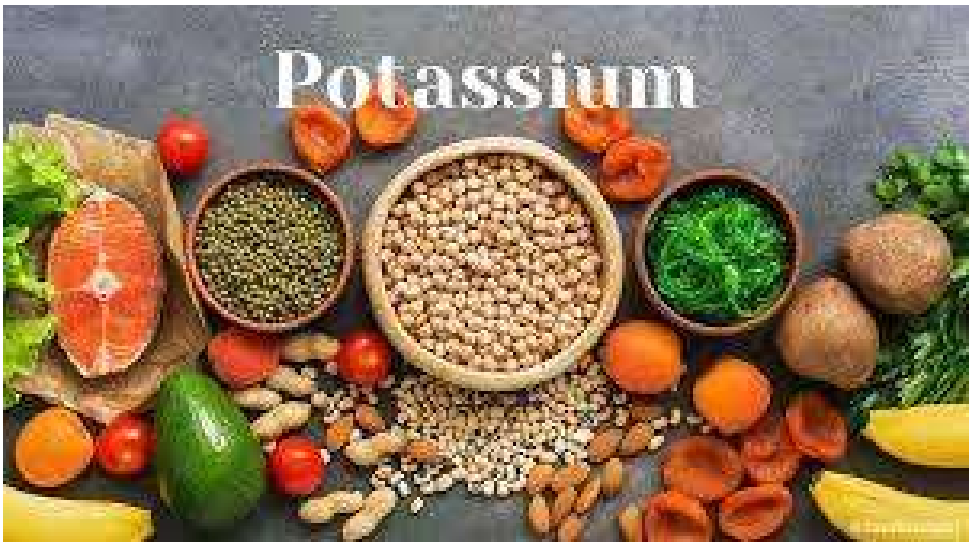

Vitamin B9
(Folic Acid)
C19H19N7O6
PHARMACIST RECOMMENDED
Nature Made
Folic Acid
400 mcg
(665 mcg DFE)
Helps support nervous system function†
Dietary Supplement
250 TABLETS


CALCIUM


Zinc


MAGNESIUM


IRON


Potassium

Macronutrients and Micronutrients Card Sort

Instructions:

1. Cut out all words and pictures
2. For reusage, laminate all words and pictures.
3. Place the title tiles (Macronutrients and Micronutrients) on the white board where it will create space for the words and pictures to be grouped under its respective title.
4. Turn all words over so the students cannot see the words and pictures.
5. Call students up one-by-one to pick a card and place it under the respective title.
6. When all of the cards are posted to the board all students need to make a T-chart on a piece of notebook paper and copy the information from the board onto the piece of notebook paper.