



# STEAM & Sports

## Lesson 1 - Designing Balanced Meals

# Designing Balanced Meals

## Concept

This lesson helps students apply their knowledge of local ingredients to create balanced meals while considering nutritional values and daily energy needs. They will explore the importance of macronutrients, hydration, and portion control to support a healthy lifestyle.

### **Students will:**

- 1.(Biology) Analyze the essential nutrients in different food groups and their role in the body.
- 2.(Mathematics) Calculate Basal Metabolic Rate (BMR) and daily energy needs based on activity levels.
- 3.(Computer Science) Use digital tools and online resources to analyze and structure meal plans.
- 4.(Chemistry) Understand how cooking processes affect nutrient retention and food composition.
- 5.(Physical Education) Recognize the role of proper nutrition and hydration in sports and overall well-being.

This interdisciplinary approach allows students to develop skills in scientific research, data analysis, and digital literacy while promoting awareness of healthy eating habits.

## Learning objectives and Outcomes

### **Upon completion of this lesson, students will know:**

1. Understand the importance of balanced nutrition and hydration for overall health.
2. Apply knowledge of local ingredients to create nutritionally rich meals.
3. Calculate Basal Metabolic Rate (BMR) and analyze daily energy requirements.
4. Use digital tools to structure and present balanced meal plans.
5. Reflect on how dietary choices impact physical performance and well-being.

### **Students will be able to:**

1. Create a meal plan that meets their nutritional needs based on their age, activity level, and Basal Metabolic Rate (BMR).
2. Incorporate local ingredients into their meal plans while ensuring a balanced intake of essential nutrients

# Methodology

1. Teamwork and collaborative research
2. Data analysis using digital tools
3. Practical application through meal planning
4. Critical thinking and problem-solving activities

## Educational standards in connection with sports

### Math

- Pattern Recognition: Spotting trends or anomalies in datasets.
- Collaborative Creativity: Working with peers to design innovative algorithms.

### Physical Education

- Balanced diet: Understanding proper macronutrient and micronutrient intake for physical performance.
- Hydration: Recognizing the importance of water before, during and after exercise.
- Avoiding harmful habits: Reflecting on the risks of excessive consumption of processed foods or sugary drinks.

### Arts

- Historical and Cultural Awareness: Connecting art with societal influences and movements.
- Art as a Social Tool: Creating works that raise awareness on contemporary issues. Multimedia integration: Using digital tools to enhance storytelling and expression.

### Chemistry

- Nutritional Chemistry: Understanding the chemical composition of macronutrients (proteins, fats, carbohydrates) and micronutrients (vitamins, minerals).
- Food Reactions: Exploring how different cooking methods (boiling, frying, steaming) affect the nutritional value of ingredients.
- Metabolism & Energy Conversion: Investigating how the body processes and utilizes different nutrients for energy and muscle recovery.

### Biology

- Human Physiology & Nutrition: Examining the digestive system and how it absorbs nutrients essential for physical activity.
- Impact of Diet on Health: Understanding the effects of different diets on metabolism, energy levels, and overall well-being.
- Sustainable Food Choices: Evaluating how local food production impacts biodiversity and ecosystem balance.



# This lesson includes elements of these school subjects

1. Biology
2. Mathematics
3. Computer Science
4. Chemistry
5. Physical Education
6. Art

## Timeframe

45 min – one school lesson

## Students Age

10-15 years

## Material needed

1. Computers or tablets with internet access
2. Worksheets for calculating BMR
3. Food pyramid and nutritional guidelines
4. Calculator



## Short description of the content

Students will explore how to design balanced meals using local ingredients while considering energy needs and hydration. They will analyze the nutritional value of meals, calculate their daily energy requirements, and use digital tools to structure their findings.

## Sequence of Lesson

### Engage (5 min)

The teacher introduces the concept of balanced nutrition, explaining:

- What makes a meal nutritionally balanced?
- Why is it important to combine different food groups?
- How do food choices impact energy levels, concentration, and physical activity?
- What is Basal Metabolic Rate (BMR), and why is it relevant for meal planning?
- Why is hydration important, and how much water should we drink daily?

A visual representation of the food pyramid and a simple caloric intake chart is used to support the discussion.

### Explore (20 min)

Students are divided into three groups based on their age:

- Ages 10-11 (Balanced School Meal)
  - Research local ingredients and their nutritional value.
  - Design a healthy school snack using local ingredients while ensuring a balanced intake of proteins, fats, and carbohydrates.
- Ages 12-13 (Meal Planning Using Average BMI)
  - Learn how to calculate average BMI for their age group.
  - Use these values to plan a balanced daily meal plan, including breakfast, lunch, dinner, and snacks.
  - Incorporate hydration by determining the recommended daily water intake for their age.
- Ages 13-14 (Personalized Meal Plans Using Individual BMR)
  - Each student calculates their own BMI and BMR using provided formulas or an online tool.
  - Based on their personal BMR, they create a custom meal plan that meets their energy and nutritional needs.
  - Determine the appropriate daily water intake based on their weight and activity level. Students use digital tools, online calculators, and educational websites to conduct their research.
  - Each group presents their meal plans and explains how they ensured nutritional balance.



- The youngest group (10-11) shares their meal ideas.
- The middle group (12-13) explains their meal plan based on the average BMI for their age.
- The oldest group (13-14) presents their personalized meal plan using their own BMR and BMI calculations

A short discussion follows, where students compare nutrient distribution, caloric intake, and hydration strategies across different age groups.

### Evaluate (5 min)

Students reflect on the following questions:

- What was the biggest challenge in designing a balanced meal?
- How do energy needs vary based on age, activity level, and weight?
- How do different cooking methods affect nutrient retention?
- How can they apply this knowledge to their own diet?

They write a short reflection or participate in a class discussion.

## Lesson Developer

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## Tips for age group differentiation (for older/younger kids than indicated in the lesson)

For younger students (under 10 years): Use simple language and focus on tasting, identifying, and drawing local foods. Include games such as matching ingredients to their origins or coloring worksheets with local dishes. Organize short group activities, like creating a collage of local ingredients. For older students (over 15 years): Assign research projects on the historical and cultural significance of local cuisine. Encourage presentations or debates on how local food traditions have changed over time. Introduce advanced topics such as the environmental impact of food choices or the chemistry of traditional cooking methods

## To which SDG(s) does the lesson relate most



SDG 2: Zero Hunger – The lesson aims to develop knowledge about balanced nutrition, the importance of local ingredients, and the prevention of malnutrition or obesity.



SDG 12: Responsible Consumption and Production – Students learn about sustainable food choices, the importance of local sourcing, and reducing food waste

## What Inclusivity and Accessibility measures can or should the teacher take for this lesson

Material adaptation: Use visual aids, large print, and clear instructions. Provide alternative formats for students with visual or reading difficulties. Flexible participation: Allow students to contribute through drawing, speaking, or writing, depending on their strengths. Physical accessibility: Ensure all students can participate in tasting or cooking activities, adapting the environment as needed. Cultural sensitivity: Respect dietary restrictions and cultural backgrounds by offering alternative ingredients or activities. Support for diverse learners: Pair students for peer support, use assistive technology, and provide extra time for research or presentations





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