7th Grade Science
Project #2

Introduction: Since we are toward the latter end of the unit on metabolism, what better way to reinforce what our cells need to give us energy with a nutrition project. Through our studies and from the Amplify metabolism simulation, we can gather that the molecules our cells need to provide us with energy comes from a few systems that must interact with each other. The digestive system aids in breaking down complex molecules of starch and protein into smaller molecules of glucose and amino acid respectively. The respiratory system brings in oxygen from the outside environment into our lungs. Molecules from the food and the air we breathe manages to get into our circulatory system from the small intestines, the villi, and from the air sacs in our lungs, the alveoli. The circulatory system then transports these molecules to the cells to make and produce energy from the cell organelle called the mitochondria.

Here are your choices for the 2nd marking period project:

1. **Protein and Starch Infographic:**
   - Description: Make an infographic explaining the roles of starches and proteins in the diet, along with examples from each of the 5 food groups.
   - Activity: Research which foods are high in starch and protein and categorize them by food group. Use graphics to show the benefits of each nutrient and how to balance them in daily meals.
   - Goal: Learn about the function of starches and proteins in the body and understand how to incorporate them into a balanced diet with the 5 food groups.
2. **"Energy for a Day" Meal Plan:**
   - Description: Create a meal plan for a full day that emphasizes balanced energy sources, including carbohydrates, proteins, and fats.
   - Activity: Research foods that provide quick energy (like fruits and grains) and those that provide sustained energy (like proteins and fats). Create a one-day meal plan, including breakfast, lunch, dinner, and snacks, and explain how each meal supports energy levels throughout the day.
   - Goal: Understand how different types of foods contribute to energy levels and how to structure meals for sustained energy.
3. **Modeling the Medical Conditions**
   - Description**:** Explore how different medical conditions—pancreas injury, diabetes, anemia, and asthma—affect the body's normal functioning. Using simple hands-on models, observe how each condition changes the way organs work, how the body responds, and why symptoms occur.
   - Activity**:** Choose one of the four medical conditions and design a model that demonstrates how that condition affects the body, then explain what changes occur in the body as a result of the condition. Include written descriptions explaining the condition and how the model demonstrates its effects.
   - Goal**:** To understand that medical conditions can disrupt important body systems (digestive, endocrine, respiratory, and circulatory). Through modeling, they will learn how each condition affects the body's ability to move air, transport oxygen, digest food, or manage sugar levels.
4. **A Whole New System**
   - Description: Explore one body system—**nervous**, **skeletal**, or **muscular**—and create a simple model or demonstration to show how it works.
   - Activity: Choose one body system, other than the 3-systems we worked on in the metabolism unit, and design a model or demonstration that shows its main function, then explain what the system does and why it is important for the body.
   - Goal: To understand the basic function of a chosen system and explain how it helps the body move, respond, or stay supported.
5. **Digestive System: Mechanical vs. Chemical Digestion**
   - Description: Explore how the digestive system breaks down food using both mechanical and chemical processes. This project shows how the body physically and chemically digests what we eat.
   - Activity: Compare mechanical and chemical digestion by mashing a piece of bread to simulate chewing and then soaking it in a safe liquid like vinegar or lemon juice to simulate chemical digestion. Observe the changes and describe how each process breaks down the food.
   - Goal: Understand the difference between mechanical and chemical digestion and explain how both processes help the body absorb nutrients.

Rubric: Protein and Starch Infographic

Criteria	4-Advanced	3-Proficient	2-Developing	1-Beginning
Content Accuracy and Completeness	Infographic thoroughly explains the roles of starches and proteins, with accurate examples from each of the 5 food groups.	Infographic accurately explains the roles of starches and proteins with examples from 4-5 food groups.	Infographic gives basic explanations of starches and proteins, with examples from 2-3 food groups.	Infographic has incomplete or inaccurate information, with few or no examples from the food groups.
Clarity and Visual Appeal	Infographic is clear, visually engaging, and well-organized, making information easy to understand.	Infographic is visually appealing and mostly clear, though some sections may need more organization.	Infographic is somewhat clear, but organization or design makes it harder to follow.	Infographic lacks clarity and organization, making it difficult to understand or visually unappealing.
Graphic Representation of Nutrient Benefits	Graphics effectively illustrate the benefits of starches and proteins, with clear examples of how to balance them in meals.	Graphics show the benefits of starches and proteins with some examples for balancing them in meals.	Graphics provide basic information on nutrient benefits, but lack examples or balancing tips.	Graphics are minimal or unclear, lacking information on nutrient benefits or balance in daily meals.
Understanding of Nutritional Balance	Demonstrates strong understanding of balanced nutrition, showing how starches and proteins fit within the 5 food groups.	Shows good understanding of nutrition and attempts to balance starches and proteins across food groups.	Shows some understanding of nutrition but lacks clear guidance on balancing starches and proteins.	Shows limited understanding of how starches and proteins contribute to a balanced diet across the 5 food groups.

Of note, we need to see a works cited and for you to **cite** your sources within the text of your project.

Rubric: "Energy for a Day" Meal Plan

Criteria	4-Advanced	3-Proficient	2-Developing	1-Beginning
Content and Meal Balance	Meal plan includes well-balanced meals and snacks with a variety of carbohydrates, proteins, and fats for sustained energy throughout the day.	Meal plan includes mostly balanced meals with a good variety of carbohydrates, proteins, and fats.	Meal plan includes some balance of carbohydrates, proteins, and fats but lacks variety or specific focus.	Meal plan is unbalanced or missing key energy sources, with limited attention to carbohydrates, proteins, and fats.
Explanation of Energy Sources	Thoroughly explains how each meal and snack supports quick and sustained energy, clearly linking foods to energy levels.	Explains how most meals and snacks support energy levels, with a few connections between foods and energy.	Basic explanations of energy sources with limited details on how each meal supports energy levels.	Minimal or inaccurate explanation of how foods contribute to energy levels; lacks clear links to energy types.
Research and Food Selection	Demonstrates strong research with a variety of foods that provide quick and sustained energy, covering all meals and snacks.	Shows good research with a range of foods providing energy, but may be limited in some meal choices.	Shows basic research with some foods chosen for energy but lacking variety or specific focus on energy needs.	Shows limited research with minimal attention to food types needed for energy, or includes foods without energy focus.
Organization and Presentation	Meal plan is well-organized, clear, and easy to follow, with each meal and snack labeled and visually appealing.	Meal plan is mostly organized and easy to follow, though some details may need clarification.	Meal plan has basic organization but may lack clarity or detail in some areas, making it harder to follow.	Meal plan is disorganized or unclear, making it difficult to understand the meals and how they contribute to energy needs.

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Rubric: Modeling the Medical Conditions

Criteria	4-Advanced	3-Proficient	2-Developing	1-Beginning
Model Accuracy	Model clearly and accurately represents the chosen medical condition.	Model accurately represents the chosen medical condition.	Model is partially accurate or incomplete.	Model is partially accurate or incomplete.
Understanding / Explanation	Explanation is detailed, accurate, and shows strong understanding of how the condition affects the body.	Explanation correctly describes how the condition affects the body.	Explanation shows some understanding but has gaps or minor errors.	Explanation is very limited, inaccurate, or missing.
Completeness & Organization	Work is neat, well-organized, and shows creativity or extra effort.	Work is neat, well-organized, and shows creativity or extra effort.	Work is neat, well-organized, and shows creativity or extra effort.	Work is incomplete or disorganized.
Communication	Student communicates ideas clearly and confidently.	Student communicates ideas clearly and confidently.	Student communicates ideas with some difficulty.	Student has difficulty communicating ideas.

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Rubric: A Whole New System

Criteria	4-Advanced	3-Proficient	2-Developing	1-Beginning
Model / Demonstration Accuracy	Model or demonstration clearly and accurately represents the chosen body system and its main function.	Model or demonstration accurately represents the chosen body system.	Model or demonstration partially represents the system or has minor inaccuracies.	Model or demonstration does not clearly represent the system.
Explanation / Description	Explanation is detailed, accurate, and clearly shows understanding of how the system functions.	Explanation correctly describes how the system functions.	Explanation shows some understanding but has gaps or minor errors.	Explanation is missing, incomplete, or inaccurate.
Completeness & Organization	Work is complete, well-organized, and easy to understand.	Work is complete and organized.	Work is somewhat complete but may be disorganized or missing details.	Work is incomplete, disorganized, or hard to understand.
Creativity & Effort	Model or demonstration shows creativity and effort beyond basic requirements.	Model or demonstration shows adequate effort and clarity.	Model or demonstration shows minimal effort or limited clarity.	Model or demonstration shows little to no effort.

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Rubric: Digestive System: Mechanical vs. Chemical Digestion

Criteria	4-Advanced	3-Proficient	2-Developing	1-Beginning
Model / Demonstration	Clearly demonstrates both mechanical and chemical digestion with accurate representation.	Demonstrates both processes with mostly accurate representation.	Demonstrates only one process accurately or shows minor inaccuracies.	Demonstration is incomplete or inaccurate.
Observation / Description	Observations are detailed, accurate, and clearly explain the changes in the food during both processes.	Observations are accurate and explain the changes in the food.	Observations are somewhat accurate but incomplete or vague.	Observations are missing, inaccurate, or unclear.
Understanding / Explanation	Explanation shows strong understanding of the difference between mechanical and chemical digestion and why each is important.	Explanation shows understanding of the difference and importance of each process.	Explanation shows limited understanding or has some errors.	Explanation is missing or demonstrates little understanding.
Completeness & Effort	Work is thorough, well-organized, and shows creativity or extra effort.	Work is complete and organized.	Work is somewhat complete but may be disorganized or missing details.	Work is incomplete, disorganized, or shows minimal effort.

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