4th/5th Mystery Build: A Collaborative STEM Challenge

Grade Level: 4th-5th Grade

Time Required: 60-75 minutes

Materials Needed:

- LEGO sets or similar building blocks
- Drawing paper
- Crayons/markers/colored pencils
- Timer

Texas Essential Knowledge and Skills (TEKS) Addressed:

- Science:
    - 4.2 Scientific investigation and reasoning.
    - 5.2 Scientific investigation and reasoning.
- Mathematics:
    - 4.1 Mathematical process standards.
    - 5.1 Mathematical process standards.

Objectives:

- Students will practice descriptive language skills by verbally describing LEGO structures.
- Students will develop artistic skills by drawing representations of LEGO structures.
- Students will engage in teamwork and collaboration.
- Students will learn to write clear and precise instructions.
- Students will reflect on their learning experiences and identify strategies for improvement.

Procedure:

Introduction (10 minutes):

- Begin by discussing the importance of teamwork, communication, and artistic expression in problem-solving.

- Explain the activity: students will work in groups of four or five with different roles – Observer, Artist, Author, and Builder.
- Describe the task: the Observer will view a LEGO structure hidden from the rest of the group. The Observer must then describe the structure to the Artist, who will draw it out using colors. The Author will write out step-by-step instructions based on the drawing. The Builder will attempt to replicate the structure using only the instructions provided.
- Emphasize the need for clear communication and attention to detail.

Activity (30-40 minutes):

- Divide students into groups of four or five and assign roles (Observer, Artist, Author, Builder).
- Set a timer for each phase of the activity (5-10 minutes for each phase).
- The Observer looks at the LEGO structure and describes it to the Artist. The Observer cannot talk to anyone except the Artist.
- The Artist draws the structure based on the Observer's description, using colors to represent different parts if desired.
- The Artist hands the drawing to the Author, who writes clear and detailed instructions on how to build the structure step by step. If there are two Authors, they can collaborate on writing the instructions.
- The Builder receives the instructions from the Author(s) and attempts to replicate the structure using LEGO blocks. The Builder cannot communicate with anyone except the Author(s).

Reflection (15 minutes):

- Lead a class discussion on the activity.
- Prompt students to reflect on their experiences: What was challenging about their role? What strategies did they use to overcome challenges? How did they communicate effectively within their group?
- Discuss the importance of clear instructions in problem-solving and the role of teamwork in achieving a common goal.
- Encourage students to share any insights or lessons learned from the activity.

Conclusion:

- Summarize key points from the reflection discussion.
- Reinforce the value of effective communication, collaboration, and problem-solving skills in STEM activities.
- Encourage students to apply these skills in future projects and endeavors.

Assessment:

- Informal assessment can be conducted through observation during the activity, participation in the reflection discussion, and the clarity and accuracy of the written instructions provided by the Author(s).

Extension:

- For advanced learners, increase the complexity of the LEGO structures or require the Author(s) to write instructions without seeing the drawing, relying solely on the Observer's description.
- Introduce elements of competition by scoring each group based on the accuracy of the replicated structure and the clarity of the written instructions.
- Explore how technology tools could enhance communication and collaboration in similar STEM activities.

Safety Considerations:

- Ensure students handle LEGO pieces safely to prevent any accidents.
- Maintain a clear workspace to avoid tripping hazards.