SEPA 5E LESSON PLAN DESIGN TEMPLATE

Theme: **Building**

Lesson Title: **Engineering Building Day: Introduction to the First Day of School**

Grade Level: K-2

Standards Addressed:

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
Science and Engineering Practices: Asking Questions and Defining Problems; Developing and Using Models; Analyzing and Interpreting Data
Disciplinary Core Ideas: ETS1.A: Defining and Delimiting Engineering Problems
Crosscutting Concepts: Structure and Function

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
Science and Engineering Practices: Planning and Carrying Out Investigations; Analyzing and Interpreting Data
Disciplinary Core Ideas: PS2.A Forces and Motions; PS2.B Types of Interactions
Crosscutting Concepts: Cause and Effect

Objectives:

1. **to introduce the students to exploring and building**
2. **to become familiar with the word engineer, architect**
3. **to collaborate as a team, working and helping each other**
4. **to discuss, design and build a structure**
5. **to participate in all activities**
6. **to promote critical thinking**
7. **to communicate how structures were created**
8. **to encourage creative thinking**
9. **to build knowledge for future building innovations**

Purpose: (and optional background) To familiarize K-2 students to the engineering process, to learn how engineers collaborate on a building project,
and to build background knowledge for further engineering projects.

Focus Question: (Optional) What do engineers do?

Materials: meat trays, small apples, stick pretzels, M & M's, protein bars, 3 x 5 index cards, tangrams, magic markers, colored pencils, paper, rulers protractors, blank aprons, engineering tools poster, tubs of "No-Ends", tub

of legos, tub of colored cubes, boxes of sugar cubes, a variety of boxes of all shapes and sizes and the book, "What Is An Engineer?"

Advanced Planning: Time allotted: Morning or Afternoon Session
Supported and Assisted by Parent volunteers
Ten Stations, Teams of 2-3 Rotating every 15 minutes
Parents are contacted prior to opening day of school.
Stations and materials are provided by teacher.

Station Area is reserved with principal, and set up in an outside area of the school.

Directions and expectations are written on cards; these are shared with parents

manning the station activities.

Model of Instruction: 5-E Presentation:

Engagement:

WHOLE GROUP ACTIVITY SKETCH an ENGINEER

(Pre-Assessment Tool: Student's Name, Date, Save)

Materials: 3 by 5 index cards, pencils, magic markers, crayons, colored pencils

Exploration:

Station # 1. CREATING DESIGNS using TANGRAMS
Materials: paper, pencils, colored pencils, magic markers

Station # 2. CREATING DESIGNS with Measuring Tools
Materials: paper, pencils, colored pencils, magic markers, rulers, protractors

Station # 3. ENGINEER TOOL APRON
Materials: blank aprons, pencils, magic markers, display of engineering tools
Create one engineer's tool on apron

Station # 4. BUILDING with NO ENDS
Materials: tubs of No ENDS
Create one structure as a team.

Station # 5. BUILDING with LEGOS
Materials: tubs of LEGOS
Create one structure as a team.

Station # 6. BUILDING with COLOR CUBES
Materials: tubs of COLOR CUBES

Create one structure as a team.

Station # 7. BUILDING with SUGAR CUBES
Materials: boxes of SUGAR CUBES
Create a structure as a team.

Station # 8. BUILDING with BOXES
Materials: boxes, all shapes and sizes
Create a structure as a team.
Station # 9. BUILDING with LINCOLN LOGS
Materials: tubs of LINCOLN LOGS
Create a structure as a team.

Station # 10. ENGINEER JACKET
Materials: old white shirts cut to size, pencils, magic markers, table covering
Label shirt "JUNIOR ENGINEER" with pencil, then color with magic markers

Explanation: End of Day: CELEBRATION of ENGINEERING
Magic Circle: Discussion, "Building was fun because ……."
Materials: meat trays, small apples, stick pretzels, M & M's, protein bars
Build a structure on your meat tray using materials provided.

Elaboration: Read book, "What Is An Engineer?"
Share Building/Engineering books

Evaluation: Discussion: What do you think engineers do now?
List ideas on chart paper, computer, chalk-board

Background Information for Teacher:

Kathleen B. Horstmeyer
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International Technology Engineering Education Association Liaison
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Engineering Building Day: Introduction to the First Day of School
Time allotted: Morning or Afternoon Session
Supported and Assisted by Parent volunteers
Ten Stations, Teams of 2-3 Rotating every 15 minutes

WHOLE GROUP ACTIVITY SKETCH an ENGINEER
(Pre-Assessment Tool: Student's Name, Date, Save)
Materials: 3 x 5 index cards, colored pencils, markers, crayons

Station # 1. CREATING DESIGNS using TANGRAMS
Materials: paper, pencils, colored pencils, magic markers

Station # 2. CREATING DESIGNS with Measuring Tools
Materials: paper, colored pencils, markers, rulers, protractors

Station # 3. ENGINEER TOOL APRON
Materials: blank aprons, pencils, markers, display engineering tools
Create one engineer's tool on apron (other tools will be added later)

Station # 4. BUILDING with NO ENDS
Materials: tubs of No ENDS
Create one structure as a team.

Station # 5. BUILDING with LEGOS
Materials: tubs of LEGOS
Create one structure as a team.

Station # 6. BUILDING with COLOR CUBES
Materials: tubs of COLOR CUBES
Create one structure as a team.

Station # 7. BUILDING with SUGAR CUBES
Materials: boxes of SUGAR CUBES
Create a structure as a team.

Station # 8. BUILDING with BOXES
Materials: boxes, all shapes and sizes
Create a structure as a team.

Station # 9. BUILDING with LINCOLN LOGS
Materials: tubs of LINCOLN LOGS
Create a structure as a team.

Station # 10. Building with KEVA Planks
Materials: tubs of KEVA Planks
Create a structure as a team.

Parents are contacted prior to opening day of school.
Stations and materials are provided by the teacher.
Outside area is reserved with principal, and tables set up
Directions and expectations are written on cards and shared with parents manning the station activities.

Goals:
1. **to introduce the students to exploring and building**
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End of Day: CELEBRATION of ENGINEERING DAY
Magic Circle: Discussion
Materials: meat trays, small apples, stick pretzels, M & M's, protein bars
Design a structure on your meat tray.

Read book, "What Is An Engineer?"
Share Building/Engineering books

Discussion: What do you think engineers do now?
List ideas on chart paper, computer, chalk-board

ENGINEER JACKET
Materials: white shirts cut to size, pencils, markers, table covering
Label shirt "JUNIOR ENGINEER" with pencil, then color with markers