Marble Run/Use your Noodle STEAM Lesson Brief

Grade Level: Pre-K 4

State: FL

Students use knowledge from across the disciplines to strengthen their understanding of each subject’s content and its related careers through topic or theme oriented realistic problem-based activity-rich lessons.

Theme that this lesson would tie to: Landforms and Transportation

Specific Topic Concept within that theme: Identify the most efficient mode of transportation in conjunction with chosen landform

<table>
<thead>
<tr>
<th>PROJECT IDEA + brief notes &amp; supplies</th>
<th>BASIC CONCEPTS</th>
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<tbody>
<tr>
<td><strong>Essential Concepts:</strong> Students will be exposed to various forms of research regarding differing landforms and modes of transportation. (SS,LA,S,T,E) Students will then test the velocity of different sized marbles on different size slides. (S, M, PE, E, T) A specifically designed obstacle course will give a kinesthetic experience to the participants. (S, LA, PE, T, E) Before construction, the students will group, sort and measure materials with their buddies. (M, T, LA) With a 4th grade buddy, the students will design, construct and implement a marble run made of pool noodles. (S, T, E, A, PE, LA) After 4 days of practical experimentation, the students and peer partners will sculpt marble runs with Marble Magic. (T, E, FA, LA) A music educator will help the students compose lyrics and movement to “Marble Motion” to the original song, “The Locomotion.” (Fine Arts, Music, PE, LA) The students will be able to correctly sequence photographs and illustrate the correct order of events. (LA, FA, T, M, SS)</td>
<td><strong>Science</strong></td>
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<td><strong>Concepts</strong> –</td>
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<td>hypothesis, test, analysis, ramps, simple machines, speed, time, velocity</td>
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<td><strong>Goal / Objectives</strong> –</td>
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<td>Observe and describe how objects move on a ramp.</td>
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<td><strong>Standards</strong> –</td>
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<td></td>
<td><strong>Careers</strong> –</td>
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<td></td>
<td>Physicist</td>
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<td><strong>Project</strong> –</td>
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<td>The students will hypothesize based on observations, then test the velocity of different sized marbles on different sized slides</td>
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<td>Students will predict which run/marble will be faster</td>
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<td>Teacher will chart predictions on graph paper</td>
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<td>The students will race marbles down two different sized slides and calculate the speed by using a stop watch.</td>
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<td>Upon completion of the marble race teacher will write the outcomes of the race on the graph beside the predictions. The class will compare predictions verses outcomes.</td>
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<td><strong>Assessment</strong> – The students will be active participate in running and timing the marble races. And understanding how their predictions were proven or not.</td>
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<td><strong>Extension</strong> –</td>
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<td>Graph and tally actual results of marble races.</td>
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**Basic Plan:**
Children will be introduced to various land forms and modes of transportation through big books, little books, mimio lessons and real photographs. They will compare and match appropriate modes of transportation that would best suit different landforms. Students will design and construct “marble runs” with landforms in mind. Students will participate in the obstacle course run. Once completed we will compose a song to the tune of “Locomotion” called “Marble Motion.” Once composed, the song will include vocals and movements. The students will roll different size marbles down different playground slides. They will hypothesize and predict the outcome of the marbles racing down different slides. With a “Buddy Class,” students will collaborate to design and engineer their own “marble runs.” They will test its functionality. After students have been given like materials, they will be required to count, measure (using nonstandard items) and group their manipulatives. Student partners will mold “marble runs” using model magic. Their “Runs” will be showcased in the library, school entry way, on Village School Live television program and school website. Throughout the plan, students continually discuss and analyze the main topic. Photographs will be taken throughout the week of the children engaged in this building process. Concluding the week, students will sequence actual photographs of the marble run building and illustrate the building process.

**Skill level (Grade Range):** Plan devised for Junior Kindergarten

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**Technology & Engineering –**

**Concepts –**
Students will plan, construct, engineer and analyze their created marble runs.

**Goal / Objectives –**
Use various devices (mimio board, I-Pad) to research and explore different marble runs. Construct, engineer and analyze marble runs.

**Standards –**

**Careers –**
Engineer, Architect Programmer, Web Designer, Graphic Designer, Amusement Ride Designer, Rollercoaster Engineer, Architect, Golf Course Designer, Golf Course Superintendent, Landscape Designer

**Project –**
The students will design and build the Marble Run using pool noodles.
The students will collaborate with their partner from the Buddy Class to build and test out the functionality of their Marble Run creation.
After using the i-pads and mimeo board to research different configurations of marble runs, the students will design and draw their own plans for a run.
Noodle connectors will be used to join together the noodles to create the finished product.

**Assessment –**
The students will design and complete a successful marble run using pool noodles.

**Extension –**
The students will create marble runs using various materials (paper towel tubes, straws, and rolled newspaper). The students will identify any problems, communicate and brainstorm possible solutions.

**Math –**

**Concepts –**nonstandard measurement, counting, reading charts and graphs, sorting

**Goal / Objectives –**
Explore using non-standard measure of length Measure
Sort pool noodles into groups

**Standards –**

**Careers –**
Analyst, Teacher, Mathematician, Surveyor

**Project –**
The students will measure different pool noodles
**Timing of Lesson:** 1 hour (spread throughout the day) 5 days/ 1 week

**Basic Supplies:**
- **All Subjects:**
  - Individual Subjects:
    - Math: Pool noodles, noodle connectors, tape, marbles of various sizes, a variety of different sized blocks, boxes, and boards, large chart paper and markers
    - Science: 2 Playground slides, marbles (same size), 2 stopwatches
    - P.E.: Mats (3-D various sizes and shapes), cones, hula hoops, balance (limbo) bars
    - Music: Guitar, recording device, recording of the original “Locomotion.”

- **IT Resources:** Mimio Board, computer, I-Pads, I-Pod docking station, digital camera
- **Literature:** Books, Periodicals

- **Other Resources:** Local professionals in the construction and building industry, Parent Volunteers/Career specific, step 2 roller coasters, other tubular manipulatives and design materials, tubes and straws

- **Misc:**

- **Photos:** Digital photography of landforms and modes of transportation

Students will group noodles according to their attribute - color

**Assessment –**
The children will be able to demonstrate they can recognize, explain and make patterns, groups, count and accurately measure with pool noodles. Then students will be able to analyze and answer questions from the data on the teacher made graph.

**Extension –**
Students will create patterns with the pool noodles.

**LA –**

- **Concepts** – The students will be able to correctly sequence real life pictures of marble run construction in the correct order of events.
- **Goal / Objectives –**
  - Make real-life connections using illustrations, photographs, prior knowledge, and real-life experiences
  - Name/Describe actual or pictured objects
  - Identify sequence of events
  - Compare and contrast photographs
  - Organize information into chart
- **Standards –**
- **Careers –**
  - Project Manager, Programmer, Teacher
- **Project –**
  - The students will sequence events using actual photographs of their creations of the Marble Run.
  - The students will have photos of marble run creations that were taken during the week. During class students will show recognition of and describe the events in the photos. They will verbally compare and contrast various photos. Students will create an accurate linear sequence using the photos of their marble run creations.
- **Assessment –**
The children will be able to correctly sequence events by using photographs of their marble runs and verbally describing the sequence.

**Extension –**
The students will verbalize, list and dictate the pros and cons of the Marble Run project and the teacher will list and compile the student’s answers.
SS –

Concepts –
Students will research the best modes of transportation to maneuver through differing landforms.

Goal / Objectives –
• Identify/discuss similarities and differences among different landforms and modes of transportation.

Standards –
Careers –
Pilot, Navigator, Construction, Construction Superintendent, Air traffic Controller, Transporter

Project –
Using the interactive (smart or mimio) board students will correctly select and match landforms and vehicles. Class will discuss and observe actual photographs and video of various vehicles traveling on various landforms. Students will do experiments with toy vehicles in sand, water, mud, grass & ice.

Assessment –
The students will be able to correctly associate vehicles and match them with the correct landforms.

Extension –
The students will bring a show and tell item that depicts a mode of transportation for different landforms. Students will digitally create a vehicle on the computer. The students will create a vehicle using classroom manipulatives (K-nex, Legos, Playstix). Parents will come in and share real life experiences. (ie mountain climber, bob sledder, whitewater rafter, downhill skie, ski jumper)

Art –

Concepts –
Students will create Marble Run
Can add in sculpture with a simple machine - ramp

Goal / Objectives –
Exhibits appropriate hand-strength and control
Uses art materials appropriately

Standards –
Careers –
Ceramic Artist, sculptor

Project –
Students will design and mold miniature marble runs using Model Magic. These Model Magic marble runs will be shown in school for the other students to view and for the individual child to take home and share
with their family.

**Assessment** –
The students will demonstrate and display their completed Model Magic Marble Runs.

**Extension** –
Paint, decorate, add flags and accessorize. Students will show creations on the Village School Live television program and on the school website.

**PE** –

**Concepts** –
Students will maneuver through an obstacle course which replicates different land forms.

**Goal / Objectives** –
Demonstrate coordination and balance
Follow a sequence of movements
Perform actions in games
Shows and awareness of moving thought space

**Standards** –

**Careers** –
Physical Trainer, Physical Therapist, Military Personal, Teacher, Coach

**Project** –
The students will participate in an obstacle course depicting differing landforms

**Assessment** –
The children will be able to successfully complete the obstacle course.

**Extension** –
Students will ride Step 2 Roller Coaster.

**Music** –

**Concepts** –
The students will create the lyrics to the Marble Motion song and perform for peers.

**Goal / Objectives** –
Explore rhythms
Participate in musical activities
Links personal vocabulary with new lyrics of song
Uses content words in relation to musical composition

**Standards** –

**Careers** –
Musician, Author, Artist, Digital/Media Designer, Lyricist, Composer

**Project** –
The students will compose, sing and act out movements for the song “Marble Motion.” (based on the tune of “The Locomotion”)
| **Assessment** –  
Students will perform the song “Marble Motion.”

**Extension** –  
Students will perform the song “Marble Motion” for the students in Pre-K Two and Three. The students will sing “Marble Motion” on the Village School Live television program and during a PTO Meeting |