Professional Development Proposal Plan:
Cosmic Coding - Storytelling with Dash Robots and Scratch Jr using NASA Resources
(2ⁿᵈ – 3ʳᵈ Grade Students)
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Title and Topic Selection
The title of the STEM professional development is "Cosmic Coding: Storytelling with Dash Robots and Scratch Jr using NASA Resources." This topic was selected to address the growing need for integrating coding and storytelling in elementary education while leveraging engaging NASA content. It combines STEAM concepts, coding skills, and narrative creation, providing a multidisciplinary approach that aligns with current educational trends.

NASA Integration
This PD integrates NASA assets by utilizing resources from the Mars Exploration Program, including images and information about Mars missions. These materials will serve as the foundation for creating stories and coding scenarios, allowing teachers to bring real space exploration into their classrooms.

Proposed Audience
The target audience is K-5 STEAM teachers, serving approximately 10 educators who collectively teach around 3,000 students. This PD is designed for teachers across various subjects, including science, technology, and language arts, to promote interdisciplinary learning.

STEM Concepts and Learning Goals
The PD will address the following STEM concepts and learning goals:
1. Basic coding principles using Dash robots and Scratch Jr
2. Integrating storytelling with coding to enhance engagement
3. Applying space science concepts in elementary education
4. Developing problem-solving and critical thinking skills through coding challenges
These concepts can potentially replace traditional lecture-based science lessons or standalone coding activities.

NASA Resources for 2nd-3rd Grade Mars Exploration
1. Mars Exploration Curriculum
   Full URL: https://mars.nasa.gov/education/modules/mars.pdf
2. MyNASAData: GIS Data
   Full URL: https://mynasadata.larc.nasa.gov/
3. NASA Space Place - Explore Mars Rover Game
   Full URL: https://spaceplace.nasa.gov/explore-mars/en/
4. TeachEngineering - The Amazing Red Planet Lesson
   Full URL: https://www.teachengineering.org/lessons/view/cub_mars_lesson01
5. NASA Space Place Scavenger Hunts
   Full URL: https://spaceplace.nasa.gov/scavenger-hunts/en/
6. Mars Activities PDF
   Full URL: https://mars.nasa.gov/files/mepjpl/MSIP-MarsActivities.pdf

7. NASA JPL Mission to Mars Unit
   Full URL: https://www.jpl.nasa.gov/edu/resources/lesson-plan/mission-to-mars-unit/
8. NASA Space Place Parents and Educators Resources
   Full URL: https://spaceplace.nasa.gov/menu/play/parents-and-educators/

Standards Alignment
NGSS Standards:
2-ESS2-2: Develop a model to represent the shapes and kinds of land and bodies of water in an area.
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.
3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

CCSS Standards:
CCSS.ELA-LITERACY.W.3.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
CCSS.MATH.PRACTICE.MP1: Make sense of problems and persevere in solving them.
CCSS.ELA-LITERACY.W.K.6: With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.

CSTA Standards:
1A-AP-08: Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks
1A-AP-10: Develop programs with sequences and simple loops, to express ideas or address a problem
1A-CS-01: Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use

Session Details and Recruitment
The PD session will be one hour long, with lecture and hands on learning. District STEAM teachers will meet in March for a PD day. This will be incorporated within that day.

Pre- and Post-Surveys
The pre- and post-surveys will assess teachers' confidence in using coding tools, their familiarity with NASA resources, and their attitudes towards integrating coding and storytelling in their classrooms. The surveys will include Likert-scale questions to quantify responses, as well as open-ended questions to gather qualitative data.

Expected Outcomes

Expected outcomes include:
1. Increased teacher confidence in using Dash robots and Scratch Jr
2. Enhanced ability to integrate NASA resources into lessons
3. Improved understanding of how to combine coding and storytelling
4. Increased likelihood of implementing these tools in the classroom

Follow-up and Data Collection
Follow-up will include:
1. Informal follow up at STEAM teacher meetings
2. A dedicated online forum for participants to share lessons and ask questions
3. Pre- and post-surveys to measure immediate impact

Detailed Professional Development Session Structure

Pre-Survey (5 minutes)
- Participants complete the pre-survey as they arrive and settle in

1. Introduction (5 minutes)
- Welcome and brief overview of session objectives
- Quick icebreaker: Participants share one thing they know about Mars

2. NASA Resources Overview (10 minutes)
- Introduction to NASA's Mars Exploration Program resources
  - Showcase Mars images, mission information, and educational materials
- Demonstrate how to access and navigate NASA's education resources website
- Highlight specific resources suitable for 2nd-3rd grade students

3. Dash Robot Coding for Storytelling (20 minutes)
- Brief introduction to Dash robots and their capabilities (3 minutes)
- Demonstration of basic Dash programming for movement and sounds (5 minutes)
- Hands-on activity: "Mars Exploration Mission" (12 minutes)
  - Participants work in pairs to program Dash to:
    - Navigate a simulated Martian terrain
    - Collect "soil samples" (represented by colored markers)
    - Avoid obstacles (rocks, craters)
  - Participants write and illustrate their robot's journey afterwards, integrating storytelling

4. Scratch Jr for Digital Storytelling (20 minutes)
- Introduction to Scratch Jr interface and basic functions (5 minutes)
- Demonstration of creating a simple Mars-themed story (5 minutes)
- Hands-on activity: "A Day on Mars" (10 minutes)

- Participants create a short digital story about a day in the life of a Mars rover
  - Incorporate Mars backgrounds, characters, and science facts from NASA resources

5. Integration and Classroom Implementation (5 minutes)
- Discussion: How these activities align with NGSS standards
  - Focus on 2-ESS2-2, 3-ESS2-1, and 3-5-ETS1-1
- Brainstorming: Additional ways to integrate coding and NASA content into existing curriculum
- Tips for classroom management when using robots and coding tools

6. Conclusion and Q&A (5 minutes)
- Recap key points and learning objectives
- Open floor for questions and discussion
- Provide information on follow-up resources and support

Post-Survey (5 minutes)
  - Participants complete the post-survey before leaving

Pre-Survey

1. On a scale of 2-10 (2 being not at all confident, 10 being very confident), how would you rate your confidence in:
  - Using Dash robots for educational purposes 2   4   6   8   10
  - Using Scratch Jr for storytelling 2   4   6   8   10
  - Integrating NASA Mars resources lessons 2   4   6   8   10
  - Teaching basic coding concepts to 2nd-3rd grade students. 2   4   6   8   10

2. Have you ever used NASA Mars resources in your teaching? (Yes/No)
  If yes, please briefly describe how:
  _____

4. What do you hope to gain from this professional development session on Cosmic Coding with Mars exploration?

  _____

Post-Survey

1. On a scale of 2-10 (2 being not at all confident, 10 being very confident), how would you rate your confidence in:
  - Using Dash robots for educational purposes 2   4   6   8   10
  - Using Scratch Jr for storytelling 2   4   6   8   10
  - Integrating NASA Mars resources lessons 2   4   6   8   10
  - Teaching basic coding concepts to 2nd-3rd grade students. 2   4   6   8   10

2. How likely are you to incorporate Mars-themed coding activities in your 2nd-3rd grade classroom after this session?
  - Unlikely
  - Neutral
  - Likely

3. Do you plan to use NASA Mars resources in your future 2nd-3rd grade lessons? (Yes/No)
  If yes, please briefly describe how:

  _____

4. What was the most valuable thing you learned from this professional development session on Cosmic Coding with Mars exploration?

  _____

7. How would you rate the overall effectiveness of this professional development session for your 2nd-3rd grade teaching?
  - Not effective.   - Somewhat effective.   – Effective   - Very effective

8. What additional support or resources would you need to successfully implement these Mars-themed coding activities in your 2nd-3rd grade classroom?

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