

Pinto Online PD Final Paper  
STEM Leadership Seminar  
Fall 2020

**I. Title:**

Red Rover, Red Rover - Perseverance in the Classroom

**II. Description, School, Participants**

Hosting a STEM focused watch party for the Mars 2020 Mission landing in February, 2021  
Gilmer ISD, Gilmer Texas

Hosted for 8 formal and informal educators of various levels including:

Traci Cole - 7th Science - [colet@gilmerisd.org](mailto:colet@gilmerisd.org)

Bill Hickman - 8th Science - [hickmanb@gilmerisd.org](mailto:hickmanb@gilmerisd.org)

Kathleen Savage - 8th Science - [savagek@gilmerisd.org](mailto:savagek@gilmerisd.org)

Shona Pinto - Homeschool, various levels - [shonapinto001@aol.com](mailto:shonapinto001@aol.com)

**III. NGSS Standards:**

**K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

**2-PS1-2.** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

**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.

**MS-PS3-5.** Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

**HS-ETS1-2.** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**MS-ETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

**MS-ETS1-3.** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

#### **IV. Objectives:**

- Provide background and context on the Mars 2020 Perseverance mission and landing for educators
- Demonstrate available Perseverance/Mars STEM resources from NASA and JPL for multiple grade levels
- Demonstrate cross-curricular activities associated with the Mars mission and landing
- Provide a quick overview of other NASA STEM activities that can be incorporated into the classroom.

#### **V. Pre-questions Survey List**

As an educator, what is your level of comfort incorporating the Mars 2020 mission into your classroom/homeschool instruction?

A - Mission? What Mission??

B - I would like to incorporate NASA happenings into my classroom/homeschool curriculum but I'm not really sure what resources are available.

C - I use NASA current events all the time and am just looking for some fresh ideas.

#### **VI. Description:**

The Red Rover presentation focused on preparing and encouraging both formal and informal educators to host a STEM focused watch party for the NASA Mars 2020 mission landing on Mars in February 2021. This event will be a perfect opportunity for many schools to host a STEM focused day in conjunction with current events of national interest. The PD attempted to provide basic background information for educators as well as ideas for simple, easy, low-cost and low-prep STEM projects that could easily be adapted to a wide variety of classrooms. Also included were several cross-curricular ideas that would allow all subject areas to integrate mission history and objectives into their lessons. The presentation included STEM activities for all levels of students from kindergarten through twelfth grade and included homeschool, distant learning and face to face options. Finally, several more in-depth options were included for STEM specific classes to go deeper into NASA and JPL curriculum related to Mars, the Perseverance Rover and the Mars 2020 mission.

## VII. Participant Activities:

1. Meeting was held via Zoom meeting. Once participants joined the Zoom meeting, they were asked to go to Nearpod.com on a separate browser tab and join a Nearpod session via a class code.
2. Once in the Zoom and Nearpod sessions, participants were greeted and presented with the list of objectives for this session.
3. Participants were presented a poll which asked the pre-survey question.
4. The first part of the presentation focused on presenting background information on the Mars 2020 Mission, Perseverance lander, Ingenuity Helicopter and NASA resources for following the mission. Participants were shown a video of the mission launch, the NASA cruise website which shows where the spacecraft is currently in it's flight, NASA's watch party site, and a quick video of the Jezero crater flyover for information on the landing site. After the background information was presented, participants were encouraged to ask questions about mission objectives and details.
5. The second part of the presentation focused on possible STEM activities for educators of various levels and settings including homeschool and formal educators, elementary middle and high school students and virtual as well as face to face schools. Using Nearpod, educators were introduced to the [jpl.nasa.gov/edu/learn](https://www.jpl.nasa.gov/edu/learn) website and the specific projects listed for each grade level below:
  - a. K- 2 Build a Parachute
  - b. 3-8 Touchdown! Build a lander
  - c. 6-12 Build a Cardboard Rover
  - d. Cross-curricular ELA - Planetary Poetry
  - e. Cross-curricular Math - Pi in the Sky Problems
  - f. Gen Ed Background - Mars in a Minute video series

For each activity, educators were linked to the website for instructions. The topics of supplies, time needed and standards addressed were presented after which the session was opened to a collaboration board to share questions and ideas.

6. The third part of the presentation was an extension of the basic watch party for those educators who were interested in more in depth STEM specific activities related to the NASA mission. The full Mission to Mars Unit was presented and discussed as well as the Coding a Mars Helicopter game, both from the JPL and NASA STEM curriculum sites. A brief overview of other resources were presented as shown below:
  - a. STEM activities for educators on Perseverance:
    - i. <https://www.jpl.nasa.gov/edu/teach/tag/search/Rovers>
    - ii. <https://www.jpl.nasa.gov/edu/teach/tag/search/Perseverance>
    - iii. <https://www.jpl.nasa.gov/edu/learn/tag/search/Mars>
  - b. NASA STEM at Home -
    - i. <https://www.nasa.gov/stem-at-home-for-students-k-4.html>
    - ii. <https://www.nasa.gov/stem-at-home-for-students-5-8.html>
    - iii. <https://www.nasa.gov/stem-at-home-for-students-9-12.html>
7. The final activity in the presentation was a poll which asked participants if they planned to incorporate the Mars 2020 mission or any of the presented activities into their own

classroom or homeschool curriculum. The session was then opened up for question and discussion before ending the Zoom meeting.

### **VIII. NASA Resources:**

This presentation relied heavily on NASA and JPL STEM education curriculum. For a full list of all NASA websites used please see the references page. In particular, the session focused on NASA resources related to the Perseverance Rover. Videos showing the mission launch and landing sites were included. NASA STEM at home and [JPL.NASA.gov/edu/teach](https://www.nasa.gov/education/teach) sites were showcased.

### **IX. Post- survey question**

Do you plan to incorporate Mars 2020 mission and the Perseverance Rover landing into your classroom??

A - Absolutely! I will use one or more of the ideas presented in this webinar!

B - Probably. I will try to incorporate some of the material into my classroom.

C - Maybe, but probably not the ideas presented here,

D - Eh.. probably not.

### **X. Outcomes.**

Overall, the presentation was extremely well received and I was actually asked to present again for other participants. I was surprised at how little the participants were aware of the current Mars 2020 mission and the opportunities it presented for inclusion in the classroom. Several of the participants were science teachers while others were general ed teachers and even a few homeschool teachers. Across the board their interest was high and prior knowledge was low or non-existent. I felt that the presentation was targeted for this exact audience and served its purpose to inform, educate and inspire teachers to connect their students to the mission and STEM in general. I edited my presentation to target a general audience as opposed to a STEM audience and was therefore able to include several simple STEM projects and resources that these teachers had not known existed. At the end of the presentation every teacher was excited about the possibility of hosting a watch party in their own classroom context and even asked to collaborate to host a school-wide watch party on my campus.

As the presentation was so well received, I will be reaching out to my campus and district administrators to allow the all staff to receive this information in hopes of generating excitement and interest in a school wide landing watch party in February. My hope is to share the presentation widely within my educational region so other schools can also become involved.

The presentation was successful in part because I was able to incorporate four of the five core features for effective professional development as defined by Desimone (Desimone, 2011). The presentation was content focused on specific STEM resources related to hosting a watch party for the Mars mission landing. It included active learning in the form of collaboration boards and interactive polls and surveys in Nearpod. It was based on the educators individual desire to incorporate current events in STEM into their curriculum and included educators who were of

similar interest and grade level. I do plan to continue offering STEM suggestions, projects and ideas for hosting a watch party through the Facebook event created for the presentation which will eventually satisfy the fifth core element of successful professional development of duration.

Furthermore, I believe this presentation satisfies several components of teacher leadership that can drive school reform as described in the readings. My district struggles with focusing adequate resources and attention on STEM related topics although we do recognize the importance of it in our mission to educate a relevant future workforce. This presentation is a step towards incorporating STEM at all levels and across all content areas in a simple, fun and easy to implement manner.

As I reflect upon my overall presentation and performance, I am extremely pleased with how well the audience received the information. I believe there is a gaping need for STEM leadership in my area and that this type of activity or event would be an excellent step in incorporating current STEM events in the world around us into my small, rural community and school. I believe the presentation that I created was simple, streamlined and effective at giving teachers enough background information on the mission to allow them to be comfortable leading a watch party for their students. At the same time, it included several possible easy to implement STEM activities to help them plan to incorporate STEM into their classroom even if they have never done so before and finally provided a few resources for those teachers who wish to go deeper and learn more about the mission and it could be used to stimulate STEM learning.