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# Transformers: From Student Vision to Engineering Marvel

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Editor's Note: The author describes one Forest Service unit's novel and effective approach for exposing young students to real-world technical scientific and engineering applications. The students' idealized settings became canvases for engineers to illustrate a variety of particular engineering applications.

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As an engineer or a technician for the USDA Forest Service, have you ever tried to explain engineering's role and the USDA Forest Service's mission to young children? The Northern Region Engineering staff did just that with some elementary school students.

Every month, the regional office engineering staff in Missoula, MT, holds a family meeting with a 30- to 40- minute program. In February 2000, the program involved a fourth-grade class from Hellgate Elementary School in Missoula.

In January 2000, Nita Kattell's class (see figure 1) produced some artwork depicting a natural forest or mountainous setting. It was understood that at their family meeting the engineering staff would add to the artwork by illustrating various aspects of the USD Forest Service's mission and their own engineering contributions. Twenty-one kids did artwork on 11- by 17- inch white construction paper with colored chalk. They produced great pictures of mountains, streams, trees, and wildlife.



Figure 1. Nita Kattell's fourth-grade class from Hellgate Elementary School exhibits its artwork.

The engineers were asked to add to the artwork with black charcoal pencils and to write descriptions of their illustrations in a corner the students left blank (see figure 2). The engineering staff's general consensus was, "Do we really want to mess up these great pictures with our poor illustrations?"



Figure 2. Northern Region Engineers add illustrations to the students' drawings.

The Engineers illustrated a wide array of engineering applications including signage, roads, trails, a hand pump and vault toilet, a public lands boundary survey system, satellites and airplanes representing our mapping capabilities (see figure 3), a fish ladder and bottomless culvert, a lookout tower, a ranger station, a dam and landslide, various USDA Forest Service vehicles, and smoke jumpers. One student drew a picture of a landscape viewed from the sky, creating a perfect setting for an engineer's rendition of a winding road leading to a bridge and ski lift (see figure 4).



Figure 3. Satellites illustrating GPS and remote-sensing applications.



Figure 4. An engineer has added a winding road and a bridge leading to a ski lift. Note the oblique view that was drawn by a student.

John Kattell, the Northern Region Structures Group Leader and Mrs. Kattell's husband, presented the pictures with the engineering staff's additions to the fourth graders and encouraged them to ask questions. Some of the students said, "What a neat bridge!" "Cool!" and "Sweet!" as they received their augmented artwork. And they asked plenty of questions (see figure 5 and 6).



Figure 5. John Kattell hands back a picture.



Figure 6. John Kattell explains the engineering applications one engineer contributed to a child's artwork.

They wanted to know about latitude and longitude with respect to the mapping and boundary survey illustrations; what a fish ladder is; and what a vault toilet is. (The students understood the latter after Mr. Kattell used the word "outhouse.") They also asked what lookouts are used for.

Mr. Kattel showed the students photographs of various USDA Forest Service vehicles. For real-life examples of ranger stations, the fourth graders visited the Nine Mile Ranger Station in Huson, MT, and viewed a photograph of Fenn Ranger Station, which is located 30 miles east of Kooskia, ID.

The artwork exchanged sparked discussion about the importance of vault toilets and clean water and how necessary they are at campgrounds and trailheads. The 4<sup>th</sup> Graders truly seemed to enjoy getting their artwork back with the engineers' additions.

Special thanks goes to Mrs. Kattell's fourth-grade class at Hellgate Elementary School for encouraging some USDA Forest Service engineers to connect with the community. They had fun sharing practical science applications with the students.