

**The Alvin All-Star Railroad (AASRR)**  
**A Multi-Subject HO-Modeling Project for a Third Grade Classroom**  
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by Jamie Foster

With the successful completion of the Alvin All-Star Railroad (AASRR) project, we demonstrated that model railroading is a very exciting and effective tool in the school classroom. Under the umbrella of railroading, we taught elements of local history, social studies, geography, English, and science to a third grade class at Alvin Elementary School in Santa Maria, California (northern Santa Barbara County, about 150 miles north of Los Angeles along the coast).

Here's the basic recipe for success. Add one part teacher – my wife, Lynn, teaches third grade in a public school system. Add two parts avid railroaders – my father, Bill, and I build model railroads (outdoor G and indoor HO) and do “train stuff” as often as possible. Add all parts available of local railroad and history buffs and groups, supportive school administrators, and other family members and friends. Mix vigorously. And voila, a classroom railroad!

There are two parallel stories to tell. First, I'll talk about the background, design, goals, and activities making up the educational framework of the AASRR. Then, I'll describe the construction and operation of the HO layout itself that served as the focal point for the unit.

Local history is a state educational standard for the third grade in California. As in many areas across the country and the world, railroading played a vital role in the history of the Santa Maria Valley of California. One of Santa Maria's most well known historical Figures is Allan Hancock, after whom the local college is named. Among Hancock's many activities was the purchase and development of the Santa Maria Valley Railroad (SMVRR) beginning in 1925. Organizations related to Hancock still operate the SMVRR today as a 14-mile shortline standard-gauge railroad. [The Coast Belle Rail Group bought the SMVRR in 2006 and continues to operate it as of this writing.]



**Figure 1: As four first grade visitors watch in awe during the culminating Open House, an AASRR brakeman (left foreground) signals the AASRR engineer (at the far end of the platform) in the process of building a train in the SMVRR downtown yard.**

With the exception of hauling military cadets to the Hancock College of Aeronautics for fighter pilot and mechanic training in Santa Maria during World War II, the SMVRR was and is exclusively a freight railroad. [The SMVRR began offering limited excursions in 2007.] The railroad carried a variety of goods including oil, fruits, vegetables, and animals from locations in the valley to the interchange with the Southern Pacific RR (now the Union Pacific RR) at Guadalupe (about 10 miles west of the City of Santa Maria).

One history focus for this project was the sugar refinery at Betteravia (about halfway between Guadalupe and Santa Maria). At one time, Betteravia was a thriving town of several thousand people (today, there's very little there). One half of the AASRR layout modeled this area (see Figure 3, 8, 10). The Southern Pacific RR hauled sugar beets primarily from the Imperial Valley of California (east of Los Angeles) to the Guadalupe interchange. From there, the SMVRR would take the loaded sugar beet gondolas to the sugar refinery and return the empties to the interchange. The Union Sugar Company formed in 1897, and the refinery began operations in 1899. Operations continued with some interruptions until closed permanently in 1993 and mostly demolished in 1997 (some parts remain today). Though originally called Union Sugar, through buyouts and mergers it operated under the names of Holly Sugar and Imperial Holly as well. Betteravia, the name of the town in which the refinery stood, is from the French "betterave" which means sugar beet.



**Figure 2: "Show and Tells" with railroad memorabilia was a big hit with the students. One of their favorite activities was lantern signaling.**

In addition to classroom time devoted to building and operating the railroad, we spent time on the following topics:

- History of the Santa Maria Valley and the City
- Overview of Railroading in the U.S.
- History of the Santa Maria Valley railroads (several sessions)
- Sugar beet trains ("Imperial Valley Sugar Beet Trains: The Ending of an Era", Video Rails #VR074, VHS)

Acquainting the students early on with railroading vocabulary was a critical element. English was a second language for 9 of the 17 third graders, and 15 were Title I (low economic demographics). They had no railroading vocabulary at the outset. This vocabulary was crucial for learning the history as well as building and operating the model railroad.

Each student prepared a report about an historical building of their choice (not necessarily railroad-related). They also prepared a 3-D image of their building for use as background scenery on the model railroad (see Figure 3, 9, 13). This one assignment, thereby, covered a number of assessment areas: local history, research, writing, and art. The students genuinely identified with their buildings, and were able to identify and talk about them when encountered on field trips, in books, etc. In a similarly multi-pronged approach, the students built a timeline literally around the room with written descriptions and drawings of significant events from the days of log rails in the 1700s and Spanish settlers to the present.

Each time I went to the classroom for a presentation or to work on the layout, I brought a piece of railroad memorabilia for “show and tell”. This “realia”, as educators refer to it, was a significant portion of the learning experience as well as a great attention grabber. The children loved the realia (see Figure 2). Items included crossbucks, lanterns, spike maul (hammer) and spikes, oil and water cans, date nails, a rail section, a working telegraph, whistles, switch locks and keys, boxcar seals, patches, badges, and the like. The students particularly enjoyed learning lantern signals. If you don’t have items of your own, try finding local collectors who are often very excited to share their memorabilia. We had a few G-scale railroad cars and railroad posters scattered about the room for good measure.

The class took three field trips during the course of this unit to explore local history in general, and railroading in particular.



**Figure 3: One student does touch up on the ground texturing after the masking tape has been removed (note the bare areas around the switch stands). In this oblique view of the background pictures on the divider, the yellow foam backing that creates the 3-D effect is more clearly visible.**



**Figure 4: The AASRR class poses on the SMVRR's GE 70-ton diesel during their tour of the downtown yard.**

Alvin Elementary is fortunate to be within walking distance of three facilities, and we visited them all:

- Santa Maria Valley Historical Society Museum ([members.pronet.net/smmuseum](http://members.pronet.net/smmuseum))
- Santa Maria Valley Railway Historical Museum ([www.smvrhm.org](http://www.smvrhm.org))
- Santa Maria Valley Railroad ([www.smvrr.com](http://www.smvrr.com)) (see Figure 4)

To facilitate the students' research, we built a classroom library by keeping our eyes open for appropriate books as we visited railroad museums and bookstores during the months before the project. Here are the children's titles we used (across reading levels from first through fifth grades):

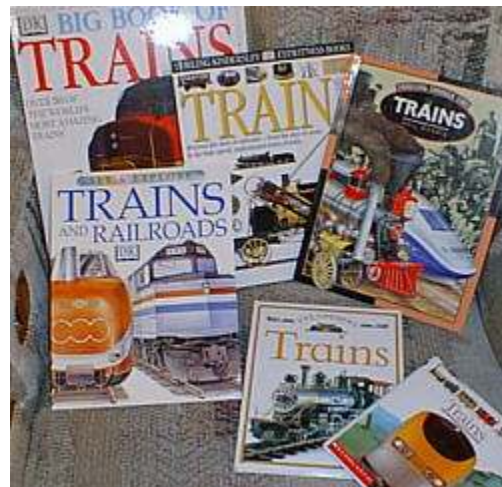
- Trains, First Discovery Book (series), Jeanesse and Prunier, Scholastic Inc., 1995.
- Trains, Eye Openers (series), Dorling Kindersley Books, 1991.
- Train, Eyewitness Books (series), John Coiley, Darling Kindersley, 1992.
- Trains: Traveling Through Time, Neil Morris, Silver Burdett Press, 1997.
- Trains and Railroads, See and Explore (series), Sydney Wood, DK Publishing, 1998.
- Big Book of Trains, National Railway Museum, York, England, DK Publishing, 1998.
- The Railroad Book, E. Boyd Smith, Houghton Mifflin Company, 1983.
- Ultimate Train, Peter Herring, Dorling Kindersley, 2000.
- Ten Mile Day and the Building of the Transcontinental Railroad, Mary Ann Fraser, Henry Holt and Company, 1996.
- The Little Engine That Could, Watty Piper, Platt & Munk, 1976.

And here are the adult-level titles the students had access to:

- Railroads of the Santa Maria Valley, Hal Madson, Olive Press, 2001.
- The Pacific Coast Railway: Central California's Premier Narrow Gauge, Westcott and Johnson, Benchmark Production Ltd, 1998.
- Iron Horses, Michael Del Vecchio, Courage Books, PRC Publishing Ltd, 2000.
- The Railroad: What It Is, What It Does, John H, Armstrong, Simmons-Boardman Books, Inc., 1998.



**Figure 5:** Pictured above is the Alvin All-Star Railroad logo from which we produced 3" embroidered patches.



**Figure 6:** Pictured above are most of the children's titles in the AASRR classroom library.

- The Engine Driver's Manual, Brian Topping, Oxford Publishing Co., 2000. (How to prepare, fire, and drive a steam locomotive.)
- Santa Maria Historical Photo Album, Phil Ault, ed., Santa Maria Valley Historical Society, 1987.
- The Good Years: Snippets of Santa Maria Valley History, Shirley Contreras, Santa Maria Valley Historical Society, 2001.
- Classic Trains, Hans Halberstadt, MetroBooks, 2001.

The children designed and we produced Alvin All-Star Railroad (AASRR) embroidered patches (see Figure 5) months before the unit actually took place. Each student drew and submitted a proposed patch (another art lesson!). We chose one of the designs, cleaned it up a bit, and sent it to Bay Imprint ([www.bayimprint.com](http://www.bayimprint.com)) for production at under \$2 each in a quantity of 100 (which should last us 2-3 years). These patches turned out to be a highlight on numerous fronts. They got the students involved very early. The patches were well received as thank you items to our hosts at the various places we visited and to other folks who helped along the way. The principal of the school has one framed and hanging in the front office. And most importantly, each student received their own patch sewn on a red bandana when his/her final report was complete (see Figure 15 foreground).

Now finally, let's talk about the AASRR model layout. These were the design parameters:

- 4x8 foot footprint (this was our space allowance in the classroom)
- Easy to store, carry, set up, etc. – the classroom teacher may have to do this on her own at times (like when the carpet cleaners came unexpectedly)
- Allow 6 student operators at a time
- Allow up to 10 students working around/on the railroad at a time

The 4x8 foot platform is divided in half lengthwise physically and prototypically (see Figure 7). One half is the sugar beet refinery operation, and the other is the SMVRR downtown yard. When bolted together, a foam board divider rises about 12" above and between the surface of the two halves. This provided a mounting surface for the students' 3-D building pictures and acted as a background for each area (see Figure 3, 8).

We laid and wired the track before the platform entered the classroom. This included toggles for each block on the platform surface right next to the block each controlled. Manual ground throws and switch stands operated each turnout. We used a dual-

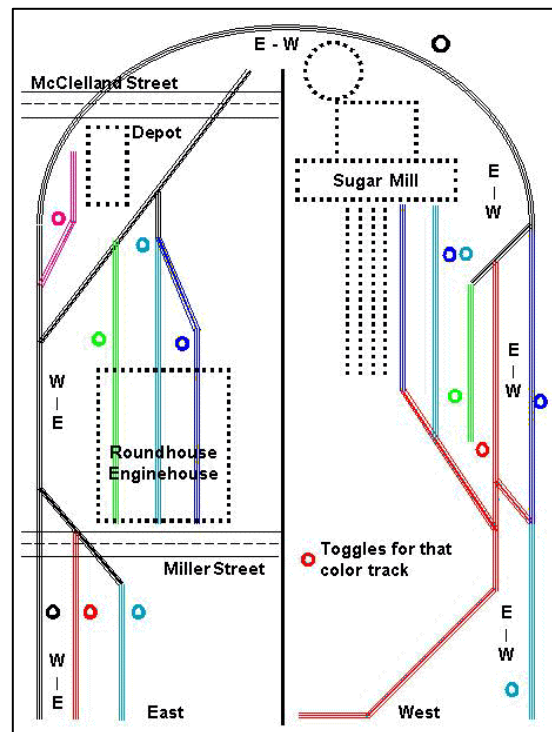


Figure 7: AASRR Layout Diagram

throttle power pack with each throttle controlling one side of the platform. This allowed two crews of 2-3 students each to operate simultaneously. A connecting block (controlled by a double-throw-double-pole toggle) allowed traffic to flow from one side of the platform to the other.

We completed the preparatory construction of the platform in the fall of 2001. The platform was constructed in two 2x8 foot sections using a T-beam technique (see Figure 12). 3"-tall lengths of 1/4-inch plywood were cut and capped along the top edge with a 1x3/8-inch board (routed to accept the plywood) to make a total beam height of 3 1/2 inches. These were the inside T-beams (in cross-section, the T was 3 1/2 inches tall, 1/4-inch wide upright, and a 1-inch wide top). The exterior sides were 4"-tall lengths of 1/4-inch plywood with the same 1x3/8-inch board glued along the inside 1/2 inch down from the top. Eight T-beams ran to the center of the platform, one from each corner and one from the center of each side. Once the T-beams and sides were glued together, a 1/4-inch piece of plywood could be set into the top of the frame and rest on the tops of the T-beams and on the 1x3/8-inch strips glued along the side pieces. This made for a very light, strong structure. It was so rigid that its levelness was not disturbed by the swayback table on which it sat in the classroom.

In-class presentations began in January of 2002, the students were out of school the month of February (year-round scheduling), and the platform was in the classroom the entire month of March 2002.

In general, one adult modeler could monitor the activities of up to four student modelers at a time (see Figure 8). When it comes to supplies, it works best if each student has their own supplies and tools with which to work, as opposed to common containers of supplies. This meant keeping available a healthy supply of small plastic cups, tubs, paint brushes, Popsicle sticks, and the like. The railroad worked as a "center" in the classroom, meaning that students would rotate in and out during the 55-minute period available on railroading days. The rest of the students would work with the classroom teacher or do independent work (which may or may not be railroad-related depending on the teacher's overall teaching plans).

The students first undertook texturizing the ground (see Figure 8). This was a relatively simple process of applying a white glue (Woodland Scenics scenic cement) to the plywood surface with a paint brush and then



**Figure 8: This day the students were applying the ground texturing on both sides of the platform. The white divider rises between the two sides and will eventually carry their 3-D historical building pictures. Note that each student has his/her own supplies.**

sprinkling the various color gravels or greenery on top. Before this process began, we put masking tape over the moving parts (toggles, switches, ground throws, etc.) so that gravel would not get in and jam them. When the bulk of this was completed, we selected some of the more careful students to remove the tape and touch up the groundwork as needed (see Figure 3). A fair amount of glue and gravel ended up on portions of the rail, which a track-cleaning block easily removed.



**Figure 9: Students work on their 3-D images of historical buildings. Some of these works are already mounted on the platform's white divider in the background of this picture.**

While ground texturing proceeded, some students worked on installing the roadways. We used Woodland Scenics road system materials (paving tape, smooth-it, and top coats) according to instructions.

Buildings on the platform were next. In all cases, a sub-structure was provided to the students. In the case of the sugar refinery (see Figure 10), the sub-structure was simply a series of green floral foam blocks (available at most craft stores) taped together. The students measured the foam blocks, cut construction paper to fit, and painted the facades of the buildings on the paper. Then these facades were simply attached to the foam blocks with masking tape rolls (sticky side out) to complete the building. The students used pictures of the old refinery to guide their work.



**Figure 10: Here's a ground-level view of the sugar mill area with the model nearly completed. The beet-dumping highline goes up to the left with the refinery just beyond, and a train of full sugar beet gondolas waits on the siding to be unloaded.**

In the case of the depot (see Figure 14 foreground), sheets of balsa wood were pre-cut to the dimensions of the outside walls. Again using pictures to guide their work, students painted the exterior features onto these pieces of balsa wood and then glued the sheets to the sub-structure. Likewise, they painted pre-cut roof sheets and attached them the same way.

The finish work on the enginehouse was a bit more complicated. The students had to measure, cut, and glue into place all the little window pane uprights on the two long sides of the building. The stock was strips of 1/8-inch balsa wood. As a finishing touch, they glued pre-cut pieces of clear plastic on the inside of these “panes” to give the appearance of glass. The roof was completed in the same manner as the depot’s roof (see Figure 1 largest structure on left, and Figure 14 in the distance).



**Figure 11: One of the AASRR students gets his first lesson in reading and operating switches.**

The 3-D background images of the historical buildings exemplified the connection between the layout and the study areas of this unit, and were done as follows. All the students used sky-blue construction paper as the base. This made for a consistent and appropriate background from one end of the divider to the other. Each would draw their building on the paper in pencil and crayon. Then, the most significant feature of the drawing, typically the building itself, was traced, drawn on another sheet of paper, and cut out. A ¼-inch foam backing (we used grocery store meat trays) was then cut out to match the cutout building. The cutout building was glued to the foam, and then the foam glued to the original drawing. The result was a building that stood out in some relief to the background. These were then stapled to both sides of the divider to complete the background (see Figures 1, 3, 9, 13).

Since this was the first experience with model trains for all of the students, we slowly and deliberately taught how to handle and operate the trains. Individual sessions covered each topic separately and in this order, with lots of time for everyone to practice:

- how to put rolling stock on the track and make sure it rolls correctly (a good exercise is to have the class close their eyes, listen to



**Figure 12: One 2x8-foot section of the platform, with all eight T-beams in place, is ready for the 1/4-inch plywood surface to be laid on top.**



- moving trains, and decide if the cars are on the track or not)
- how to read and change a switch (see the web site for a worksheet)
- how to use the throttle, direction control, block toggles, and the layout diagram (see Figure 7)
- how to move a lone locomotive around the layout
- how to build trains by picking up cars (see Figure 1)

We used the following rolling stock and motive power for the AASRR's version of the SMVRR during its transition era from steam to diesel (late 1940s to early 1960s), and the present:

- 3 yellow GE 70-ton diesels (Bachmann, Spectrum Series)
- 1 red low-nose GP9 diesel (Walthers, #4616, needs re-decorating)
- 1 Southern Pacific diesel (scrounged from the attic)
- 1 mikado (2-8-2) steam locomotive (also from the attic)
- 12 sugar beet gondolas (Red Caboose kits, SP drop-bottom w/board extensions)
- 2 cabooses (Athearn kits repainted yellow)
- 1 oil tank car
- 3 Pacific Fruit Express boxcars
- 2 covered hoppers
- miscellaneous boxcars and hopper cars (from the attic)

The authors funded the AASRR; no school funds were requested or used. While the initial "capital investment" may seem high, once established the program will repeat for under \$200 worth of consumables. We since discovered that grants for such projects are often available through educational foundations, school districts, etc. See Table 1: Approximate First-Year Budget. Items



**Figure 13:** This ground-level view is looking northeast across Miller Street and over a vacant field. In the next go around for this project, that field will have a track-side ice house for the reefers, as did the SMVRR at one point in its history. Note that completing the grade crossings can be a task for the next class as well.



**Figure 14:** Looking east across McClelland we see the depot in the foreground to the left and the enginehouse beyond it. A GE 70-ton diesel approaches the intersection on the mainline.

budgeted as “attic” were scrounged and cost us nothing. Your “scrounge-ability” may vary.

**Table 1: Approximate First-Year Budget for the AASRR**

\$400	Books for the Classroom Library (see Figure 6)
\$100	Lumber/hardware/wire for the platform
\$185	Embroidered patch production (100, see Figure 5)
\$40	Switch stands
\$50	Balsa and foam blocks for structures
\$240	Diesel locomotives (4)
	Sugar beet gondola kits from Red Caboose (12, we found a clearance
\$150	sale)
\$80	Texturing materials (glue, gravel, road surfaces, etc.)
\$50	Other rolling stock kits (tank cars, cabooses, boxcars), e.g. from Athearn
\$50	Kaydee couplers (to standardize as needed)
attic	Additional rolling stock and locomotives
attic	All track, turnouts, spikes, joiners, etc.
attic	Ground throws
attic	Power pack (dual throttle)
attic	HO-scale vehicles, people, animals, barrels, etc.

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\$1,345 Total first-time investment (approximate)

The unit culminated in an Open House attended by parents, other classes from the school, and, as it turned out, a local TV station and newspaper. During the Open House, visitors rotated along with the students from the layout where the AASRR students demonstrated their operations skills (see Figure 1) and talked about their buildings, to the realia center (see Figure 2) where they did a “show and tell” for the guests, and to the short story and final report centers where they read their papers to the attendees.



**Figure 15: When most of the Open House guests had left, the class discusses the project. The two most common answers to "What was your favorite part of the project?" were driving the trains and the real railroad equipment (realia).**

As both TV reporters noted, “Now there’s a way to keep kids on the right track!”

For more information, visit the AASRR web site at [www.jf2.com/aasrr/](http://www.jf2.com/aasrr/). My email address is [pbjrr@jf2.com](mailto:pbjrr@jf2.com).