Week 2

Day 1.

1. **Angles and natural laws** (45 minutes)  
   a. This is also a just-in- time instruction about identifying angles within roller coasters. There is a handout that students can use as a guide to scale drawings and angles of roller coaters.
2. **This lesson also addresses scale drawings and how they use ratios and proportions to create small scales of larger models. This is relatively new content for students, so this would need to take up the majority of class time.**
3. **Scale Drawing Fun- this site is an interactive scale drawing builder that groups could do together or you could do as a class. It gives them a procedure to follow for scale drawing, as well as models correct ratios and proportions.**
4. **Group work** 15 minutes- groups will have 15 minutes to go over their ideas sheet that was turned in on Friday. This is a great time to use for conferencing with groups and using teacher “office hours” to consult about their ideas.
   1. **Students must also fill in their effort log**

Day 2

1. Scale Models lesson- this is a continuation of Day 1 of this week. The full time mentioned (40 minutes) to review the principles and even assign the students the handout with problems to be turned in as a content mastery assessment
2. Scale model rubric/guidelines- students will then need a rubric for creating their roller coaster scale model. This rubric should be gone over in detail and should engage questions.
3. Group work time- remainder of class- groups can start on their own scale models, reviewing the principles learned as well as the model of the previous day’s activity. That link can be re-accessed by groups for further investigation.
   1. Students should fill in their effort log

Day 3

1. Space and Money- today students will learn about the space and money constraints of the Dolly Wood Project.
   1. Students should already have been assessed in previous years over surface area, but this is a great time to review surface area, volume, and area and perimeter of complex polygons.
   2. A scale drawing of the space should be provided to help students compute the true amount of space for the actual build. This also provides an opportunity for groups to use what they have learned about scale models and ratios.
2. Money- budget constraints- Groups should send their acquisition managers to research a construction company to find general costs of labor and time, as well as material costs of building a real roller coaster. The group should decide on a reasonable budget and begin to outline the costs of building their rollercoaster in DollyWood. The bookkeeper will need to work closely with the acquisitions managers in the following days to ensure that the budget is developed adequately
3. **Group work** 20 minutes-
   1. During this time, groups will continue to work on their designs as well as their scale models. The engineers and project manager will work closely to ensure that the scale model is being completed in efficient time.
   2. Teachers should conference this day with the bookkeepers to talk about establishing a budget and detailing a budget. This is a skill that they become experts in and must re-teach to the rest of the classmates for accountability.
   3. Students should complete the effort log

Day 4.

1. Materials research-
   1. This is an opportunity for all of the group roles to work together to decide which material will be used in their roller coaster. Students should be given access to computers or I Pads, or even expert mechanical engineers who have built both kinds of roller coasters
   2. If time permits, open the discussion to the class for a group debate on the cost effectiveness of wood roller coasters v. steel coasters. Students can take sides no matter their group and debate the benefits. If you use a debate, it may be a good idea to scaffold the debate and talk about proper debate etiquette.
2. Materials acquisition form- this form is included and will be due at the end of class.
   1. This form asks questions about the real build for Dolly Wood, as well as a scaled model to be built the following week with representative materials.
   2. CRITICAL THINKING- students have to work together to present and detail the budget and justify how their design also meets space requirements of Dolly Wood.
3. **Group work**- rest of class- students should finish their scale models, which should also include the ratios for translating that design into a build.
   1. Teachers need to conference with the materials acquisition managers to ensure that they understand the requirements of the form and are able to work with other members of the group to ensure that the right materials and amounts of materials are requested. This is a great opportunity for self-questioning of students and reflection.

Day 5

1. **Scale models due-** 
   1. **Students will need to complete the scale models if time is needed**
2. **Peer Critique- groups will receive a peer critique guide to help them critique another group’s scale model. The groups will exchange up to two times to receive as much feedback as possible.**
   1. **Groups will then decide what feedback to initiate into changes and will have the rest of class to make the necessary changes before turning the scale model in at the end of class.**
   2. **Teachers will use the rubric ONLY to grade the scale models. Creativity cannot be assessed at this level. This scale model is really to test for mastery of ratios and angle content taught at the beginning of the week, as well as area and perimeter in regards to space requirements of Dolly Wood.**
   3. Students will need to complete the effort log for today.