Size Wise Activity 7: Recreate a Scene

Analysis and Prediction

Overview
This activity uses Size Wise tools to recreate a favorite photograph or scene from a movie by analyzing and predicting where subjects need to stand.

Big Idea
Students will select a famous scene from a movie or photograph and recreate it with forced perspective photography by manipulating the positions of subjects who are standing in for characters in the scene. The activity can be done two ways:

- By using Size Wise as a planning tool to generate the distances one would need to stand and prepare for the photo.
- By asking students to predict the distance from the camera the subjects need to stand to get the desired effects.

In both cases, students use the proportional relationships between image size, object height and object distance in the execution of a creative project, and in their explanations of how they set up their shots.

Learning Objectives
Students will be able to:

- Use ratio language to describe a ratio relationship between two quantities
- Use ratio reasoning to solve real world math problems involving the height and distance of objects
- Analyze data and make predictions
- Follow a multistep procedure when performing technical tasks

Vocabulary
- Image Size
- Object Height
- Object Distance
- Ratio
- Proportional Relationship

Grades
6-8, middle school

Standards Addressed
Common Core State Standards- Math Content
Ratio and Proportional Relationships
6RP1. Understand the concept of a ratio and use ratio language to describe a relationship between two quantities.

**Common Core State Standards-Math**  
**Mathematical Practices**  
MP2. Reason abstractly and quantitatively. Students interact with the concept of ratios and proportionality in two different ways. One is by visually determining the ratio relationship. Another is by mathematically determining the ratio relationship.

MP4 Model with mathematics. Students will use ratios reasoning to solve real world problems that pertain to designing digital media. Students will identify important quantities in a practical situation and analyze the relationships to draw conclusions.

**Common Core State Standards- ELA**  
**Literacy & Writing**  
W.6.3, W.7.3, W.8.3: Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

RST6.8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

**Classroom Strategies**  
*Single-device implementation*  
Students can do much of their mapping out in real time on the floor. This would require investigating the distances subjects need to stand to appear like the characters in the photo’s scene. Then they will need to take a picture with their own phones or digital cameras available. These photos could be imported into Size Wise and analyzed by the class via Smart Board or projection screen.

*Multiple-device implementation*  
This activity is well suited to groups of four: actors, photographers, measurers, and data keepers are needed. Have students follow the steps provided.

**Tips and Tricks**  
The *King Kong* example helps demonstrate how students might go about approaching this problem.

*Recreating a scene from King Kong*  
Notice that of course the person in her hand isn’t really that small, he just appears to be small enough to hold in her hand. The white line on the ground is a tape measure to help position the subjects at the predicted distance from the camera. Instead of using a tape measure, students can use the Caliper Tool. The Caliper Tool will note how far away students are from the camera so they can check to see if their predictions would yield a successful recreation of the scene.

*Working with Calipers:* Students will need to use their friends’ Object Calipers on the characters in the photos they plan to represent. Note that the calipers will have to match the height of the student posed the same way the character does. For instance, if a student will be posing as Luke Skywalker crouching down looking at a hologram of Princess Leia, that student should have his own crouching height measured and entered into his object caliper.
Inspiration for selecting scenes: You can give students a lot of latitude in choosing the scenes to recreate, but here are a few guidelines you might want to give them:

- The goal is to take a funny photo, which in this situation means that the on-camera size relationships are wildly different than the real-life size relationships. If all of the characters in the photo are to be represented by students, then the scene should include very large and very small characters in the scene.
- Think about science fiction, fantasy, monsters, animated, or animal movies.
- There should be a role for everyone in the group, with the exception of the photographer.
- It might be funny to include an action figure as one of the photo subjects, positioning it to appear as one of the characters.
- Keep in mind that the forced perspective illusion can break down if the images of the characters overlap in ways that won’t work with your setup. It’s best to choose images where the characters overlap minimally, if at all.

When students take the final picture, they might have to play with the height of the camera to get the best shot. Sometimes the best angle is from the ground.

App Features

In Camera Mode, students will use:

- To enter and calibrate the height of subjects and objects.

- To see how far away one has to stand to achieve an effect.

- To reflect on the things they notice about the pictures they take. They can email the notes to themselves.

In Gallery Mode, students can use:

- To write ratios seen in the photos they have taken.

- To drag in up to four pictures and compare the data.
**Expected Activity Time**

**Recreate a Scene** (total time 40-80 minutes)
**Option 1: Using Size Wise Tools to Find Object Distances** (20 minutes)
**Option 2: Predicting Distances** (20 minutes)

**Materials and Prep**
- Recreate a Scene Student Sheets
- iPad with Size Wise for each group of 3-4 students
- Wifi access to send work to other iPads or online project space
- Measuring tapes
- Prep: Make sure students have ample space to take pictures at different distances (hallways are good)

**Introducing the Activity**

Not all special effects are computer generated. Below are links to two YouTube clips from a video about how forced perspective was used in Lord of the Rings.

- [https://www.youtube.com/watch?v=V3ZiHEQimwE&t=137](https://www.youtube.com/watch?v=V3ZiHEQimwE&t=137) (watch from 1:37 until 3:42)
- [https://www.youtube.com/watch?v=QWMFpxkGO_s](https://www.youtube.com/watch?v=QWMFpxkGO_s)

Using what you have learned from other activities, choose a picture of a movie scene and recreate it using forced perspective photography.

**To Do**

**Option 1: Using Size Wise Tools to Find Object Distances** (20 minutes):
- Have students think about movies they have seen, especially those that involve moments with large people or animals in contrast with smaller people or things.
- Once they’ve found a picture of the scene they want to replicate, have them snap a photo using the Size Wise app. The challenge is to recreate that scene with group members standing in for the characters.

**Option 2: Predicting Distances** (20 minutes):
- Have students think about movies they have seen, especially those that involve moments with large people or animals in contrast with smaller people or things.
- The challenge is to recreate that scene, but there’s a catch: Students need to predict the distances that the people and/or objects need to be away from the camera.
- Have students choose a scene and create some diagrams to help make distance predictions. Make sure students show their work.
- Note: Some data will have to be collected by measuring the photo and each other. At least one piece of data might come from a decision the students make. (How big will the main image be on the iPad?) Some data will be calculated. (Where will everyone else stand?)
- Once they’ve predicted where everyone should stand, have them set up the shot and take the picture. Ask: Were you right?

**Discussion**

Once students have attempted to recreate the scene of a friend’s picture, ask:

- How did you go about predicting the necessary distances from the camera to correctly recreate the scene?
- Were you able to do this without physically moving around until you fit in the shot?
- What mathematics did you use to help you
calculate where people should stand?

Extensions and Inquiring Further
A great extension is for students to swap recreated scenes with another group and try to replicate it. Without looking at their classmates’ data, have students try the following:

• Analyze this new scene the same way. Have them set up the shot and take the picture.
• Does the diagram you made of your friend’s picture relate to the things you did to recreate your own scene? How so?
• Now have them compare their data to the data of the original designers. It’s very unlikely that it would be exactly the same.
• How is it different? Are some aspects of it the same? Write an explanation of which mathematical relationships are very close between the two pictures, and which are very different.
Name: ___________________________ Date: ______________

(Option 1) Recreate a Scene Using Size Wise Tools to Find Object Distances

Using what you have learned from other activities, choose a picture of a movie scene and recreate it with your group members using forced perspective. You’ll use Size Wise tools to analyze your chosen image and predict the distances.

- Think about movies you have seen, especially those that involve moments with large people or animals in contrast with smaller people or things.
- Once you’ve found a picture of the scene you want to replicate, snap a photo with Size Wise. Your challenge is to re-create that scene with your group members standing in for the characters.
- Using Calipers, the Ratio Tool, and the Distance Tool analyze the picture and figure out how far away from the camera your friends would need to stand in your final photo.
- Once you’ve collected all the data you think you need, set up the shot and take the photo. How does it look? Write an explanation of your process and why it works.

Check out the example below.

• Of course the person on the table isn’t really that small, he just appears to be small enough to hold in her right hand.
• The white line on the ground is a tape measure that helped position the subjects at the predicted distance from the camera.
• Instead of using a tape measure, you can use the calipers and the Distance tool. The distance tool can tell you how far away students are from the camera.
Option 2: Recreate a Scene by Predicting Distances

Using what you have learned from other activities, choose a picture of a movie scene and recreate it with your group members using forced perspective. You’ll calculate the distance from the camera for each group member to stand. Show your work!

To Do:
- By now you should have done at least a few of the introductory activities in the app.
- Think about movies you have seen, especially those that involve moments with large people or animals in contrast with smaller people or things.
- Your challenge is to recreate that scene, but there’s a catch: You need to predict the distances that the people and/or objects need to be away from the camera.
- Choose your scene and create some diagrams to help make your predictions of distances your group members need to stand. Show your work!
- After you’ve made your predictions of where subjects should stand and you have clearly shown the math used to figure out your placement, set up the scene and take the picture. Were your predictions right? Did you get the shot?

For hints, check out the example below:

- Note that of course the person on the table isn’t really that small, he just appears to be small enough to hold in her hands.
- The white line on the ground is a tape measure that helped position the subjects at the predicted distance from the camera.
- The distance tool can tell you how far away students are from the camera.
Name: ______________________________  Date: ________________

**Recreate a Friend’s Scene from a Movie (Extension)**

Look at your classmates’ recreated scenes and see if you can replicate what they did.

- Swap re-created scenes with another group, but don’t take their data or their mathematical predictions
- Analyze this new scene the same way as in Part 1.
- Set up the shot and take the picture.
Recreate a Scene

Reflections

1. Compare your Size Wise recreated picture to the original photo you chose. What do you notice? How close were your predictions?

2. How did you figure out the distance each object or person needed to be from the camera in order to fit correctly in the scene? Describe your process including any data or calculations you used.