

Classroom activity

Light the Lights

NAME: _____

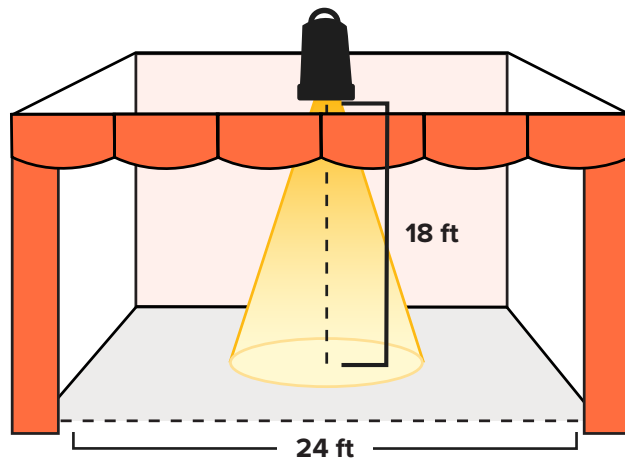
DATE: _____

You are the director for a show, and the lighting designer has asked you to make a decision. In a key scene, a lighting fixture is hung 18 feet above a stage and shining directly downward.

Name of show: _____

Description of show:

Key scene of show:



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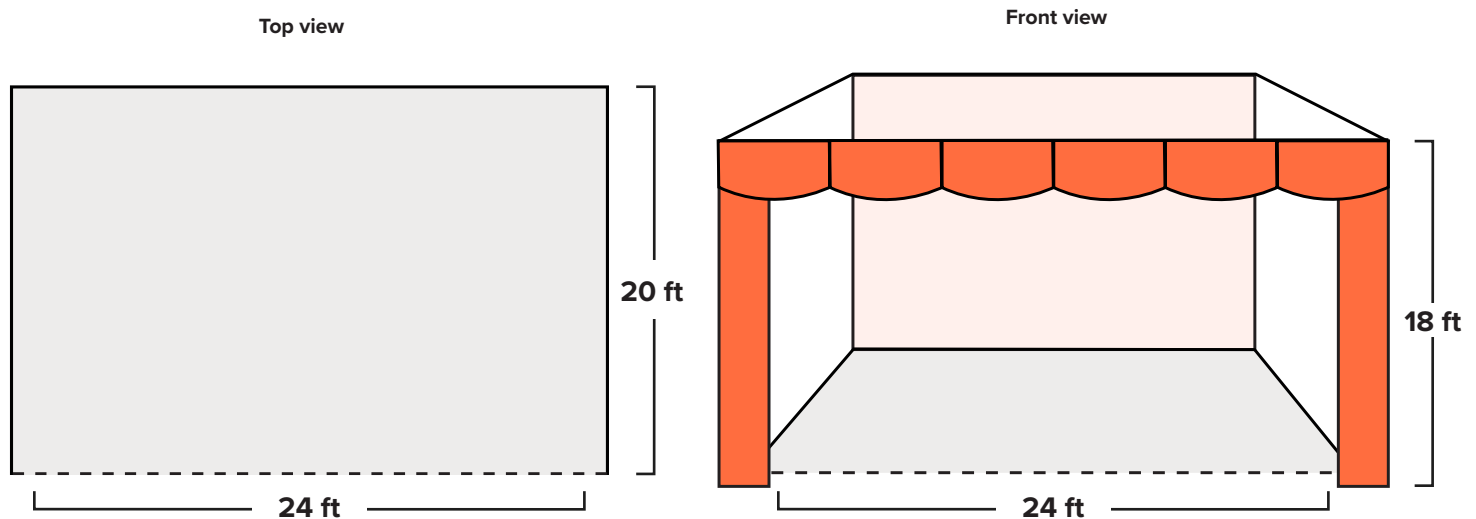
Light the Lights

You are asked to choose among three lights to place in the fixture. Each light has a different effect when shone and has a multiplication factor given by the manufacturer.

Light	Light description	Multiplication Factor
The Fuzzy Source	This will create a diffuse circle of light that draws the audience's attention to everything happening inside of it.	1
The Soft Model G	This will create a tighter, less diffuse circle that can fit several people and focuses the audience's attention on what's happening in the middle.	0.55
The Shinemaster	This creates sharp shadows and draws full and undivided attention to the person or object in the center of the stage.	0.35

Which light will you pick? Explain your reasoning.

Draw the scene below. Note that it is critical for the rest of the rest of stage design team that your circle be drawn to proportion.



Teacher's guide

Light the Lights

Grades: 5–8, for any number of students

Time: approximately 30 minutes

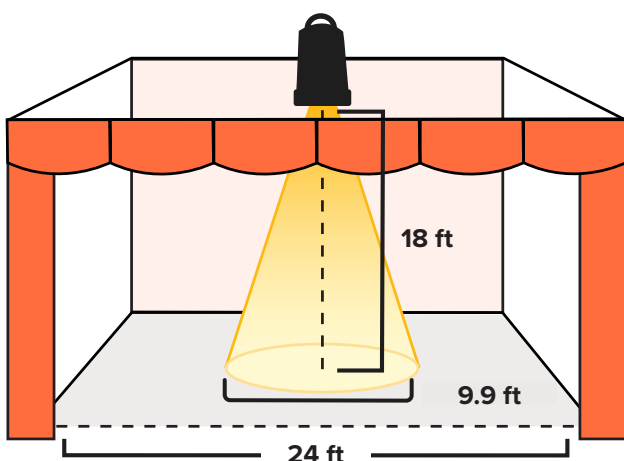
Standards:

- Multiply decimals to hundredths, using drawings and different strategies (Grade 5)
- Solve problems involving surface area of three-dimensional objects (Grade 7)
- Model with mathematics (all grades)

The width of a pool of light can be calculated by multiplying the distance by the multiplication factor given by the manufacturer. Therefore, the widths of each of the light sources provided is the product of the multiplication factors given and 18:

Light	Multiplication Factor	Expression to Find Width	Width of Pool of Light
The Fuzzy Source	1	18×1	18 feet
The Soft Model G	0.55	18×0.55	9.9 feet
The Shinemaster	0.35	18×0.35	6.3 feet

All answers are defensible, but look to make sure that 1) students correctly calculate the width of the pool of light, and 2) the light is drawn and labeled accurately in the drawings. Here, for example, is the front view if the Soft Model G is chosen:



Sample explanation: The scene features two people talking to each other, and I don't want the audience paying attention to anyone else on stage. The Fuzzy Source would highlight too much of the stage, and the Shinemaster would mostly highlight just one person. The Soft Model G is a good compromise that is wide enough to draw attention to just the two people talking on stage.

Teacher's guide

Continued

Light the Lights

Classroom setup

This activity can be completed individually, in a small group, or as a whole class. Here are three ways that the show that students are lighting can be decided upon:

1. Students individually produce their own show from scratch. This would require additional time for students to think about and write down. This could also be assigned as homework.
2. Students collaborate to produce a show as a team. This could work well in pairs or small groups, with each team member being assigned a role. For example, a team of three could be a story writer, lyricist, and composer, and they must together agree to a musical and key scene in it.
3. You provide students with a show. This is the fastest option and lessens the cognitive load of the activity. You could use an actual scene from a show or it can be creatively written by students. This can be scaffolded, for example by creating a poll where the students' answers determine choices about what the show will be.

You may want to explain that most performances in a theater are either plays or musicals. Plays tell a live story with actors. In musicals, the actors sing, too. You can look online for scenes from different plays and musicals. In addition to plays and musicals, there are many other types of performances they could choose to have on stage: concerts, magic shows, dance performances, and so on.

ELA connections

This activity can be tied to practice different ELA skills. If needed, work with the students' English teachers to see what drama they may be learning about in class and have them light a scene from a play they're reading.

You could also have students write more about the show they're producing. What will the plot be? How will they raise money? What other creative decisions would they make?

Classroom conversations

Consider the questions below as ways to guide a classroom discussion and include all students in math talk about this problem.

- How can the lighting affect how an audience sees something? Watch online videos of different professionally shot performances on stage and pay attention specifically to the lighting.
- What are the advantages and disadvantages of each of the light sources? You could have students fill in a Venn diagram.
- How will the circles of light be different based on the multiplication factors?
- How would the pool of light change if the light source is raised, lowered, or moved horizontally? What if the light is rotated to shine at an angle?