

New Room

Standards

Addressing 3.MD.C.5, 3.MD.C.7.b, 3.MD.C.7.d
 Building Toward 3.MD.C.5, 3.MD.C.7.b, 3.MD.C.7.d


Instructional Routines

- Notice and Wonder

Goals

- Explain (orally) decisions and assumptions made when representing and solving a real-world problem.
- Present (using words and other representations) a solution to a real-world problem involving the areas of figures, including those with unknown side lengths.

Student Facing Learning Goals

-  Let's fit furniture into a room.

Lesson Purpose

The purpose of this lesson is for students to use their experience with areas of figures composed of rectangles to solve problems.

Narrative

This lesson is optional because it does not address any new mathematical content standards. This lesson does provide students with an opportunity to apply precursor skills of mathematical modeling (MP4).

In previous lessons, students solved rectangular area problems. They connected area problems to multiplication. They learned that area is additive as they found the areas of figures composed of rectangles by decomposing them into non-overlapping rectangles.

In this lesson, students find unknown side lengths of a room and use their knowledge of the area of a rectangle to solve a problem about fitting a bed and a desk into a room. As students make decisions, they consider what space in the room is usable or what spot in the room is best for each piece of furniture.

Access for Students with Disabilities

- Action and Expression

Access for English Learners

- MLR5

Required Materials

Materials to Gather

- Grid paper: Activity 2
- Scissors: Activity 2
- Tools for creating a display: Activity 2

Materials to Copy

- New Bed and Desk Handout (1 copy for every 2 students): Activity 2



Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	25 min
Synthesis Estimate	10 min

Teacher Reflection Questions

What unfinished learning or misunderstandings do your students have about the areas of rectangles? How did you leverage those misconceptions in a positive way to further the understanding of the class?

Warm-up

🕒 10 min

Notice and Wonder: Floor Plan

Standards

Building Toward 3.MD.C.5, 3.MD.C.7.d

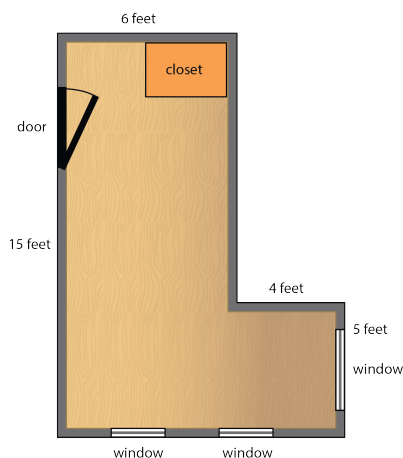
Instructional Routines

- Notice and Wonder

The purpose of this *Warm-up* is to elicit ideas about floor plans and the mathematics that might be involved. This will be useful when students design a layout for a bedroom in a later activity. While students may notice and wonder many things about this image, such as the familiar shape of the diagram that can be broken up into rectangles, the features that make this a floor plan, such as the windows and the door, are the important discussion points.

Student Task Statement

What do you notice? What do you wonder?



Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

Activity Synthesis

- “This diagram is a floor plan. A floor plan is like a map for a room.”
- “What are some items of furniture we might see in the floor plan of a bedroom?” (bed, dresser, nightstand, desk, chair, bookshelf)

Student Response

Students may notice:

- We can break this figure into 2 rectangles.
- One of the side lengths is unknown.
- We could use what we know about rectangles to find the unknown side lengths.



- The measurements are given in feet.
- There is a door and 3 windows.

Students may wonder:

- What does the figure represent?
- What is the area of the figure?
- What are the lengths of the unknown sides?

Activity 1

🕒 15 min

Floor Plans

Standards

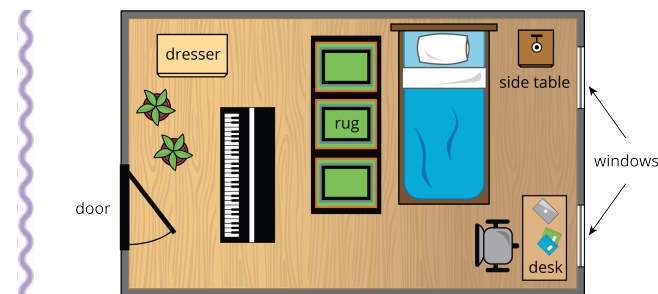
Addressing **3.MD.C.5**
 Building Toward **3.MD.C.7.b**

The purpose of this activity is for students to make sense of floor plans. In the *Launch*, students make sense of how different features of the floor plan, such as windows, doors, and furniture, are visually represented. Students analyze the plan and consider what is usable floor space and where it makes sense to put the furniture. Students may give both aesthetic and practical reasons for furniture placement. This short activity prepares students to make similar considerations in the next activity.

MLR5 Co-Craft Questions. Display the image of the floor plan, and invite students to write a list of possible mathematical questions they could ask about the situation. Invite students to compare their questions, “What do these questions have in common? How are they different?” Amplify questions related to comparison and areas of rectangles.

Advances: Reading, Writing

Student Task Statement



The image shows the design of a floor plan for a bedroom. Discuss with your partner:

1. What is 1 thing you like about the design?
2. What is 1 thing you would change and why?

Launch

- Groups of 2

Activity

- “Take a few minutes to think about what you like about this design, and think of one thing you would change and why.”
- 2–3 minutes: independent work time
- 4–5 minutes: partner discussion
- Monitor for students who discuss:
 - Usable floor space.
 - Increasing floor space.
 - Rearranging objects to make it easier to move around the room.

Student Response

1. Sample response: I like that they put the desk by the



window because this might help the person focus more if they are working or can enjoy looking outdoors if they want to take a break.

2. Sample response: I would move the plants to the other side of the door so that it can open all the way.

Activity Synthesis

- Invite a few students to share what they like about the current design and what they would change and why.
- Consider asking:
 - “Why might it be a good idea to move the plants to another spot?” (When the door is opened, it might bump into the plants. The door can’t be opened all the way.)
 - “What else could we rearrange to make moving around the room easier?” (The piano could be moved against a wall to make it easier to walk across the room. I would move the bed to the left to make it easier to walk between the bed and the desk chair.)

Activity 2

 25 min

New Bed and Desk

Standards

Addressing 3.MD.C.5, 3.MD.C.7.b, 3.MD.C.7.d

The purpose of this activity is for students to apply their understanding of the area of a rectangle to design a floor plan for a room. Students use their experience from the previous activity and consider what space is usable as they arrange the furniture. When students consider assumptions about information not given in a situation and report on their conclusions and reasoning, they model with mathematics (MP4).

Access for Students with Disabilities

Action and Expression: Provide Access for Physical Action. Provide access to a variety of pre-cut materials to reduce barriers for students who need support with fine motor skills and students who benefit from extra processing time.

Supports accessibility for: Fine Motor Skills, Organization, Visual-Spatial Processing

Required Materials

Materials to Gather

- Grid paper: Activity 2
- Scissors: Activity 2
- Tools for creating a display: Activity 2

Materials to Copy

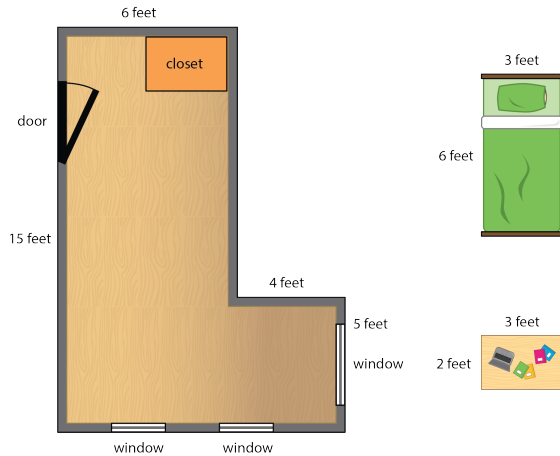
- New Bed and Desk Handout (1 copy for every 2 students): Activity 2





Student Task Statement

This is a diagram of a bedroom, a desk, and a bed.

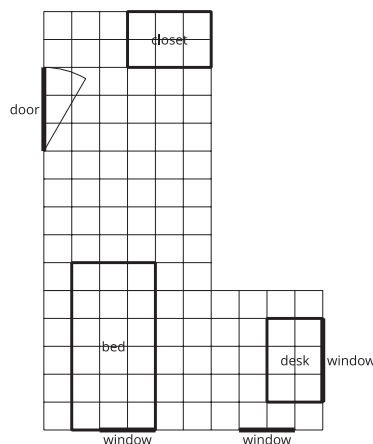


1. How would you arrange the bed and desk in the room?
2. What is the area of the floorspace in the room that is not covered by furniture?

Create a poster to show your thinking. Organize it so it can be followed by others.

Student Response

1. Sample response: We decided Tyler should put the bed in the lower corner of the room. This lets him get to his desk and keeps the bed from blocking the door or the closet. When Tyler sits at the desk, he will be in a separate place in the room to work or read, or to look out the window.



2. Sample response: We added all the area that wasn't covered by furniture, which is 80 square feet.

Launch

- Groups of 2 or 4
- Give each group scissors, a copy of the blackline master, tools for creating a display, and access to grid paper.
- Display images of Tyler's desk, bed, and new room.
- "Tyler is moving into a new room and needs to decide where he is going to put his bed and his desk. What are some of the things he might want to think about when deciding where a bed and a desk should go in his room?" (Whether he wants space on both sides of his bed or just one side. His view while he's sitting at his desk. How easy it will be to move around the room.)
- 30 seconds: quiet think time
- 1 minute: small-group discussion

Activity

- "Work with your group to solve both problems. You can cut out the furniture in the handout or create your own diagram on grid paper. Then, create a poster to show how you solved the problems."
- 15 minutes: small-group work time

Activity Synthesis

- Display the student posters around the room.
- "Now, half of the class is going to stand with their posters while the other half visits those posters. If you're standing with your poster, explain how you solved the problem. As you visit other posters, ask any questions you have about the solution to the problem."
- Ask half the groups to stand with their posters to share their ideas or answer questions as the other groups visit them.
- Ask the other half of the class to visit other groups' posters.
- 5 minutes: small-group work time
- Remind students to switch places after 2 minutes, if they haven't already, so they see a few posters.
- Switch group roles and repeat.



Lesson Synthesis

“Today we solved a problem that had many possible answers. What decisions did you have to make as you solved the problem about how Tyler should arrange his bed and desk?” (I had to decide if the bed should be up against the wall or to leave a space between the bed and the wall. I decided to leave some space for Tyler's chair by the desk.)

Consider having students respond to the previous question as a journal prompt.

Suggested Centers

- Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
- Five in a Row: Addition and Subtraction (1–3) , Stage 8: Add within 1,000, with Composing (Supporting)

