



Lesson Plan: Design Your Dream Room



Grades: 5 – 8 (US)

Duration: 6 hours

Skills:

- 2D design
- 3D design
- Brainstorming
- Geometric design
- Mathematical computation
- Measurement conversion
- Spatial reasoning

Subjects:

- Art
- Design
- Math

Lesson Plan Overview

Help your students learn skills so that they can become the innovative architects and designers of the future! This lesson takes an interdisciplinary approach to teaching students how to work through the design process, work with real-world measurements, and convert measurements down to a scale so that it fits the Tinkercad workplane and can be 3D printed (as an option). Students will identify the attributes they want to include in their dream room, plan it on paper, use basic math, and then recreate their vision in Tinkercad. The estimated time to complete this will vary based on prior Tinkercad experience and the level of details students may want to add.



Learning Objectives

- Use technology and sketching to develop an organized system for drawing ideas and documenting progress.
- Develop proportional models based on real measurements.
- Convert feet/inches to millimeters.
- Choose an appropriate scale to create a room on a Tinkercad workplane.
- Create a 3D room and accessories that are easily identifiable.
- Design a 3D room that can be 3D printed.

Standards

- **ISTE Standard 4 | Innovative Designer**: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful, or imaginative solutions.
- **ISTE Standard 5 | Computational Thinker**: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- **ISTE Standard 6 | Creative Communicator**: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats, and digital media appropriate to their goals.
- **CCSS, Grade 7, Ratios & Proportional Relationships**: Analyze proportional relationships and use them to solve real-world and mathematical problems.
- **CCSS, Grade 5, Measurement & Data**: Convert like measurement units within a given measurement system.
- **CCSS, Grade 6, Geometry**: Solve real-world and mathematical problems involving area, surface area, and volume.

For more information about standards used in this lesson plan, visit these websites:

- ISTE: www.iste.org/standards/for-students
- Common Core (Math): www.corestandards.org/Math/Content/6/introduction/



Materials

This is a list of materials each student will need to complete this lesson.

- Computers or tablets with audio and Internet access to Tinkercad
- Digital or paper sketchbook or sheets of paper
- Computer with slideshow software, like PowerPoint, Google Slides, or Keynote
- Sticky notes
- Pencils or pens
- Cardboard or other prototype materials (optional)
- Digital drawing software (optional)
- 3D printer and filament (optional)

You'll find links below where you can directly download and print files from the [Tinkercad Lesson Plan page](http://www.tinkercad.com/lessonplans/design-your-own-dream-room) (www.tinkercad.com/lessonplans/design-your-own-dream-room) that your students will need for this lesson:

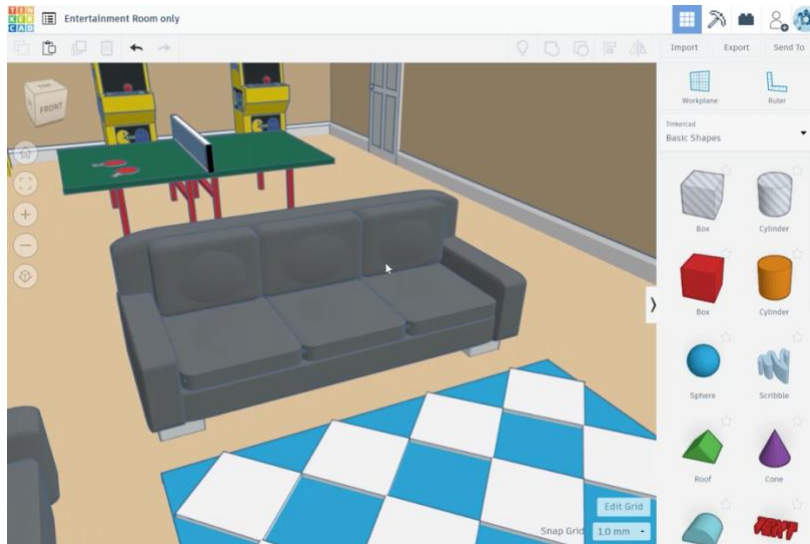
- [Evaluation Rubric](#) [PDF with fillable text fields]
- [Intro to Project](#) [video]
- [Graph Paper](#) [PDF]
- [How to Convert Measurements](#) [video]
- [Determine Scale](#) [video]
- [Convert Measurements worksheet](#) [PDF]
- [Work With Boxes](#) [video]
- [Work With Furniture](#) [video]
- [Tips for Creating Room Objects](#) [PDF]
- [See a Finished Video](#) [video]

Setting Up Your Class

This lesson is intended to be done independently, but collaboration can be done if a student would like another classmate to make a supplemental drawing that better represents that student's ideas. Collaboration is expected for the critique phase before making revisions. If students are working remotely, ask them to use an online tool approved by your school, such as Zoom, to collaborate with each other.

Prepare to Design [15m]

1. Intro to Project [15m]



Teacher Instructions

[Click the link to play this video.](#) Encourage students to begin sketching what comes to mind and think about what they would want to include in their own space.

Student Instructions

[Click the link to watch this video,](#) write down initial ideas you have, and discuss them with a partner.

Materials:

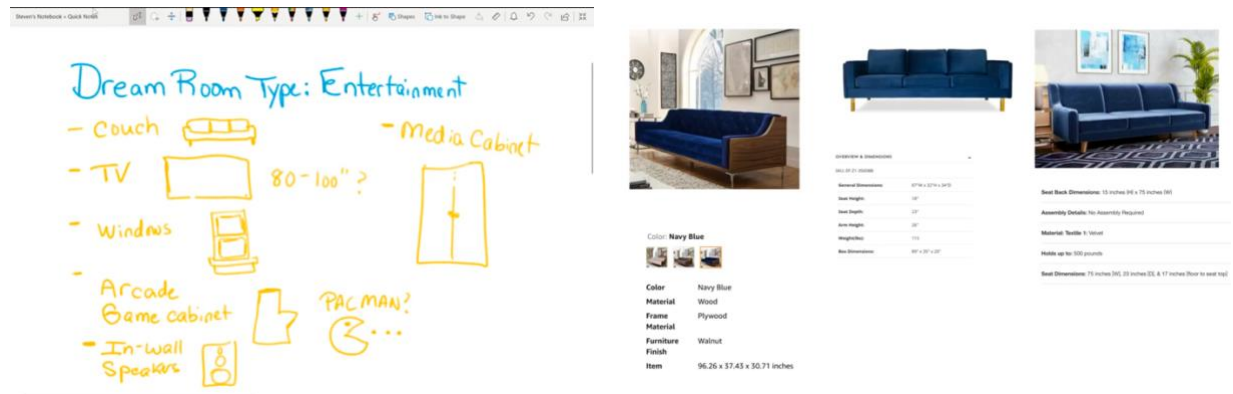
- Computer and speakers, with online access

Outcome:

- Use technology and sketching to develop an organized system for drawing ideas and documenting progress.

Define Room Attributes [60m]

2. Research [60m]



Teacher Instructions

Encourage students to gather reference images and measurements and add them to their portfolio. Encourage them to create a “style board” to organize the objects they might like to include in their room designs.

Student Instructions

Using a digital notebook or paper and pen, take some time and brainstorm some objects or attributes for your dream room! Sketch out what you imagine these items look like. Search online for reference images. For example, if you want to create an entertainment space, you might include:

- Sofa
- TV
- Games
- Windows
- Speakers
- Media cabinet

You may also search the shapes library in Tinkercad to find object ideas. Keep note of the measurements of your objects. You’ll use them later to help you determine the sizes you want. This will help you keep everything proportional. Once you gather your images, create a digital or paper “style board” to organize them.



Materials:

- Computer and speakers, with online access
- Digital notebook or paper sketchbook
Pencil/pen

Outcomes:

- Use technology and sketching to develop an organized system for drawing ideas and documenting progress.
- Develop proportional models based on real measurements.



Design Your Room [1h 10m]

3. Sketch [30m]

Teacher Instructions

Encourage students to use whatever digital tools are available to create a draft blueprint of their room. We have also included graph paper (*please see link below*) that can be downloaded and printed.

Student Instructions

Using a digital drawing tool, graph paper, or sketch paper, begin drawing a “blueprint” of your room. (*Please see link below if you need to print graph paper.*)

Imagine that you are looking at the room overhead with a view of the outlines. Include space for a door and windows, as well as any objects you want to arrange in the space. Place measurements on your drawing of the length and width of the room, windows, and the door.

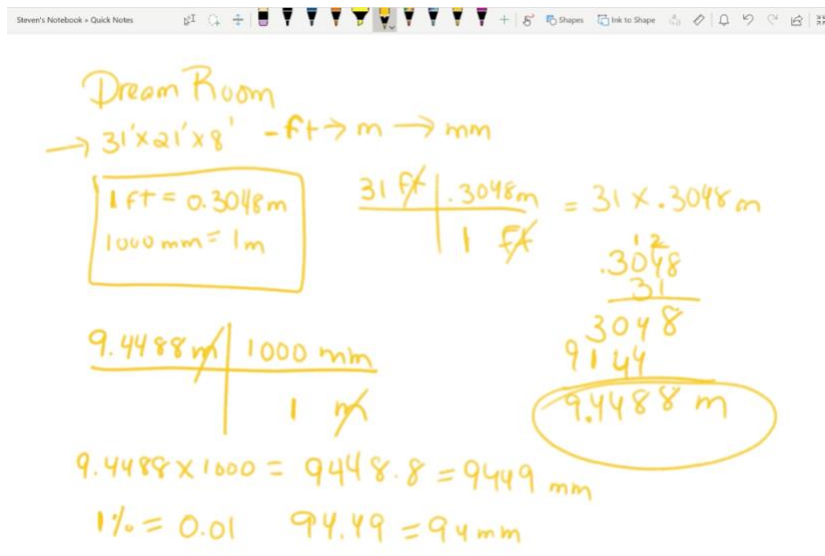
Materials:

- [Graph Paper](#) [PDF] (*Please click the link to download the document.*)
- Computer with digital drawing tool (optional)
- Graph paper or sketch paper
- Pencil/pen
- Ruler

Outcomes:

- Use technology and sketching to develop an organized system for drawing ideas and documenting progress.
- Develop proportional models based on real measurements.

4. How to Convert Measurements [5m]



Dream Room
 → 31' x 21' x 8' - ft → m → mm

1 ft = 0.3048 m
 1000 mm = 1 m

$$31 \text{ ft} \times 0.3048 \text{ m} = 31 \times 0.3048 \text{ m}$$

$$9.4488 \text{ m} / 1000 \text{ mm}$$

$$9.4488 \times 1000 = 9448.8 = 9449 \text{ mm}$$

$$1\% = 0.01 \quad 94.49 = 94 \text{ mm}$$

Teacher Instructions

[Click the link to play this video](#) for a demonstration of how to convert inches/feet to millimeters. Consider holding a discussion with students about the various ways in everyday life that converting measurements is useful.

Student Instructions

[Click the link to watch this video](#) for a demonstration of how to convert inches/feet to millimeters.

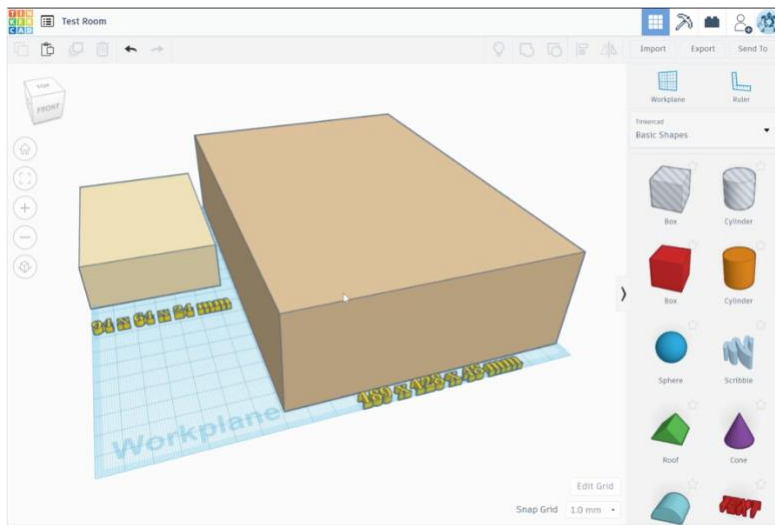
Materials:

- Computer with audio

Outcomes:

- Convert feet/inches to millimeters.
- Choose an appropriate scale to create a room on a Tinkercad workplane.

5. Determine Scale [5m]



Teacher Instructions

[Click the link to play this video](#) for details and tips for scaling a design to fit into the Tinkercad workplane. Talk about the various ways that building models can help people plan real-life objects and structures. Ask students about careers they think might require this skillset.

Encourage students to make their room at a one percent scale and two percent scale to see the difference. Provide choice, but encourage a larger scale if you can't or won't print all of the room designs.

Student Instructions

[Click the link to watch this video](#) for details and tips for scaling your design to fit into the Tinkercad workplane.

Materials:

- Computer with audio

Outcomes:

- Choose an appropriate scale to create a room on a Tinkercad workplane.
- Develop proportional models based on real measurements.



6. Convert Measurements [2m]

Teacher Instructions

Ask students complete the [Convert Measurements worksheet](#) (please see link below), and give them instructions for sharing their work with you.

Student Instructions

Download the table (*please see link below*), and then use the worksheet to create your own measurement conversions, including determining the proper scale. Using the dimensions of the objects you researched, practice converting from feet/inches to millimeters. Your teacher will give you instructions for how to share your work.

Materials:

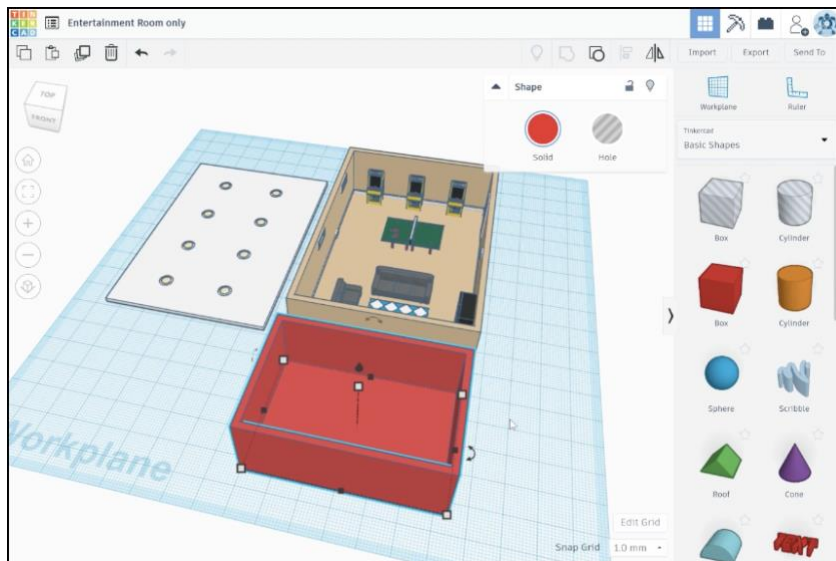
- [Convert Measurements worksheet](#) [PDF]
- Computer

Outcomes:

- Convert feet/inches to millimeters.
- Choose an appropriate scale to create a room on a Tinkercad workplane.
- Develop proportional models based on real measurements.

Design Your Room in Tinkercad [1h 15m]

7. Work With Boxes [5m]



Teacher Instructions

[Click the link to watch this video](#), which shows you how to work with boxes to create your room. Remind students to take notes while watching the video so that they can apply tips and techniques they learn about in their own designs later.

Student Instructions

[Click the link to watch this video](#), which shows you how to work with boxes to create your room. Take notes so that you can use these techniques when you create your own design in Tinkercad.

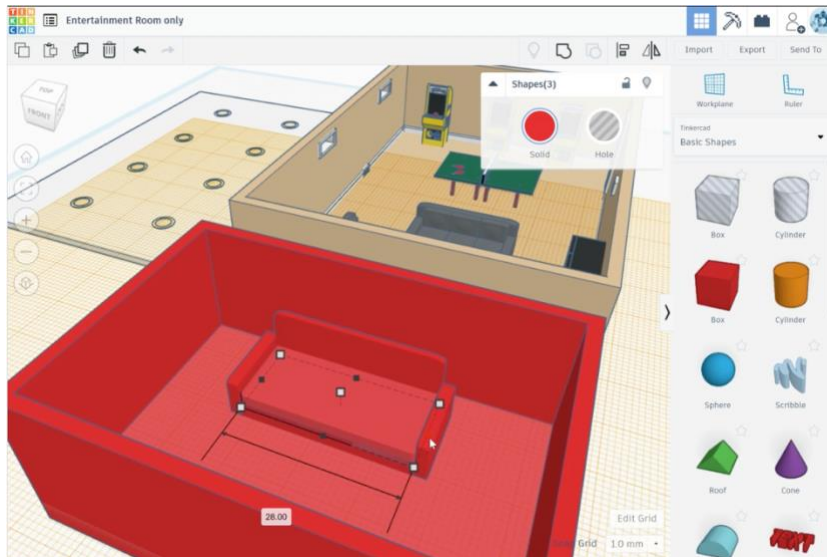
Materials:

- Computer with online access

Outcomes:

- Create a 3D room and accessories that are easily identifiable.
- Design a 3D room that can be 3D printed.

8. Work With Furniture [5m]



Teacher Instructions

[Click the link to watch this video](#), which shows you how to work with furniture like a sofa to use in your room. Remind students to take notes while watching the video so that they can apply tips and techniques they learn about in their own designs later.

Student Instructions

[Click the link to watch this video](#), which shows you how to work with furniture like a sofa to use in your room. Take notes so that you can use these techniques when you create your own design in Tinkercad.

Materials:

- Computer with online access

Outcomes:

- Create a 3D room and accessories that are easily identifiable.
- Design a 3D room that can be 3D printed.



9. Create Room Objects [5m]

Teacher Instructions

Review this tips sheet (*please see link below*) for ideas and images of different room objects students can build in Tinkercad. Remind students that the examples given in the videos and the tips sheet are not meant to be copied. Encourage students to use their creativity to design their own creations, and to work at a level of complexity they're most comfortable with.

Student Instructions

Review this tips sheet (*please see link below*) for ideas and images of different room objects you can build in Tinkercad. You're almost ready to create your own design. The videos and tips sheet will give you ideas for making your own creation.

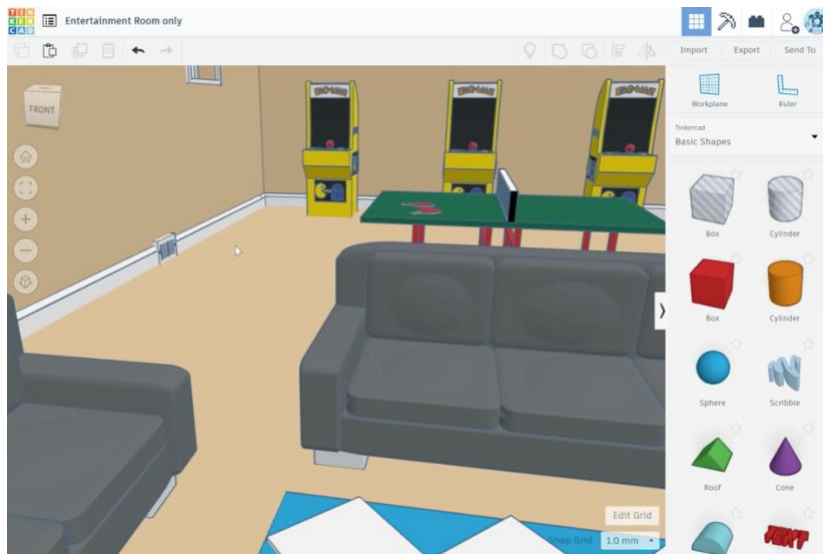
Materials:

- [Tips for Creating Room Objects](#) [PDF]
- Computer

Outcomes:

- Create a 3D room and accessories that are easily identifiable.
- Design a 3D room that can be 3D printed.

10. See a Finished Room [60m]



Teacher Instructions

Click the link to [watch this video](#) of an example room. After students review the videos and the tips sheet, encourage them to create their own original designs based on what they previously planned and not change everything to match what they were shown. It's important to learn techniques and apply them in different ways. They should take as much time as they need to build their 3D design skills.

Student Instructions

Click the link to [watch this video](#) of an example room. Then you're ready to start making your room and everything in it.

The video is meant to be a reference only; be creative in expressing your ideas through your own unique design in Tinkercad! Your teacher will give you instructions for sharing your file.

Materials:

- Computer with online access

Outcomes:

- Create a 3D room and accessories that are easily identifiable.
- Design a 3D room that can be 3D printed.



Conclusion [2h]

9. Share Feedback [1h]

Teacher Instructions

At this point students should have completed their room design and are ready for feedback. If you're working remotely instead of in a classroom, have students use Zoom or another school-approved online tool to share real-time feedback with at least three other students. Each student should document the feedback they receive in their portfolio. Their next step is to incorporate changes that they agree will improve their design.

Student Instructions

Now you are ready to share your design with three other students and ask for feedback from them. Use the format below as prompts to discuss your project with each student giving you feedback.

1. What do you like about the design? Be specific.
2. What do you think can be improved?
3. Pan and orbit the camera around the design. Is anything floating or separated that should be connected?
4. Do the proportions look correct?
5. Were all of the conversions in the table done correctly?

Use your portfolio to keep track of the feedback you receive. Your teacher will give you instructions for how to work with other students to exchange feedback on your project work.



10. Finalize and Share Design [1h]

Teacher Instructions

Provide a forum for students to share their final designs. Use the rubric to assess student work and provide each student feedback.

Student Instructions

Your teacher will give you instructions on how to share your portfolio and your final design. Be sure to share your portfolio with at least three students. If your school and teacher allow it, share your final design responsibly through social media.