Tinkercad Lesson 2: Building a Neighborhood

1. Review of Previous Skills (5-7 minutes)

- **Teacher Action:**
    1. Begin by asking review questions or having students demonstrate skills with a partner:
        - "What do the white and black boxes do?"
        - "How do you raise an object above the workplane?"
        - "How do you rotate an object?"
        - "What does snapping (cruise mode) help you do?"
    2. Have students start a new project and bring out a cube to briefly practice these skills.

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2. Introduction to Grouping and Ungrouping (5-7 minutes)

- **Activity:**
    - Drag out a cube and a triangular prism onto the workplane.
    - Demonstrate snapping the triangular prism onto the top of the cube to create a simple house shape.
    - Show how to group these objects by selecting both (either holding **Shift** or drawing a rectangle around them) and clicking the **Group** icon.
        - Move the grouped object to show how it moves as one unit.
    - Demonstrate how to ungroup the objects and adjust them separately.
    - Show the **multi-color feature** to maintain individual colors within a grouped object.
- **Practice:**
    - Students practice grouping and ungrouping their cube and prism, experimenting with the multi-color option. You can also give them some time to bring out other shapes and let them group different objects together.

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3. Creating Holes (5-7 minutes)

- **Activity:**
    - Have students delete any extra shapes they added during practice, keeping only the house (cube and triangular prism grouped together).

    - Instruct students to bring out a **round roof** shape and position it in the middle of the house near the bottom.
    - Show them how to resize the round roof:
        - Make it taller by extending its height.
        - Narrow it by adjusting its width so it looks more like a tunnel or doorway.
    - Demonstrate turning the round roof into a **hole** using the Hole option.
    - Select both the house and the round roof, group them, and explain how the hole creates a cutout in the house.
- **Practice:**
    - Students follow the same steps to add a tunnel or doorway to their house.
- **Guiding Questions:**
    - "What happens when you group a shape with a hole?"
    - "How can creating holes make your design more realistic or detailed?"
- **Teacher Note:**
    - Highlight how this technique can also be used for windows or other details in future designs. Share how some students have creatively used this method in past projects.

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4. Using the Duplicate Feature (5 minutes)

- **Activity:**
    - Show how to duplicate a grouped house by selecting it and clicking the **Duplicate** icon.
    - Demonstrate rotating and moving the duplicate to place it opposite the original house.
- **Practice:**
    - Students duplicate their houses and adjust the placement to start building their neighborhood.

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5. Neighborhood Creation Task (15-20 minutes)

- **Task Instructions:**
    - Challenge students to create a neighborhood on their workplane, starting with their initial house design.
    - Requirements:
        - Create at least **two additional house models**, one of which must be a two-story house.

        - Use the grouping, hole, and duplicate features to design the houses.
    - Optional Extensions:
        - Add streets, grass, trees, or other decorative elements to their neighborhood.
- **Teacher Tip:**
    - Guide students through creating a simple one-story house together as an example before they start designing independently.
- **Guiding Questions:**
    - "How can you make each house unique using the tools we've learned?"
    - "What details can you add to make your neighborhood more realistic?"

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6. Reflection and Sharing (5-7 minutes)

- **Activity:**
    - Have students participate in a gallery walk to view their peers' neighborhoods.
    - Encourage students to explain one skill they used and why it was important to their design.
- **Guiding Questions for Reflection:**
    - "What was the most challenging part of building your neighborhood?"
    - "How did you use the duplicate feature to save time?"
    - "What do you like most about your design?"

Adaptations for Younger Grades (2nd-3rd):

- Focus on grouping, holes, and creating one or two house models.
- Provide additional guided practice before the independent neighborhood task.
- Simplify the requirements for the neighborhood by allowing fewer decorative elements.

Assessment:

- Observe students during practice activities to ensure understanding of grouping, holes, and duplication.
- Evaluate their neighborhoods for creativity and correct use of the required skills.

- Participation in the reflection and sharing activity.

Extension Ideas:

- Faster learners can design additional decorative elements, such as parks, streetlights, or fences.
- Challenge advanced students to create unique buildings, such as a school or library, to add to their neighborhood.