Here is the complete testing plan for the third iteration, based on your input, previous templates, and learnings:

**Testing Plan: XR Assembly Prototype Iteration 3**

**Objectives**

1. Measure users’ accuracy and efficiency in placing different predefined shapes into a white transparent box and securing them with virtual screws.
2. Evaluate users’ ability to assemble furniture by using build boxes as columns and positioning a tabletop assembly, assessing task completion time and accuracy.
3. Assess engagement, creativity encouragement, and ease of use for young girls exploring construction concepts in XR.
4. Test the effectiveness of new visual feedback cues and instructional aids on user confidence, error reduction, and task strategy.
5. Identify ergonomic or interaction issues and evaluate improvements in onboarding aids and workspace setup.
6. Collect subjective feedback on mental and physical workload, usability, and user experience.

**Methodology**

* **Time on Task**: Quantitatively record the time taken by each participant to complete each task.
* **Error Tracking**: Log placement errors, incorrect assembly actions, and screw fastening mistakes.
* **Qualitative Observation**: Use think-aloud protocol to capture user strategies, difficulties, and engagement.
* **Post-task Interviews**: Gather user insights on ease of use, enjoyment, and suggestions.
* **NASA TLX Questionnaires**: Measure workload factors including mental demand, physical demand, effort, and frustration.
* **Video and Audio Recording**: For detailed behavioral analysis.

**Tasks**

* **Task 1:** Users pick shapes and place them inside a white transparent box, then use virtual screws to secure each shape.
* **Task 2:** Users assemble furniture by positioning build boxes as support columns and attaching a tabletop assembly.
* Clear instructions and visual references will be provided.

**Data Collection**

* Time to complete each task.
* Number and types of errors.
* User feedback and questionnaire responses.
* Observations on interaction comfort and tool usability.
* User engagement and creative problem-solving behaviors.

**Setup**

* XR prototype with implemented shape placement, screwing mechanics, and visual feedback cues.
* Comfortable testing environment with spatial boundaries to ensure ergonomic safety.
* Visual aids including holograms, color-coded placement shadows, and instructional overlays.

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* Visual guidance improves placement accuracy and user confidence.
* Positive/negative feedback cues reduce errors and support user learning.
* Clear onboarding and workspace setup enhance usability and comfort.
* Encouraging playful exploration fosters creativity and interest in construction.