DT – Year 3 Autumn 2

Recreating a structure that can tolerate earthquakes.

Vocabulary		
Tier 1	Tier 2	Tier 3
Structure	Design	Freestanding structure
Build	Evaluate	Earthquake-resistant
Weight	Balance	Bracing
Strong	Reinforce	Architecture
Shake	Stability	Cross-support

don't know | I know this word | I can use it in a sentence

In this unit, students will learn about the design and construction of freestanding structures that can withstand earthquakes. They will explore concepts of stability, strength, and the use of reinforcing methods in their designs.

Important Concepts:

Types of Freestanding Structures: Towers, bridges, buildings, etc.

Design Principles:

- **Triangular Shapes:** Often used for stability in structures.
- **Base Width:** A wider base increases stability.
- **Weight Distribution:** Evenly distributed weight helps prevent tipping.

Testing Structures:

- Simulate earthquake conditions (e.g., shaking tables, weights).
- Observe how structures respond to stress.

Reflection Questions for Evaluation:

- What worked well in your design?
- What challenges did you face during construction?
- What changes would you make for a better outcome?

What is a freestanding structure? A freestanding structure is a building or object that stands on its own without any support from other structures. Examples include towers, bridges, and certain types of buildings.

Why is it important for buildings to be strong during an earthquake? Buildings need to be strong during an earthquake to prevent them from collapsing, which can cause injuries and damage. Strong buildings can better withstand the shaking and forces produced by earthquakes.

What are some methods used to strengthen structures? Some methods used to strengthen structures include:

- **Bracing:** Adding diagonal supports to help distribute forces.
- **Cross-supports:** Using X-shaped structures to improve stability.
- **Wider bases:** Increasing the width of the base of a structure to lower its center of gravity and enhance stability.

How does the shape of a structure affect its stability? The shape of a structure affects its stability by influencing how weight is distributed. Triangular shapes are particularly stable because they distribute weight evenly and resist tipping.

What steps can you take to test the strength of your structure? To test the strength of a structure, you can:

- Simulate an earthquake by shaking the base or using a shaking table.
- Gradually add weights to see how much load the structure can hold before collapsing.
- Observe how the structure reacts to movement and identify any weak points.

Health and Safety

Supervision: Ensure students are supervised at all times during activities, especially during construction and testing.

Safe Workspace: Designate a specific area for building and testing to keep it organized and hazard-free.

Use of Tools and Materials:

- **Scissors:** Teach students to cut away from themselves and others.
- **Weights:** Use lightweight materials; if heavier weights are used, secure them properly.

Structural Testing: Ensure the testing area is clear and everyone stands at a safe distance. Use soft weights (like bean bags) to reduce injury risk.

Useful Resources

What is an Earthquake?" (National Geographic Kids)
https://www.youtube.com/watch?v=2wt6D7H3hRA
"The Science of Earthquakes" (SciShow Kids) https://www.youtube.com/watch?v=lVn2vY_UV2s
"How to Build an Earthquake-Resistant Building" (Engineering for Kids)
https://www.youtube.com/watch?v=6gZJ13O5Gxs