

# Strong and Stable Structures

Grade 3 Understanding Structures and Mechanisms  
Meets Ontario Curriculum Outcomes



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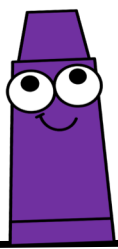
# STRONG AND STABLE STRUCTURES

## GRADE 3: UNDERSTANDING STRUCTURES AND MECHANISMS

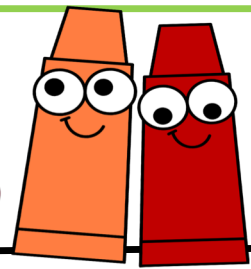
### ONTARIO CURRICULUM



1.1	Assess the effects of strong and stable structures on society and the environment (e.g., reliable loadbearing structures are essential in all areas of life for shelter, transportation, and many other everyday purposes; strong and stable structures can endure for long periods of time and provide a historical record of other societies and cultures; strong and stable structures can be hard to dispose of when their usefulness is ended and may then have a negative effect on the environment)
1.2	Assess the environmental impact of structures built by various animals and those built by humans
2.1	Follow established safety procedures during science and technology investigations (e.g., carry scissors and other cutting tools in a safe manner)
2.2	Investigate, through experimentation, how various materials (e.g., paper and wood) and construction techniques (e.g., folding, adding layers, twisting/braiding, changing shapes) can be used to add strength to structures
2.3	Investigate, through experimentation the effects of pushing, pulling, and other forces on the shape and stability of simple structures (e.g., the effect of adding one or more struts on the strength of a tower; the effect of adding ties on the strength of a bridge; the effect of adding weight to the base of a tower on the stability of the tower)
2.4	Use technological problem-solving skills, and knowledge acquired from previous investigations, to design and build a strong and stable structure that serves a purpose (e.g., a place to store lunch bags, a place to put wet boots)
2.5	Use appropriate science and technology vocabulary, including compression, tension, strut, ties, strength, and stability, in oral and written communication
2.6	Use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., an oral report to the class on the results of experiments to strengthen materials)
3.1	Define a structure as a supporting framework, with a definite size, shape, and purpose, that holds a load (e.g., a running shoe, a tepee, a bicycle, an igloo)
3.2	Identify structures in the natural environment (e.g., a tree, a bees' nest/hive) and in the built environment (e.g., a totem pole, a fence, a pyramid, the CN tower)
3.3	Identify the strength of a structure as its ability to support a load
3.4	Identify the stability of a structure as its ability to maintain balance and stay fixed in one spot
3.5	Identify properties of materials (e.g., strength, flexibility, durability that need to be considered when building structures)
3.6	Describe ways in which strength of different materials can be altered (e.g., folding, adding layers, twisting/ braiding, changing their shape)
3.7	Describe ways to improve a structure's strength (e.g., by using triangulation or crossmembers) and stability (e.g., by lowering the centre of gravity)
3.8	Explain how strength and stability enable a structure (e.g., bridge, tent) to perform a specific function
3.9	Describe ways in which different forces can affect the shape, balance, or position of structures (e.g., a load may cause a cardboard box to buckle)
3.10	Identify the role of struts and ties in structures under load (e.g., a strut is added to a wooden frame to resist a compression that might cause its collapse; a tie is added to roof truss to resist tension that might cause the roof to collapse from the weight of the shingles)



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