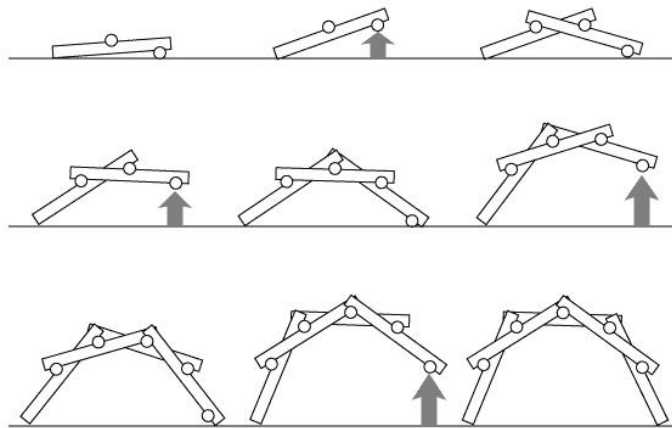


LEONARDO'S BRIDGE

Goal – Purpose of the activity.

The Leonardo's Bridge activity is based on Leonardo DaVinci's self-supporting bridge. Of the many structures Leonardo da Vinci designed, perhaps none made more ingenious use of materials than his practical design for an easy-to-assemble, self-supporting bridge.

As you can see they've used no fasteners, since the structure is designed to support itself. But in da Vinci's original design, notches were meant to be cut into the timbers to add greater security to the structure.



The group will be challenged to use teamwork, communication, and cooperation to recreate DaVinci's self-supporting bridge. This activity can be used as a stand alone activity, or incorporated into a larger activity (e.g. The Amazing Race, Bomb the Bridge, etc)

Participants

All levels of school years can participate in most of the activities (to some degree).

Leadership and Qualifications

No formal qualifications are necessary. Good facilitation skills and large group management is necessary.

Participant/Leader Ratios

Ratio 1:20 + 1 School Staff Member (Assistant Leader) for school groups.

Operational Procedures

Location: Lake Cooby

Leonardo's Bridge is a self-supporting structure. Participants need to go through the process of understanding how the design works, attempting to put the design together and perfecting the process of assembly.

The design – participants can be given the printed instructions showing how to assemble the bridge. There is also a miniature version of the bridge pieces which can be assembled so they know what it looks like.

Assembly – there are 2 sets of bridge pieces.

1. Give the group only 9 pieces of the bridge. This allows them to build the basic structure (middle picture in diagram above). Have the group then test the assembly by walking across the bridge (one at a time). Explain features of the bridge – works best with direct downward pressure, not sideways or forward and back.
2. Increase the number of pieces – give the group the extra pieces of the bridge (15 in total). This allows them to add one set of legs on either side of the basic structure. The group will discover the difficulty of assembling the bridge. Which parts to lift and where?
3. Build the bridge across a gully – at Cooby, we have built 2 platforms either side of a small gully. The complete 15 piece bridge fits across this space. The Challenge is to build the bridge to fit across the gully and then to have participants walk across the bridge.

Debrief – a full debrief of how the group worked together to construct the bridge (no matter what level of construction they achieved).

Equipment and Logistics

Equipment and materials for each activity are stored in the Top Program shed or the Middle Shed.

Levels of Challenge and Possible Variations

Do the activity as part of Bomb the Bridge
Find different locations to construct the bridge.

Safety Considerations

Activity Specific Considerations

Each activity is unique and as such must be given due consideration. Activity where students are placed close together (Tarp Turn Over.), the leader must consider the possibility of participants falling from being pushed etc. Each activity will require participants to move or interact in unusual ways and therefore, safety must be considered prior to the activity. Issuing warnings to participants to consider their actions prior to performing them is important.

- There are many planks that need to be moved and put into place. When constructing, all movement of planks should be done whereby the planks are held vertically not horizontally.
- When placing planks in the construction of the bridge, ensure participants do not place their fingers in between the planks.
- When crossing the bridge, leader should check the construction to ensure it is structurally sound. That is, all boards are in line, all overlapping on the other boards, aligned.
- Hand rail – when one participant is crossing the bridge, all other participants should be down the sides of the bridge and act as a handrail. Participants may choose to use the rail or not. But all participants must walk across the bridge using all rungs, not jump on the bridge and exist using the last step. If the bridge begins to fall they must use the handrail for support.

Sun Safety

Sunburn is a risk for anyone who participates in outdoor activities, particularly in Queensland. Leaders should take reasonable steps to prevent or minimise the likelihood of staff and participants suffering excessive sun exposure.

Weather

Effective planning requires access to up-to-date weather and fire information, which is generally available through newspapers, radio and television. The most up-to-date information is available on the website of the Bureau of Meteorology at www.bom.gov.au/qld . Or <http://www.eldersweather.com.au/qld/darling-downs/geham>

Emergency Management Procedure

- | | |
|----------|---|
| A | Assess situation, call emergency services, assist those in danger |
| E | Evacuate students, staff and visitors, if appropriate |
| I | Inform School Camp Leader onsite and off site, Camp Cooby Directors or Camp Manager if not onsite |
| O | Organise resources, advise parents |
| U | Undertake recovery operations and return site to normal |

Risk Assessment

Danger.	Risk Description	Risk Level.	Management Strategies.	Residual Risk Assessment – after Management Strategies.
Environment.				
Sun Exposure	Sunburn Dehydration Heat Exhaustion/ Stroke	M	Participants advised on appropriate clothing and equipment. Clothing with sleeves must be worn. Participants carry minimum of 3L water. Refill stops. Particular pointers to apply sunscreen to backs of hands and inside thighs. (recommended minimum +30) Regular rest stops. Encourage peer reminders and monitoring. Review weather conditions prior to the activity. www.bom.gov.au/qld . Or http://www.eldersweather.com.au/qld/darling-downs/geham Briefs and debriefs as well as team planning should be conducted in the shade where available.	L
Winds	Falling branches Falling trees.	S	Monitor winds before departure. Aggressive movement of trees nearby are an indication of thinking about strong management strategies or cancellation. No activity will take place during strong winds, or near dead trees, no pulling or swinging on trees. All dead trees & fallen branches will be monitored in initiative area. All dead trees and branches deemed a risk will be removed from the area.. Review weather conditions prior to the activity. www.bom.gov.au/qld . Or http://www.eldersweather.com.au/qld/darling-downs/geham Assess students' ability to cope with increasingly difficult wind conditions.	L
Rain	Wet Equipment Hypothermia Slips and trips	S	Review weather conditions prior to the activity. www.bom.gov.au/qld . Or http://www.eldersweather.com.au/qld/darling-downs/geham Pre-briefing and equipment list outlines appropriate clothing and wet weather gear. Participants are shown how to waterproof equipment. Group condition is monitored closely during wet weather. Group to be briefed on safe practice in wet conditions using extra caution. Students will wear firmly fitting, covered footwear with a non-slip sole. Participants will be instructed to be aware of the ground underfoot, & to avoid walking on damp/wet areas & to be aware of trees, branches & brambles, & not to run.	L

Bushfire	Burns Smoke Inhalation Death	H	Participants advised on appropriate clothing and equipment. Participants carry minimum of 3L water. Encourage peer reminders and monitoring. Review weather conditions prior to the activity. www.bom.gov.au/qld . Or http://www.eldersweather.com.au/qld/darling-downs/geham Aggressive heat waves are an indication of thinking about bush fire management strategies or cancellation. Fires may only be lit in specified areas. Fires should not be lit in windy conditions. Participants will be briefed on emergency procedures.	L
Dead Trees	Impact Injuries Canoe Damage	M	Participants are briefed about the dead trees and the likelihood of tree fall if hit. Participants are asked to care for equipment.	L
Steep Banks	Sprains & Strains	M	Appropriate pathways are chosen to avoid any difficulties. Students will wear firmly fitting, covered footwear with a non-slip sole.	L
Rubbish	Cut Feet Embedded Objects	S	Participants are expected to wear closed in shoes at all times.	L
Environmental Impact		M	Participants are to be briefed on specific environmental factors that concern Cooby Dam. Ensure rubbish is 'carried out'. Ensure that the designated landing areas are used and no landing zones are observed.	L
Wildlife		S	Participants are expected to wear closed in shoes at all times. Appropriate pathways are chosen to avoid potential wildlife Participants will be instructed to be aware of the ground underfoot, & to avoid walking through unmown areas & to be aware of trees, branches & brambles which may be home to various wildlife, & not to run. pathways are kept clear and mowed to ensure all wildlife can be seen and avoided. Participants will be instructed to give all wildlife a wide berth to avoid injury. Staff will inspect all activity areas prior to use to ensure no wildlife is in close proximity.	L
People.				

Leonardo's Bridge Activity Plan

Entrapment (equipment)	A student or staff member catches their fingers or hands between the timber boards, causing injury or distress.	H	Staff will advise that students keep their fingers and hands from being between the boards when picking them up, moving boards and placing them in position. (both in the pre-activity briefing and before the day of the activity). Staff will ensure that hair, clothing and jewellery are appropriately managed to avoid injury or mishap	L
Incorrect Technique (crossing the bridge)	Student or staff freeze	H	When crossing the bridge, extra participants must be placed either side of the bridge to form a railing. Participants crossing the bridge are to use the railings for support. In the event the bridge begins to collapse, the participant must continue to cross the bridge relying on the railings for more support. Participants are not to jump off sideways from the bridge. Students acting as railings are also required to adjust the bridge to ensure it does not collapse. This means, identifying areas of the bridge which move or become dislodged. They must also push on parts of the bridge to 'Straighten' it up to prevent collapse.	L
Inconsiderate Participants	Participants being inconsiderate of other participants resulting in soft tissue, skeletal or emotional injury / damage	M	Participants will be briefed on the risks associated with the activity. Inconsiderate participants will be removed from the activity. Staff will ensure safety procedures are met and will cease any ideas which may result in a participant's safety being jeopardised.	L
Allergies	Environmental triggers (pollens, dust)	H	Check medical information, be aware of possible triggers.	
Equipment				
Faulty	Faulty equipment could result in further damage to equipment and increase risk of incident,	H	Staff will inspect all boards and equipment before and after activity. All equipment use will be logged. All equipment will be used and maintained according to the manufacturers recommendations. Camp Staff are responsible for set up and pack down of Bridge pieces. Personal protective equipment checked for correct fitting & monitored throughout activity by the instructor	L
Incorrect use of equipment.	Failure to use climbing holds, use of tower structure	M	Clear instruction about what holds to use, avoid using tower structure to climb	L

Consequence					
Likelihood	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (almost certain)	S	S	H	H	H
B (Likely)	M	S	S	H	H
C (Moderate)	L	M	S	H	H
D (unlikely)	L	L	M	S	H

E (rare)	L	L	M	S	S
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Risk Level

H – High risk: e.g. likely or almost certain to occur, with at least moderate consequence – at least medical treatment required (See table below)

S – Significant risk

M – Moderate risk

L – Low risk

CONSEQUENCE RATING TABLE		
1	Insignificant	No injuries, No financial loss
2	Minor	First Aid treatment, Low financial loss
3	Moderate	Medical treatment required, Medium financial loss
4	Major	Extensive injuries, High financial loss
5	Catastrophic	Death, Major financial loss