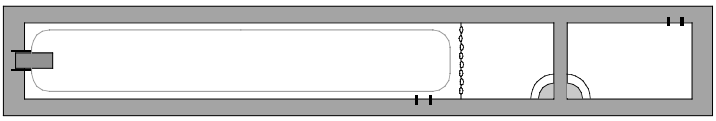
PhyzSpringboard: Thermal Conduction

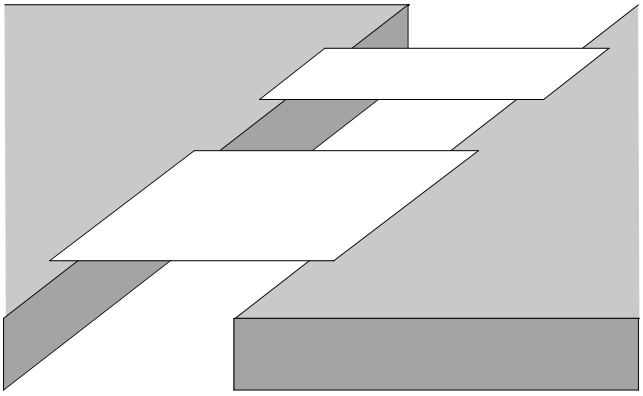


BUILDING A BETTER BRIDGE

Suppose you need to get a crowd of people from one side of a river to the other as rapidly as possible. You are in charge of designing a bridge to span the river. Which choices should you make about each of the characteristics below?

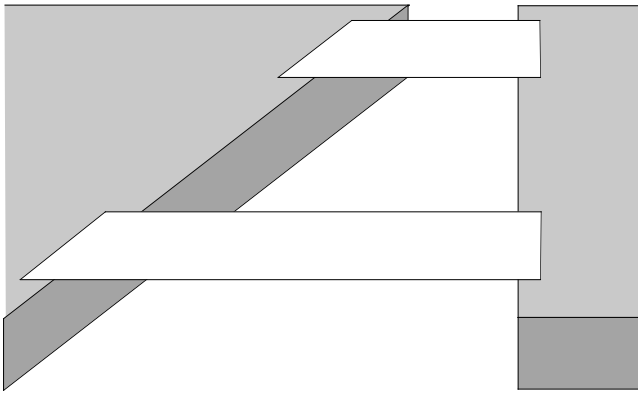
1. Width

Which would be more effective: a wide bridge or a narrow bridge? Explain.



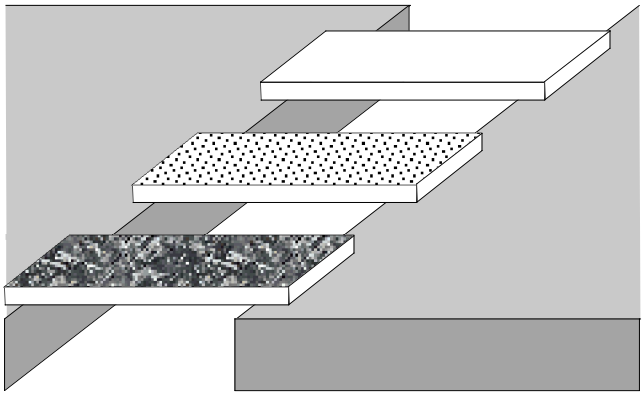
2. Length

Which would be more effective: a short path or a long path? Explain.



3. Surface Material

Which would be most effective: a hard surface (like concrete), a soft surface (like sand), or a sticky surface (concrete covered with molasses)? Explain.



BUILDING A BETTER HEAT SIPHON

A hot object and a cold object are separated by a certain distance. If they are connected by a conducting object, heat will flow from the hot object to the cold object until thermal equilibrium is attained.

Suppose we are interested in conducting the heat from the hot object to the cold object as rapidly as possible.

1. Cross-Sectional Area

Which would be more effective: a thin bar or a thick bar? Explain.

2. Length

Which would be more effective: a short bar or a long bar? Explain.

3. Material

If you have a choice of otherwise equivalent bars, which would you choose: aluminum, copper, brass, or steel? Explain.