Cheapest Link

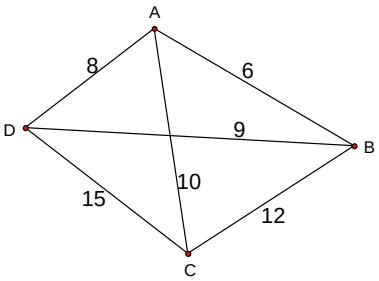
NAME _____

Note: For this activity, "route" refers to a path from one city to another, and "mini-tour" refers to a tour that does not include all cities.

The Cheapest Link Algorithm

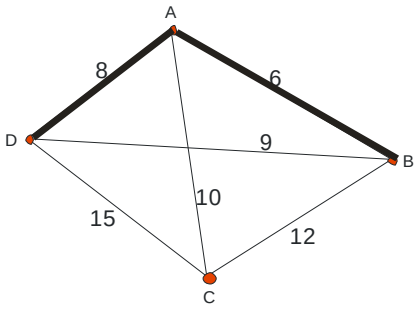
1. Sort the distances of all the routes between each pair of cities from shortest to longest.
2. Select the shortest route available on the list as long as:
   a) It does not cause three routes going to and from the same city.
   b) It does not form a "mini-tour."
3. Continue the process until there is a tour that includes all the cities.

1. Refer to the map on the right to complete this example.

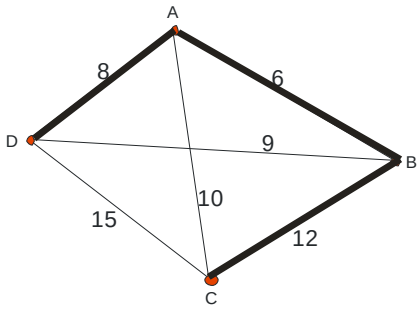


a) Complete the table of routes listed from shortest to longest.

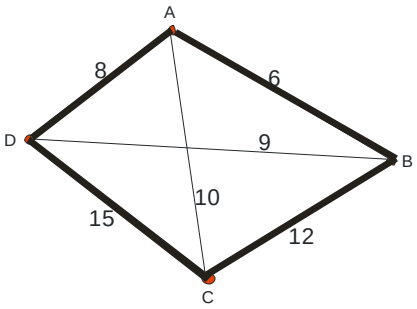
ROUTE	DISTANCE
AB	6
AD	8



Select route AB first since it is the shortest route. Next, select AD because it is the next shortest.



BD and AC are the next cities in the sorted list. However, BD would create a "mini-tour" of ABDA, and AC creates three routes at A. Therefore, select BC.

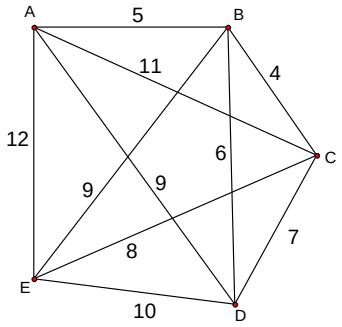


Finally, select CD to complete a tour that includes all the cities.

b) Fill in the distances between the routes used in the tour, then find the sum.

Total Distance = 6 + ___ + ___ + ___ = ____

2. Use the Cheapest Link Algorithm to find the shortest round-trip using the map below.



3. Use the Cheapest Link Algorithm to find the shortest round-trip using the table below.

	A	**B**	**C**	**D**	**E**	**F**
A	—	10	12	4	6	20
B	10	—	2	15	9	18
C	12	2	—	8	13	5
D	4	15	8	—	17	21
E	6	9	13	17	—	3
F	20	18	5	21	3	—