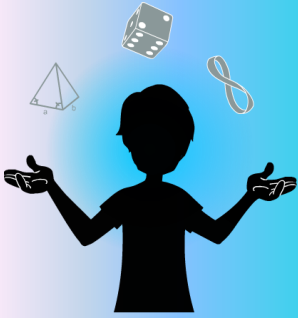


PUZZLING CARTOON

- BENJAMIN'S TRIP -



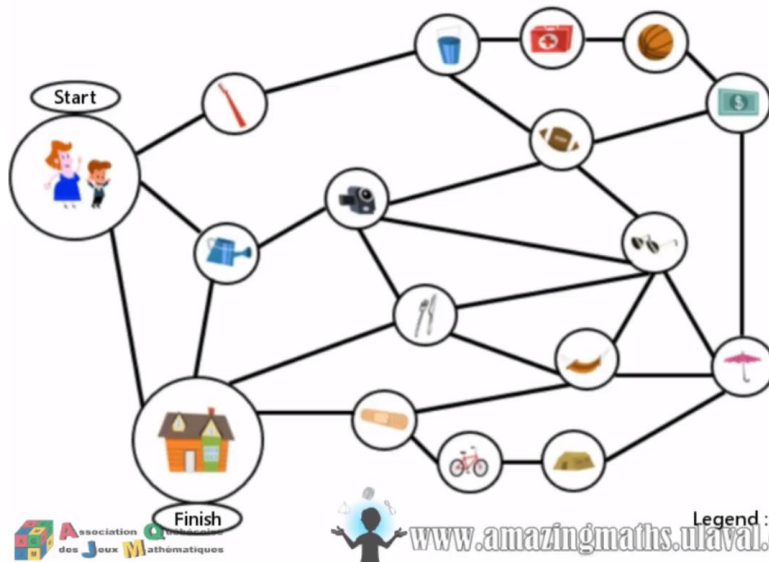
AMAZINGMATHS

Materials:

- Video of the puzzle
- Sheets of paper
- Pencils

The puzzle

It will soon be the Christmas holidays. Benjamin will go for the first time visit the warm sun of Florida with his family. To finish preparing for their trip, Benjamin and his mother still have a few errands to run. To be efficient, they have to visit all the shops in one route and never come past the same place more than once. The route must end at the house.



- Visit every shop in only one path.

- Never use the same path more than once.

Question 1: How many routes possible are there?

Question 2: What distance will they cover if they take the shortest route?



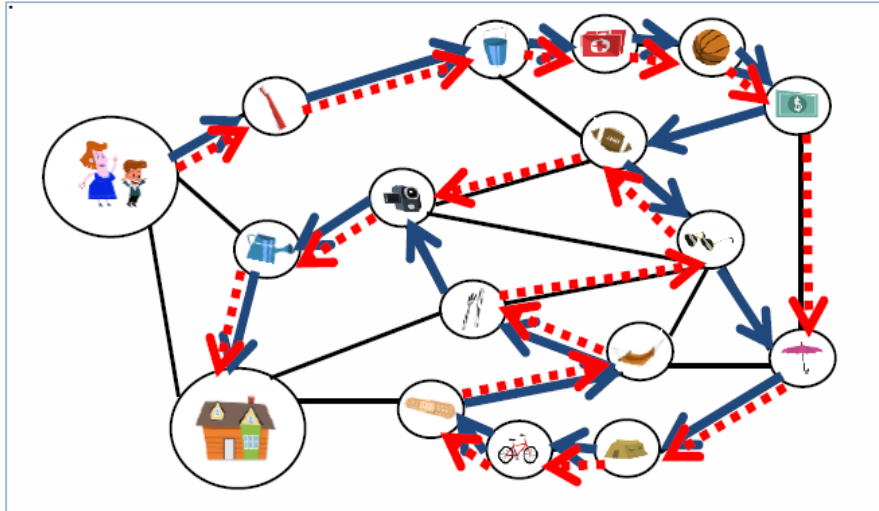
PUZZLE SOLUTION



The answer:

Question 1:

There are two possible routes: tooth brush, water glass, first aid kit, basketball ball, money, football ball, glasses, umbrella, tent, bicycle, bandage, hammock, utensils, camera, watering can (represented in blue) or tooth brush, water glass, first aid kit, basketball ball, money, umbrella, tent, bicycle, bandage, hammock, utensils, glasses, football ball, camera, watering can (represented in red).



Question 2 :

The shortest route is the one represented in blue. Benjamin and his mother will have covered 195 km by choosing the shortest route.

The solution:

Question 1:

In the puzzle *Benjamin's trip*, not all the routes work. Some aspects make it so only two routes are possible while respecting the puzzle's criterions.

Some shops we must visit during the route can only be done one after the others. The water glass, the first aid kit, the basketball ball and the money will always follow each other because they are in the same loop, no matter which side we decide to take. Likewise, the umbrella, the tent, the bicycle and the bandage will always follow each other, no matter which side we take.

Plus, to buy the watering can, we are obligated to stop for the camera first. So, these two stops will follow each other. This means that the last stop cannot be the bandage.

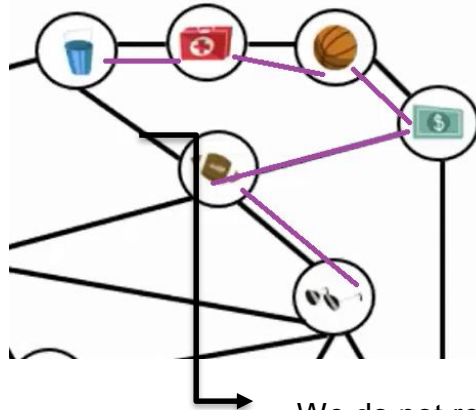
During the route, we have to be attentive to the movements. With the characteristics mentioned above, what is left is to find the routes that will respect all the criterions. Some shops offer more than one route possibility. So, we have to make sure that the route we are taking will allow us to make several purchases without coming past the same places.



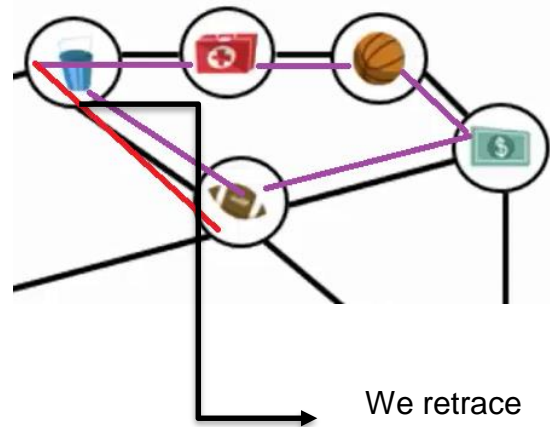
PUZZLE SOLUTION



Example:



We do not retrace our steps.

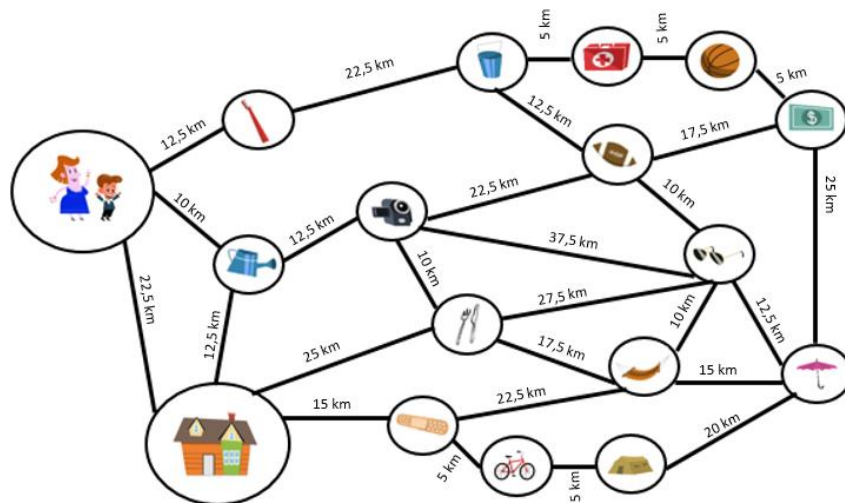


We retrace our steps.

Question 2:

To find the shortest route, we simply need to measure the distances between each stop. To do that, we have to measure the legend. It will tell us the dimension, on the sheet, that corresponds to 5 km covered by Benjamin and his mother.

With the ruler, we calculate the distance of each path between the shops. Next, we convert the measurements obtained into kilometres using the legend. If, for example, after measuring the legend, we find that 1 cm equals 5 km and one path between two shops measures 2,5 cm, we can find that Benjamin will cover 12,5 km between the two shops. Here are the measurements for each path, once the measurements were converted:



We then have to add all the measurements for a same route and compare with the others to determine which one is the shortest. By adding the distances, we obtain that the distance covered with the blue route is 195 km and the distance covered with the red route is 230 km. Therefore, Benjamin and his mother will have covered 195 km by choosing the shortest route.