



## Learn how to use a map

### SEQUENCE 1

|                                |  |
|--------------------------------|--|
| Age group                      | 6-9 y.o.   |
| Prior knowledge                | None   |
| Material needed                | The Learn how to use a map box, a ruler, pencils |
| Subjects                       | Algorithmics                                     |
| Skills involved                | Representation                                   |
| Time to carry out the sequence | 1h   |

#### Step 1: Discovering the content of the box

This first step aims at having pupils look at the box content: the material and the notice. Children should have enough time to discover the box and to become familiar with its content before starting the sequence.

#### Step 2: Understanding the concept

Ask your pupils what they did with the box. What was easy? What was more difficult?

Having a character move on a grid or a map asks pupils to change their perspective: they can only say “go left” or “go right” when they place themselves in the shoes of the character on the map.

Although it is almost impossible to determine when the oldest map was created, pupils should realise that there always has to be a reliable way to indicate where people are going.



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## Step 3: Reliable indicators

Show your students a map of the area you live in. What can they see on it? Here are some items they should notice: the name of the towns/streets, the topography, the waterways, public institutions if looking at a city map, etc. Additionally, this map should have a key to explain what the symbols represent, a scale to show distances, and cardinal points to indicate directions.

Now, ask your pupils to do the same! Ask them to draw a map of the school: they have to indicate the main points of interest and add a key and a realistic scale. Next, they will need to indicate how to go from point A to point B in the school and specify each action they take: move left, right, straightforward, backwards, go through a building, over a fence, etc.

Even though maps are used in geography most of the time, learning how to read and create a map can be considered an introduction to algorithmics. Do children know what algorithmics is?

Algorithmics is a kind of logic that is used in IT. For example, it is a process that can allow for quick problem-solving but requires users to define their steps well, which is why pupils need to give explicit indications!

For more advanced pupils, you may use this sequence as an introduction to the following one about algorithmics.



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## SEQUENCE 2

|                                |  |
|--------------------------------|--|
| Age group                      | 10-12 y.o.   |
| Prior knowledge                | None   |
| Material needed                | Learn how to use a map box, a computer, and a printer. |
| Subjects                       | Algorithmics   |
| Skills involved                | Research, learning to learn                            |
| Time to carry out the sequence | 2h with the activity                                   |

### Step 1: A bit of history

Have your pupils do some research about famous IT pioneers such as Alan Turing and Ada Lovelace. Who were they? What did their research focus on? How did the concepts they thought about work? You may use this step as an introduction to discuss gender equality and discrimination related to sexual orientation in your class!

### Step 2: Discover the box

Use the box and the storytelling resources to show your students how to go from point A to point B. Pay extra care to the level of precision they use when describing the way they are going. What was the fastest way to go from point A to point B?

You may then introduce your pupils to the notion of algorithmics: use their research to explain that algorithmics was initially created as a problem-solving methodology. Algorithmics were the very first steps of how a computer program is running: the program will look for the most efficient way to reach a specific goal.

### Step 3: Computer-less algorithmics examples

Of course, since computers exist today, you may consider this an entry-level exercise in programming. Take chess, for example. Each piece has a specific way to move, but the knight is probably the most surprising one.



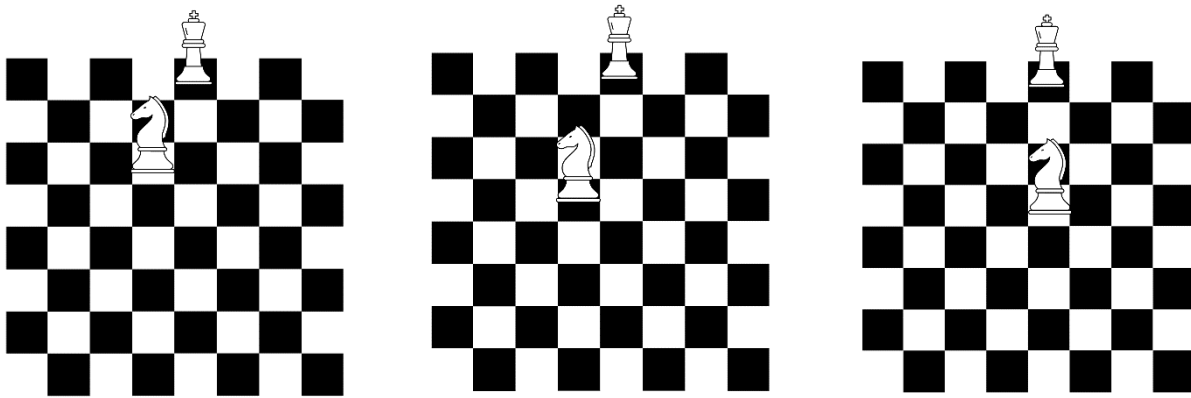
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# SCIENCES

It needs to either move one square, then two squares in a perpendicular direction, or two squares in a line, then one square in a perpendicular direction. Chess software are advanced programmes that will lead the computer to imagine every possibility for every piece to move.

In the following schemes, find out the optimal number of moves to capture the king and describe it using directions (top, right, bottom, left).



How many moves did you need to complete the puzzles? In order to complete such a puzzle, computer programs operate dozens of calculations before acting, like in the picture below:



Figure 1 DroidFish, a chess-playing software. Wikipedia

If some of your pupils are interested in that kind of methodology, you may introduce them to programming – algorithmics are the core of that kind of logic!

