

# Motion in Scratch and MicroWorlds

In MicroWorlds, the objects that move around the screen are called *turtles*. In Scratch, the objects that move around the screen are called *sprites*. In MicroWorlds, primitive commands and reporters are called *procedures*. In Scratch, primitive commands and reporters are called *blocks*.

Scratch and MicroWorlds both have primitive commands and reporters related to motion.

Scratch and MicroWorlds both have their own way of showing which procedures are commands and which are reporters, how many inputs they need, and what they like as input. They also have ways of showing us the effect of their commands and the output of their reporters.

Here's a Scratch command:



This command needs one input. It likes numbers for input. When you click on this block in the Scripts area, it moves its sprite 10 steps forward.

Here's a Scratch reporter:



This reporter doesn't need any input. The little checkbox in front of the block only appears when the block is in the Blocks Palette. When you drag it into the Scripts area and click on it, a little bubble appears showing the x coordinate of the sprite. You can also use this block as input to any block that likes a number as an input. For example:




How do we know if a Scratch block is a command or a reporter?

How do we tell how many inputs it needs?

How do we tell what it likes for inputs?

If it is a command, how do we tell what it does?

If it is a reporter, how do we tell what its output is?

The Scratch block  might remind you of the MicroWorlds **forward** procedure. Here is the vocabulary entry for **forward**:

<b>forward (fd)</b> <i>number</i>	Moves the turtle forward.  See <a href="#">back</a> .	Given that there is a turtle on the page:  <pre>pd repeat 4 [fd 50 rt 90 wait 2]</pre>
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The **forward** procedure is a command. It needs one input. It likes numbers as input. It moves the turtle forward by the number of steps given as input.

The Scratch block  is like **xcor** in MicroWorlds:

<b>xcor</b>	Stands for <b>x coordinate</b> . Reports the x coordinate of the current turtle.  See <a href="#">pos</a> , <a href="#">setx</a> and <a href="#">ycor</a> .	Given that there is a turtle on the page:  <pre>repeat 360 [setx xcor + 5 sety 100 * sin xcor]</pre>
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The **xcor** procedure is a reporter. It doesn't need any input. It reports the x coordinate of a turtle.

You can use **xcor** to get input for other procedures that like numbers as input. For example:

**forward xcor**

How do we know if a MicroWorlds procedure is a command or a reporter?

How do we tell how many inputs it needs?

How do we tell what it likes for inputs?

If it is a command, how do we tell what it does?

If it is a reporter, how do we tell what its output is?

On the next page, match the Scratch blocks on the next page with tanks for the following MicroWorlds procedures: **heading**, **left**, **right**, **setheading**, **setpos**, **setx**, **sety**, **ycor**. The matches for **forward** and **xcor** have already been done.

Scratch	MicroWorlds
