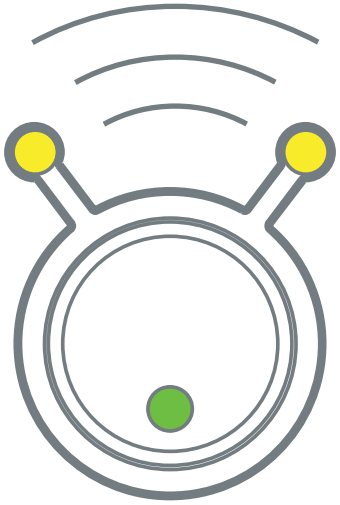
The Playful Invention Company



PicoCricket Reference Guide

Version 1.2a

Credits

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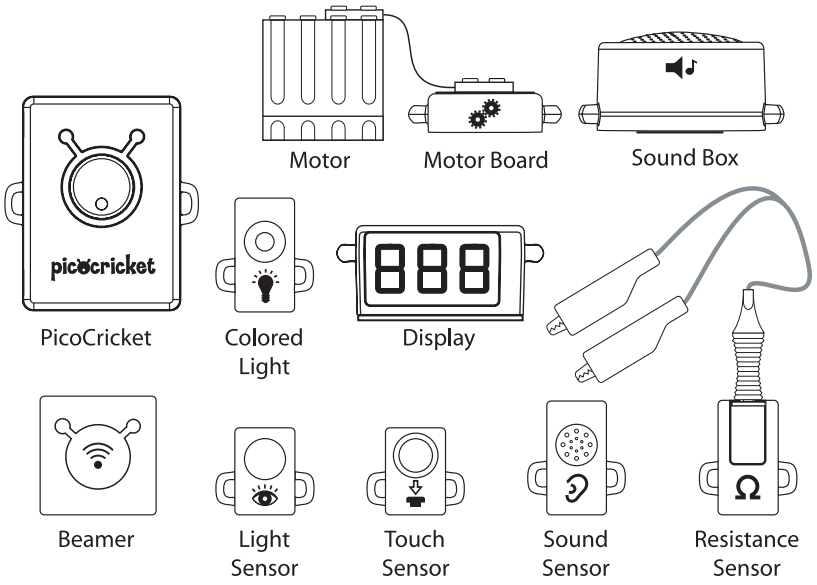
Welcome! This Reference Guide provides an overview of the PicoCricket family of parts and the PicoBlocks software used to program the PicoCricket.

If you are just getting started with the PicoCricket and PicoBlocks, please go through the Setup Guide and Getting Started booklet first, to get an overall introduction. If you want more detailed information, then come back to this Reference Guide.

We are continually updating the Reference Guide. You can download the latest version from www.picocricket.com/support

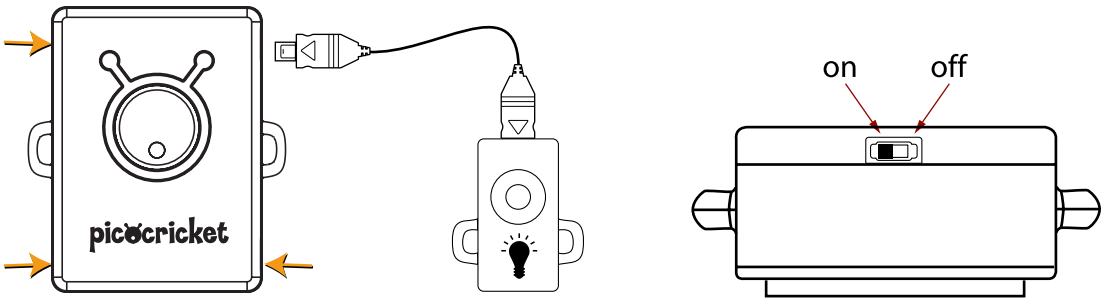
PicoCricket Family

The PicoCricket family includes the following parts:

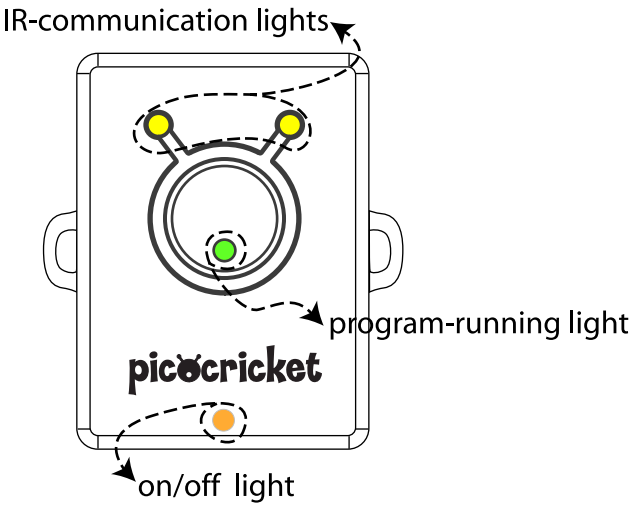


PicoCricket

The PicoCricket is a tiny computer that can control things in the world. The PicoCricket has four ports where you can plug in other devices, such as sensors, motors, and lights. You can plug any of these devices into any of the ports.



The PicoCricket has three types of indicator lights:



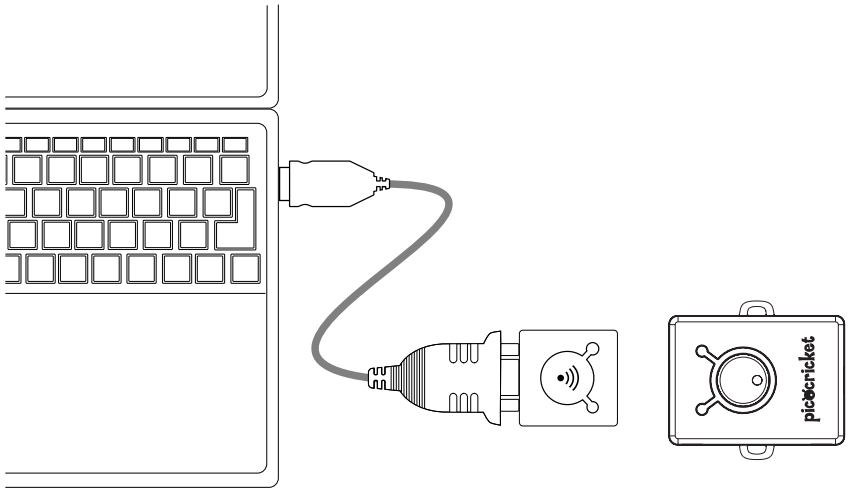
- The **on-off indicator light** turns on (orange) when you turn on the PicoCricket. If the batteries are low, the light flashes rapidly when you turn on the PicoCricket.
- The **program-running indicator light** turns on (green) when the PicoCricket is running a program, and it changes color to amber when the PicoCricket is running two programs at the same time.
- The **IR-communication indicator lights** flash (yellow) when the PicoCricket is communicating through its infrared transmitter.

If you push the PicoCricket button while the PicoCricket is running a program, the program will stop. If you push the button when no program is running, the PicoCricket will re-run the last program that it ran.

Even when you turn the PicoCricket off, it remembers the last program that it ran. So if you run a program, turn off the PicoCricket, turn it back on later, and push the button, the PicoCricket will run the program again.

Beamer

The Beamer transmits information (via infrared signals) from your computer to your PicoCricket. When you write a program using PicoBlocks software on your computer, you send the program to the PicoCricket via the Beamer.



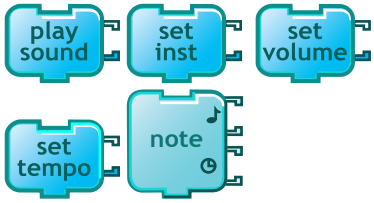
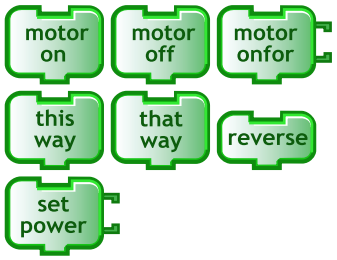
The PicoCricket Kit includes a USB-serial cable for connecting the Beamer to a USB port on your computer. Alternatively, you can connect the Beamer to a serial port, using a standard serial cable (not included).

When you are sending information to the PicoCricket, make sure that the antennas on the Beamer are facing towards the antennas on the PicoCricket. While the Beamer and PicoCricket are communicating, the indicator lights in the antennas will flash yellow (on both the Beamer and the PicoCricket).

The Beamer has a range of about a 1 meter. Note that a Beamer can communicate with one PicoCricket at a time. If you have multiple PicoCrickets, make sure that only one of them is in range of the Beamer at any time.

Actuators

Actuators are devices that make things happen in the world. The PicoCricket Kit includes four types of actuators: colored lights, sound box, motor (with motor board), and numeric display.

Name	Description	Programming Blocks	Icon
Light	You can set the color of the light across the entire rainbow, from red to violet. You can also set the brightness of the light.		
Sound Box	The sound box is a small synthesizer that can play notes, melodies, sound effects, and rhythms. PicoBlocks software includes special editors for creating melodies and rhythms. You can set and change which instrument will play notes and melodies.		
Motor and Motor Board	The motor board connects to the PicoCricket, and the LEGO motor connects to the motor board. You can turn the motor on and off, and set its power and direction.		
Display	The three-digit display can show any number between 0 and 999. It is especially useful for displaying sensor values.		

Sensors

Sensors allow your PicoCricket to respond to sounds, lights, or other changes in its environment.

Name	Description	Programming Blocks	Icon
Light Sensor	Reports the brightness of light. For example, you can use the light sensor to detect when someone casts a shadow with their hand – or when the sun shines through the window.	dark? brightness	
Sound Sensor	Reports the loudness (or volume) of sound. For example, you can use the sound sensor to detect when someone claps their hands – or when someone sings into the sensor.	loud? loudness	
Touch Sensor	Reports if the button is pressed. For example, you can write a program that makes something happen (a motor spinning or a light changing color) when someone presses the touch sensor.	touch?	
Resistance Sensor	Reports the resistance in the circuit formed by the alligator-clip cables. If you put different materials (for example, play-dough or a banana) between the alligator clips, the resistance will change. You can also use the resistance sensor to detect when the alligator clips are touching each other (or connected through a conductive material, such as aluminum foil).	connected? resistance	Ω

Each of the programming blocks will be described further in the following pages. For examples of how to use the actuators and sensors, see "Magic Lantern" and other sample project placemats.

PicoCricket Care

1. Remember to turn off the PicoCricket when you aren't using it.

2. If the orange on-off indicator light flashes, it means that your PicoCricket is running out of batteries. To change the batteries, follow the instructions in the Setup Guide.

3. Be gentle with the cable connectors. If you push the connectors up and down with too much force, the connectors will break.

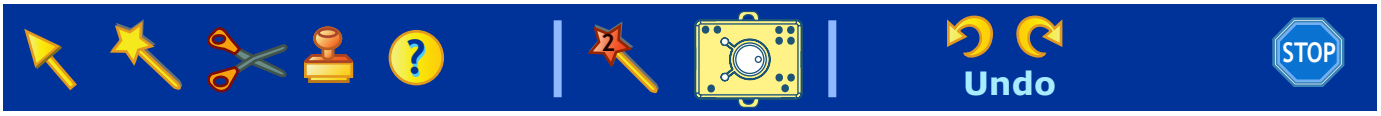
4. Keep your PicoCricket devices away from water and other liquids.

5. If your PicoCricket is misbehaving, check the Troubleshooting section in our website: www.picocricket.com/troubleshooting

Overview

PicoBlocks is a programming language designed specifically for programming your PicoCricket. With PicoBlocks, you create programs by snapping graphical blocks together into stacks.

Tools



The tools are used for taking different actions on the blocks, such as copying blocks, deleting blocks, or sending blocks to the PicoCricket. When you click on a tool, the cursor turns into that tool.

Arrow

Use the Arrow to drag blocks from the Blocks Palette to the Workspace, or within the Workspace. To move an entire stack, drag from the top block. Dragging a block from the middle of a stack will also move any blocks attached beneath the one you are dragging.

You can get rid of blocks by dragging them off of the Workspace, in any direction. If you delete blocks by mistake, click Undo

Magic Wand

Use the Magic Wand to run a program. When you click on a block or stack with the Magic Wand, it sends the program to the PicoCricket and tells the PicoCricket to run the program.

You can use the Magic Wand to click on blocks in the Blocks Palette, the same way you click on blocks in the Workspace. This feature is useful for testing out a block.

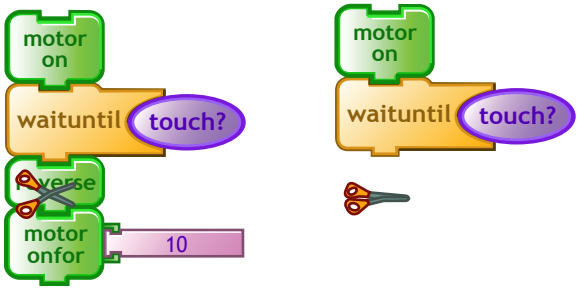
Another way to run a program is by double-clicking with the Arrow, instead of single-clicking with the Magic Wand.

Scissors

Use the Scissors to get rid of blocks. Clicking on a block in a stack will also cut all blocks attached below it.

If you delete blocks by mistake, click Undo.

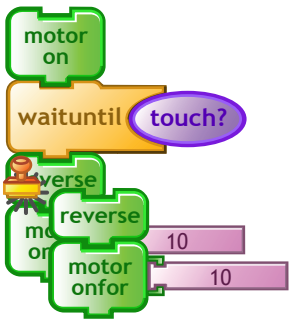
You can also get rid of blocks by dragging them out of the Workspace.



Stamper

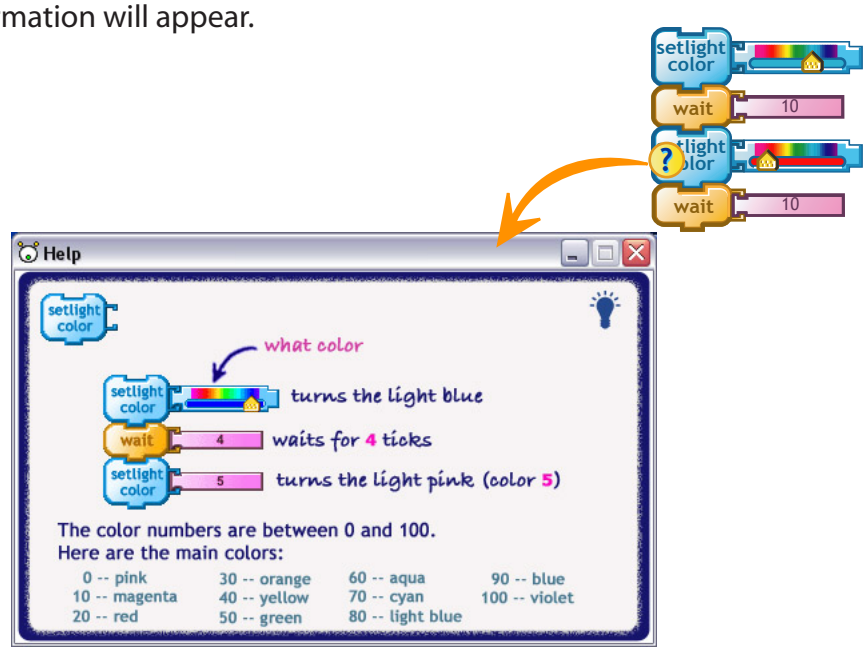
Use the Stamper to copy blocks and stacks. Click once to copy, then move to a new location and click a second time to paste. When you click on a block in a stack with the Stamper, it also copies all blocks attached below it.

You can switch to the Stamper temporarily using Ctrl + , or + .



Help

Use the Help tool to get more information. If you click on a block with the Help tool, a window with more information will appear.



Second Wand

Use the Second Wand to tell the PicoCricket to run a second stack at the same time as it is running something else. To run two stacks, click on one with the Magic Wand, then the other with the Second Wand.

For example, you can use the Second Wand to start background music or display sensor values while another program is running.

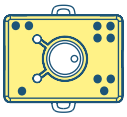
Tags

Use the Tags tool when you want to tell two devices of the same type to do different things. For example, if you plug two colored lights into a PicoCricket, and then send a setlight-color command to the PicoCricket, the PicoCricket will change the color of both lights. If you want to turn each light to a different color, you need to use Tags.

Each of the four ports on the PicoCricket is labelled with a different number of dots. If you want to send a command to a particular port, then you need to "tag" the block with the appropriate number of dots. For example, if you plug colored lights into ports ● and ●●, then you can set the color of each light individually with the following blocks:

To tag a block, click on the appropriate dot in the Tags tool, then click on the block that you want to tag.

To remove a tag from a block, click in the center of the Tags tool and then click on the block.



Stop

Click on the Stop sign to stop all programs running on the PicoCricket. Make sure that the PicoCricket is "in sight" of the Beamer. Alternatively, you can stop programs on the PicoCricket by pressing the white button on the PicoCricket. Note that stopping programs on the PicoCricket does not turn off lights attached to the PicoCricket. If you want to turn off the lights, slide the on-off switch into the off position.

Blocks Summary

This list shows all of the basic blocks in PicoBlocks.

sets the light's color

sets the light's power

turns the light off

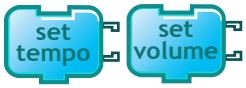
displays a value on the display

makes the PicoCricket chirp

plays a note (pitch and duration)

plays a sound

sets an instrument for the next note or melody



sets the tempo or volume for the next note, melody or rhythm

turns motor on or off

turns the motor on for a certain period of time

reverses the motor's direction

sets the motor's direction

sets the motor's power

reports true if the touch sensor is pressed

reports a value from the light sensor

reports true if the light sensor detects little light

reports true if the sound sensor detects a loud sound

reports a value from the sound sensor

reports true if the resistance sensor detects a resistance of 0

reports a value from the resistance sensor

beams a value to another PicoCricket

reports a value beamed by infrared from another PicoCricket

reports true if another PicoCricket has beamed a new value by infrared

reports the PicoCricket's timer value in 100ths of a second

sets the PicoCricket's timer to 0

erases all the data

stores a value in the PicoCricket's memory

goes back to the beginning of the data

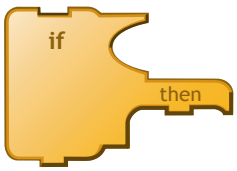
reports the value of the next data stored in the PicoCricket's memory

waits a number of ticks (where 10 ticks = 1 second)

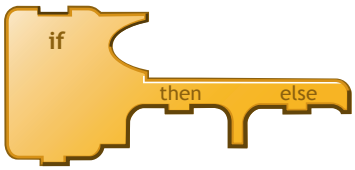
waits until the condition is true

repeats a block or stack forever

repeats a block or stack a certain number of times



runs a block or stack if the condition is true

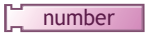


if condition is true, run one stack; if not, run the other stack

stops everything

stops this stack

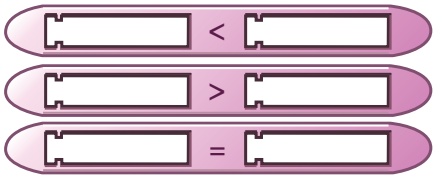

creates space between blocks, so that they don't overlap one another



specifies a number (click to highlight, and then type in a number)

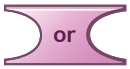
computes arithmetic operations

picks a random value between the two numbers



makes a comparison between two numbers and reports true or false

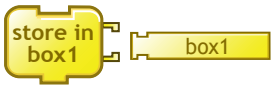
reports true if both conditions are true



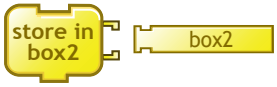
reports true if either condition is true

reports the opposite of a condition

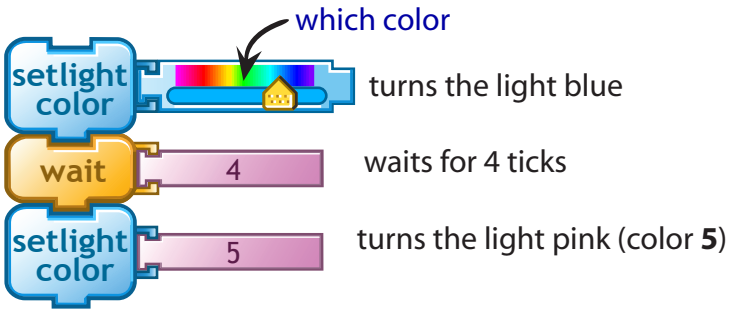

sits on top of stack, and allows you to type in name for the stack



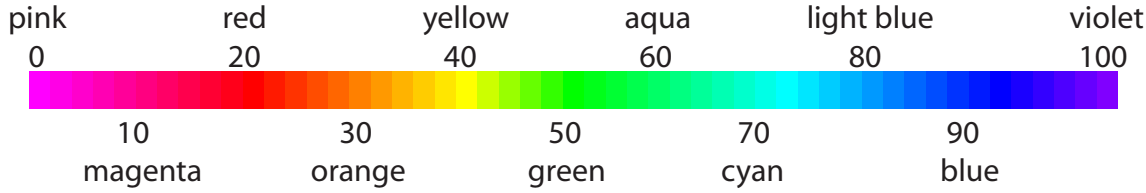
set and report values for variables



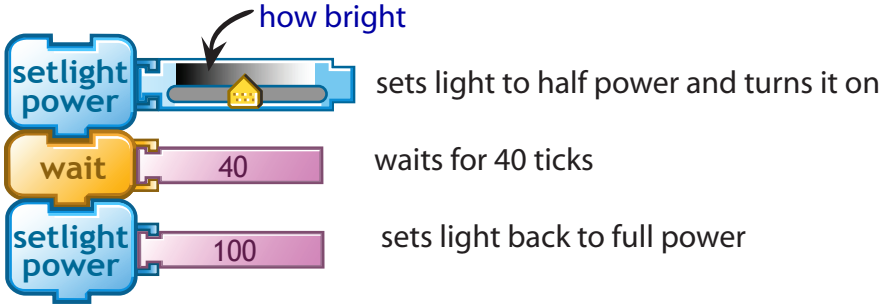
Light Blocks



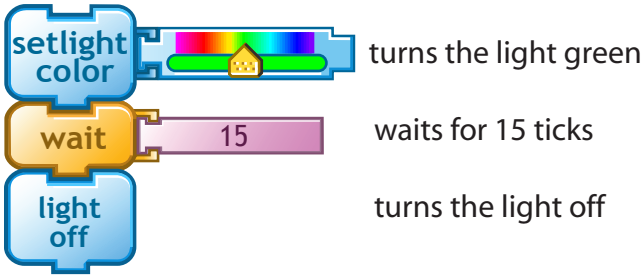
Sets the LED's color and turns it on. You can set the color by using the color slider, or choosing a number between 0 and 100. Colors are numbered as follows:



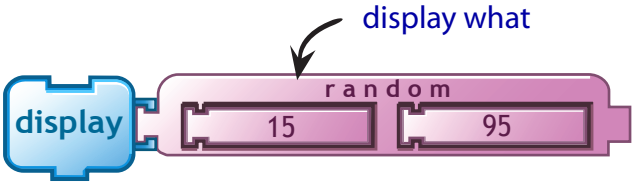
Default value: **setlightcolor 0**



setlightpower can take numbers between 0 (no light) and 100 (full power). You can set the power by using the slider or a number block.
Default value: **setlightpower 100**



lightoff turns the light off.



displays a random number

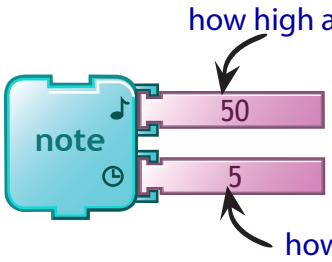
Displays a value on the display

Sound Blocks

The Sound palette starts with six basic blocks (shown below). You can create additional blocks with the Melody and Rhythm editors. See page 32 for information on creating melodies and rhythms.

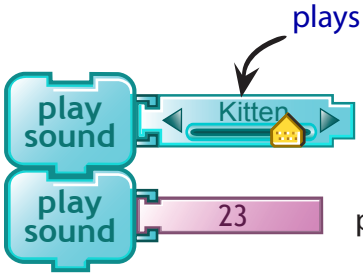
makes the PicoCricket chirp once

Making the PicoCricket **chirp** is a good way to test whether your computer is communicating properly with the PicoCricket.



plays the note 50
for 5 ticks (half a second)

note can play notes between 0 (lowest) and 100 (highest).
You can play notes with the PicoCricket speaker or with the Sound Box (but it will sound much better with the Sound Box). For composing melodies, we suggest using the Melody Editor rather than putting individual note blocks together.
Default value: **note 50 2**



plays sound 23 (horse)

Select a sound with the slider or enter a number between 0 and 100. There are 24 sounds available (see table below).

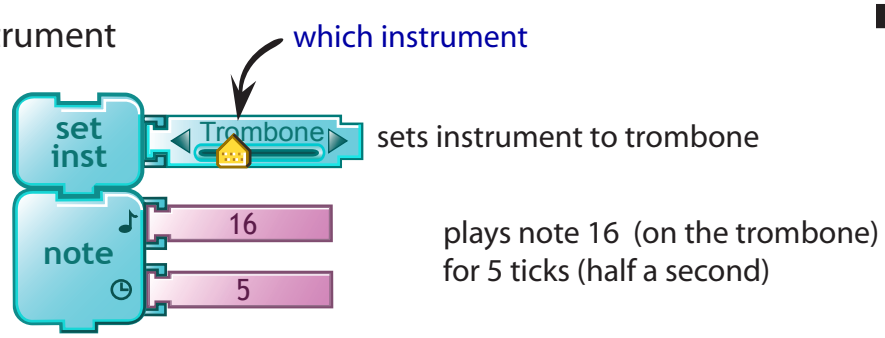
#	Sound
1	Piano
2	Flute
3	Pizzicato
4	Strings
5	Trombone
6	Vibes
7	Agogo
8	Cabasa

#	Sound
9	Claps
10	Cowbell
11	Maracas
12	Slap
13	Timbale
14	Wood Block
15	Guiro
16	Bloops

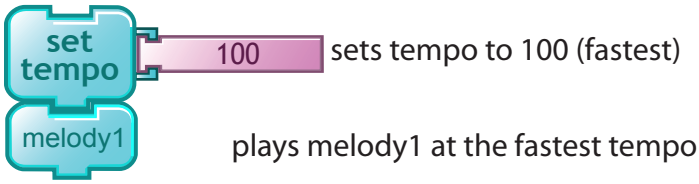
#	Sound
17	PicoCricket
18	Fairydust
19	HighQ
20	Dog
21	Rooster
22	Goose
23	Horse
24	Kitten

All these sounds require the Sound Box. Sound 0 is the PicoCricket chirp. For numbers greater than 24, playsound plays the next sound in the list: 25 plays sound 1, 26 plays sound 2, ... and so on.
Default value: **playsound 24** (kittten)

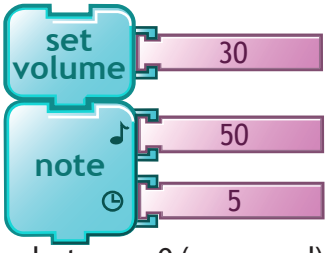
setinstrument



Sets the instrument to be used for subsequent notes or melodies. You can select the instrument with the slider or attach a number between 0 and 100. **setinstrument 0** sets the note or melody with the PicoCricket's beeper.
The inputs for **setinstrument** are the same as for **playsound** (shown in table above). You can use any sound as an instrument, but they don't all work well.
Default value: **setinstrument 1** (piano)



settempo takes values between 0 (slowest) and 100 (fastest). The fastest tempo (100) equals to 240 bpm (beats per minute), while the slowest (0) equals to 60 bpm.
Default value: **settempo 50** (120bpm)

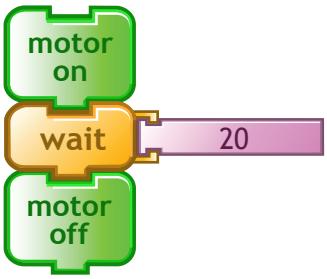


sets the volume to 30 (quiet)

plays note 50
for 5 ticks (half a second)

setvolume takes values between 0 (no sound) and 100 (loudest). **Setvolume** only works with the Sound Box. Default value: **setvolume 80**

Action Blocks

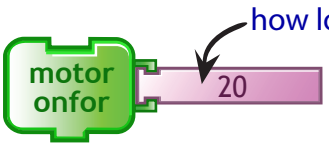


turns the motor on

waits for 20 ticks (2 seconds)

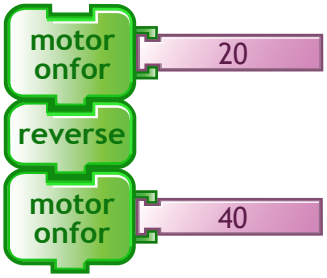
turns the motor off

motoroff makes the motor coast to a stop. If you want the motor to stop more abruptly or more gently, try using the **brake** and **coast** commands in the PicoBlocks Text Language.



turns on motor for 20 ticks (2 seconds)

10 ticks = 1 second
Turns the motor on for the specified number of ticks, then turns it off. **motoronfor** does the same thing as a stack with **motoron**, then **wait**, then **motoroff**.
Default value: **motoronfor 10**

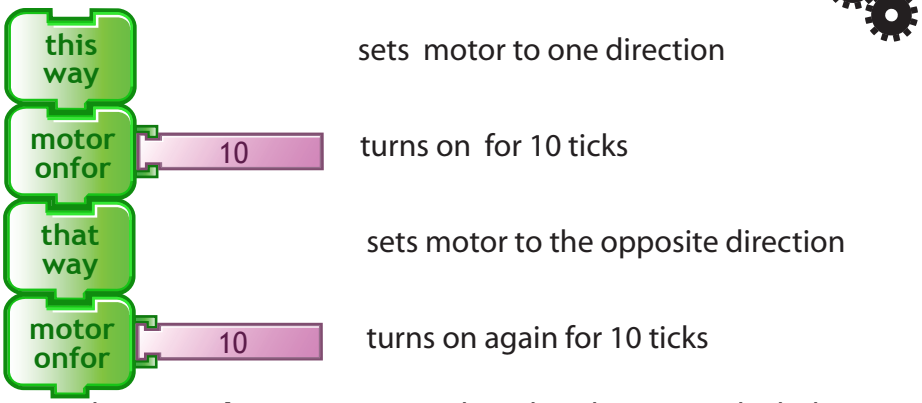


motor goes one way for 20 ticks

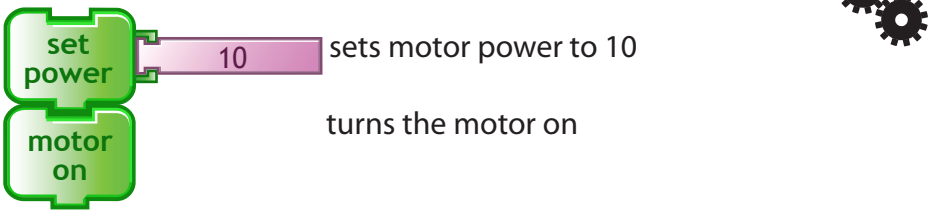
changes direction

goes the other way for 40 ticks

reverse causes the motor to change the direction in which it is spinning. **reverse** does not turn the motor on, it only changes the direction.

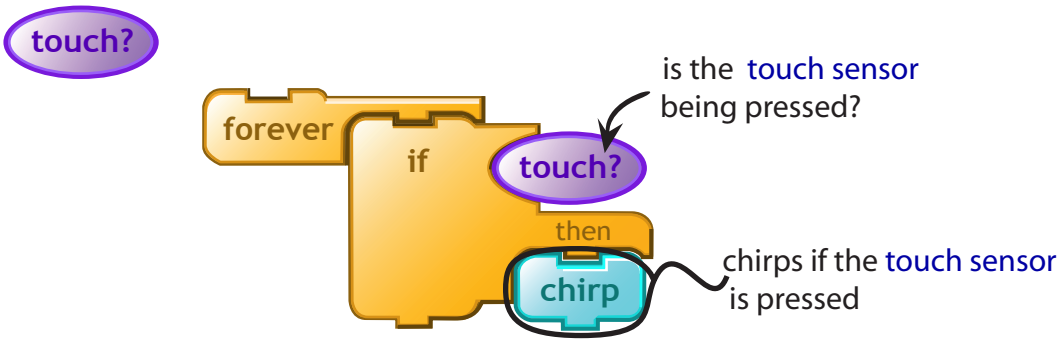


thisway sets the motor in one direction, **thatway** sets it in the other direction. Which direction is which depends on how the motor is plugged in. **thisway** and **thatway** do not turn on the motor, they only set the direction.

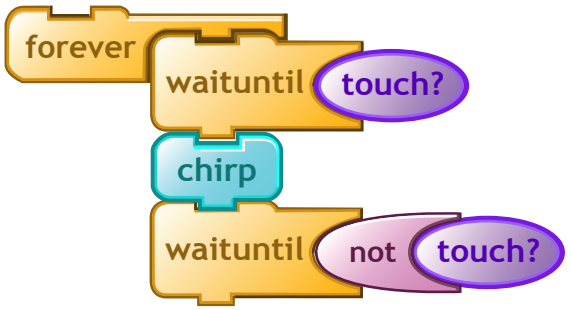


setpower takes values between 0 (no power) and 100 (strongest power). **setpower** does not turn on the motor, it only sets the power.
Default value: **setpower 100**

Sensors Blocks



touch? reports true when the touch sensor is being pressed. The example above will make the PicoCricket chirp continuously while you are pressing the button on the touch sensor. If you want to chirp only once each time you push the button, you should make a stack similar to the one shown below:



waits until the touch sensor is released

---

dark?

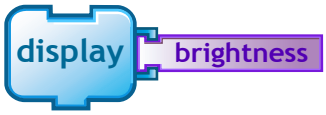
waits until the light sensor detects darkness

plays this sound (dog)

dark? reports true if the light sensor detects the brighness to be less than 15.

---

brightness



displays the number reported by the light sensor

brightness reports numbers between 0 (no light) and 100 (lots of light)

---

loud?

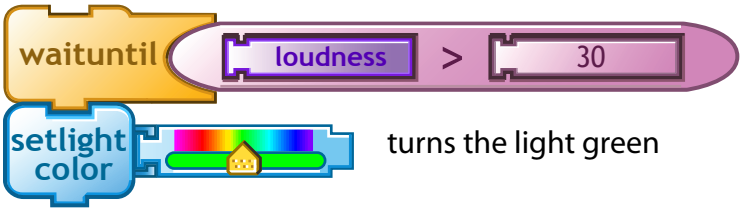
waits until the sound sensor detects a sound

turns the light pink

loud? reports true if the sound sensor detects a sound with loudness greater than 60.

---

loudness

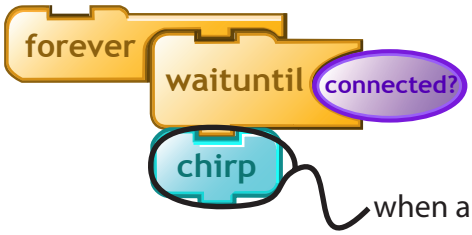


waits until the sound sensor detects a clap

turns the light green

loudness reports numbers between 0 (no sound) and 100 (loud sound).

Ω

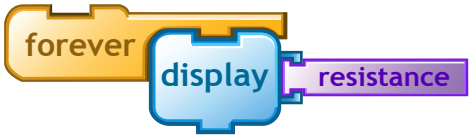


waits for resistance sensor to detect a connection

when a connection is sensed, it chirps

connected? reports true if the resistance sensor detects a resistance of less than 50.

Ω



displays the number reported by the resistance sensor

resistance reports numbers between 0 (no resistance) and 100 (lots of resistance). If you are getting numbers in a very narrow range, it is useful to adjust the range and sensitivity of the resistance block. To do that, shift click on the block to add sliders. Then adjust the sliders like this:

try this if you aren't getting low numbers

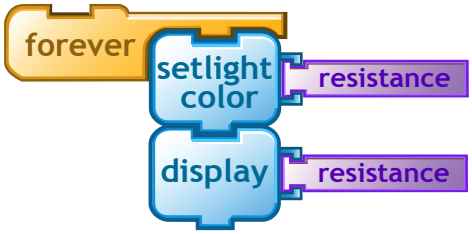
try this if you aren't getting high numbers

Remember to use the magic wand after moving the sliders

Sliders are useful in situations where you want to use resistance values control something like the color of a light:

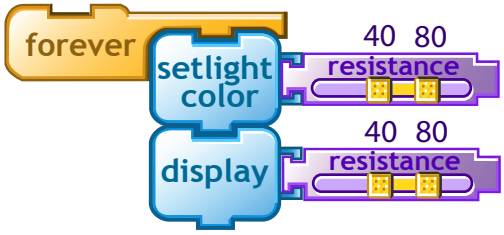
If the resistance is changing by only a small amount, you will only see a narrow range of colors. You can use sliders to extend the range of colors that you see as the resistance changes.

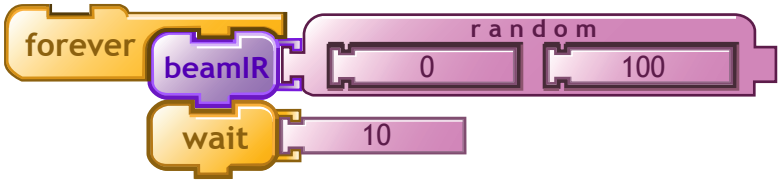
To see how this works, consider a specific example. Imagine that you connect a resistance sensor, a colored light and a display to your PicoCricket. Then connect the alligator clips of the resistance sensor to a lump of Play-Dough and start the program:



Suppose you find that as you squeeze the Play-Dough, the numbers on the display vary over the narrow range from 40 and 80. The color of the light will change from yellow to blue/green.

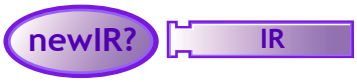
By moving sliders into the positions shown below –with the left slider at the 40 position and the right slider at the 80 position, you will expand the range of numbers on the display to stretch all the from 0 to 100, and the light color will vary from red through purple.

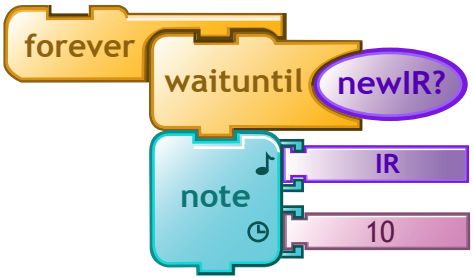




beams a number between 0 and 100

beamIR beams a number to another PicoCricket via infrared (IR). To use this command, you need two PicoCrickets: one beaming the IR signal, the other receiving the IR signal. See example for **IR** block below. We recommend using numbers in the range 0 to 100. Numbers outside this range may produce unexpected results.

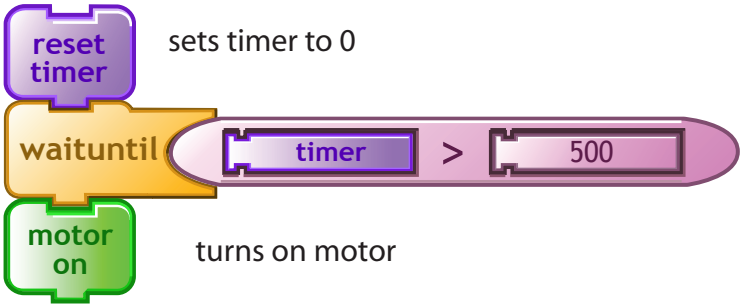




waits for a new IR message from another PicoCricket

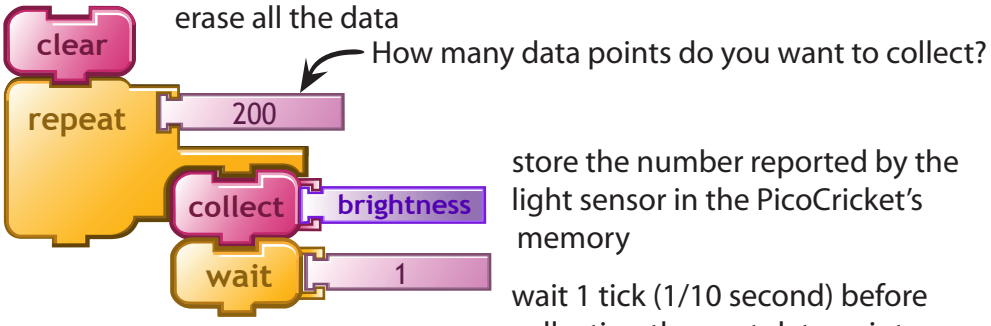
plays a note based on the number received

IR stands for Infra Red.
newIR? reports true if a new infrared (IR) signal has been received. **IR** reports the value of the latest infrared signal received.



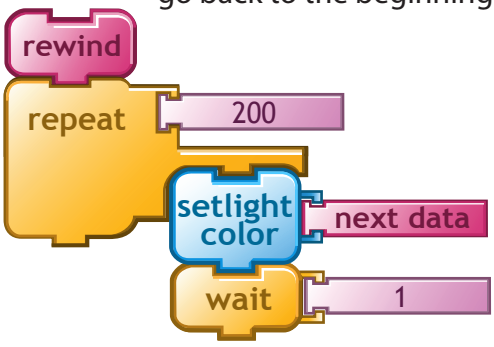
100 ticks of the timer equals 1 second

Data Blocks



collect stores a data point (a number from 0 to 100) in the PicoCricket's memory. A PicoCricket can collect up to 200 data points. Click on graph to see a graph of the collected data.

go back to the beginning of the data



set the color of the light to the value of the next data that has been stored in the PicoCricket's memory

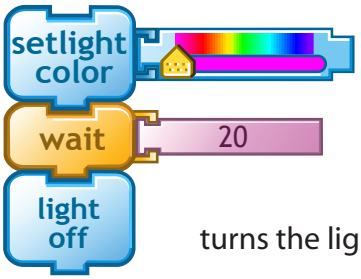
wait 1 tick (1/10 second) before playing back the next data value

rewind prepares the PicoCricket to "play back" collected data, starting with the first data point.

nextdata reports the value of the next number stored in the PicoCricket's memory. Upon reaching the end of the collected data, **nextdata** loops back to the beginning of the data.

When a rewind block is followed by a collect block, the PicoCricket starts collecting new data, permanently erasing any old data.

Flow Blocks

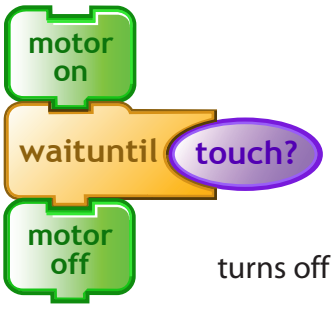


turns the light pink

waits for 20 ticks (2 seconds)

turns the light off

10 ticks equals 1 second
Default value: **wait 10**

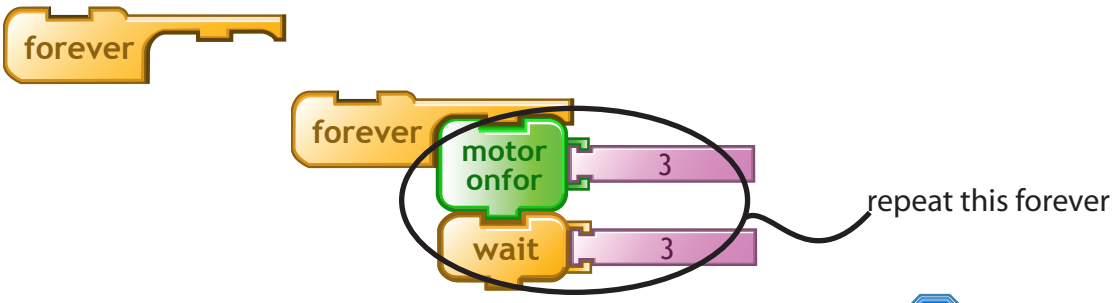


turns on motor

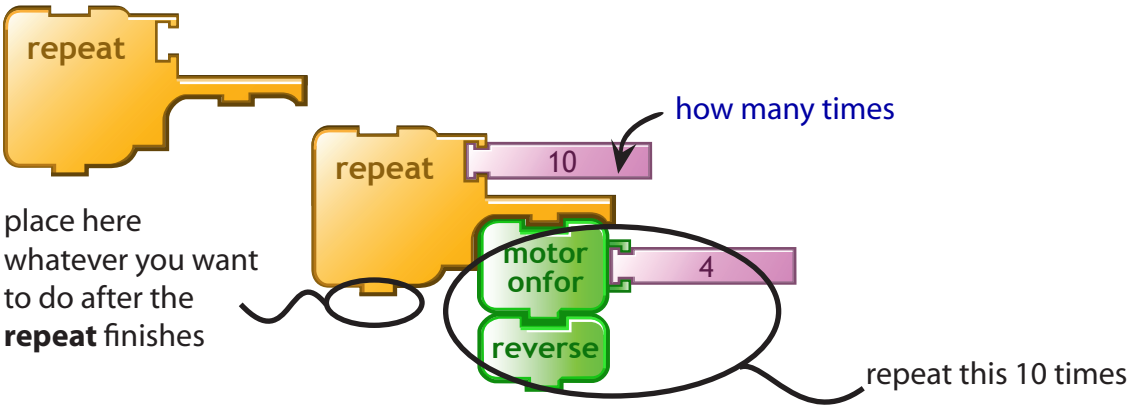
waits until the touch sensor is pressed

turns off motor

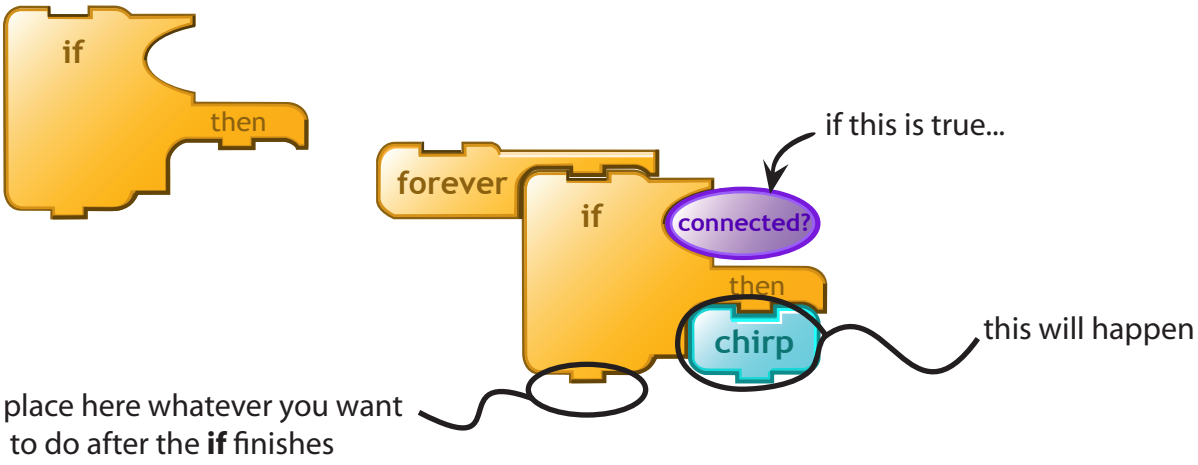
Waits until the condition is true.



To stop the forever, push the button on your PicoCricket or click on STOP

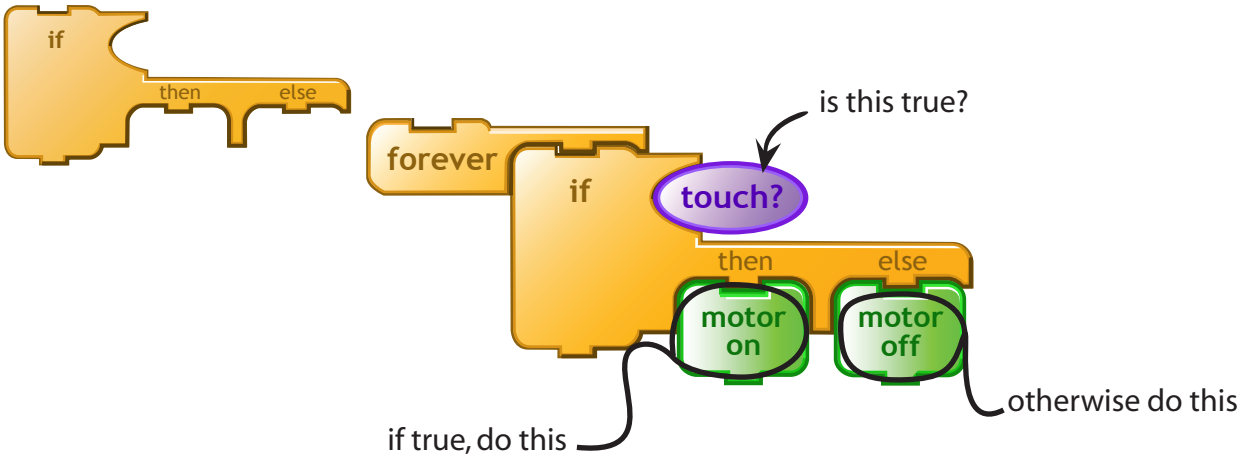


place here whatever you want to do after the **repeat** finishes



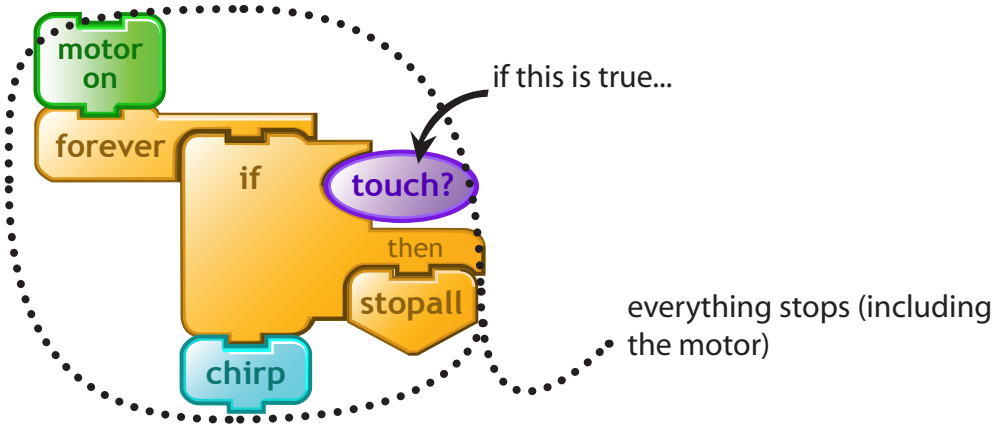
place here whatever you want to do after the **if** finishes

If the condition reports true, then the PicoCricket will run the blocks below the word "then."



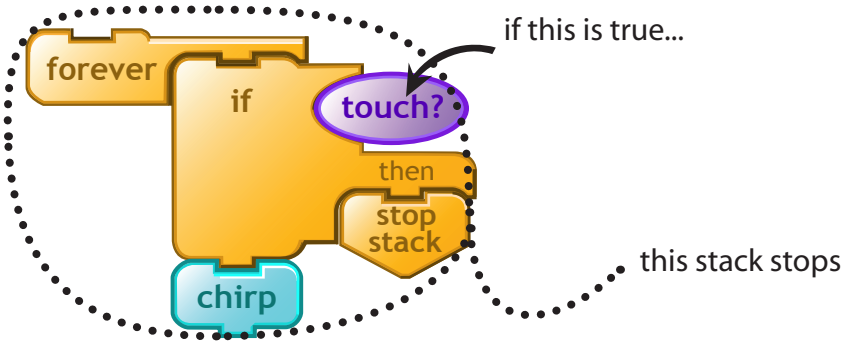
If the condition reports true, then run the blocks under the word "then"; if not, run the blocks under "else".

stopall



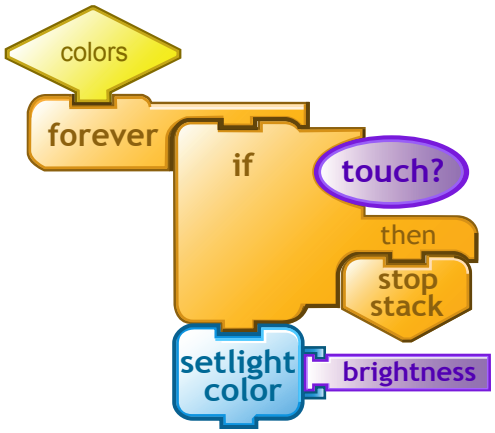
Stops all programs and motors (but leaves lights on). **stopall** is equivalent to pressing the button on the PicoCricket.

stop stack



stopstack stops only the current stack. You can use this block to stop one stack while continuing another stack.

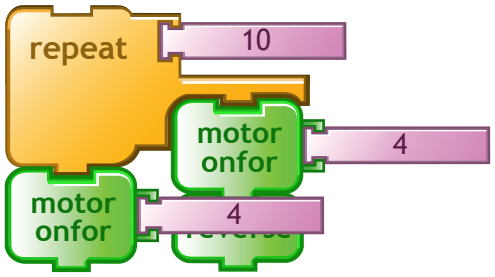
For example:



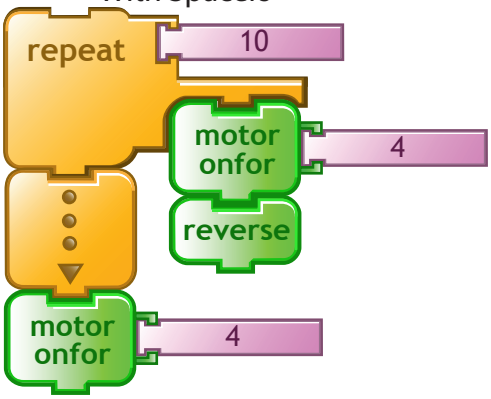
colors will stop when the touch sensor is pressed, yet the other stack will continue. The light will be turned off and melody1 will be played.

Vertical Spacer

Without Spacers



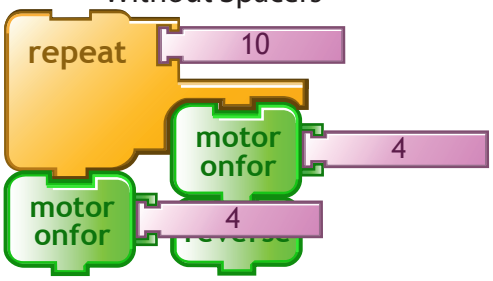
With Spacers



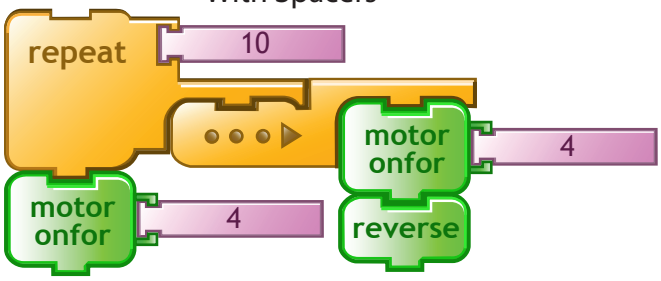
Use spacers to keep the blocks from overlapping. (Adding spacers does not change the way the program runs.)

Horizontal Spacer

Without Spacers

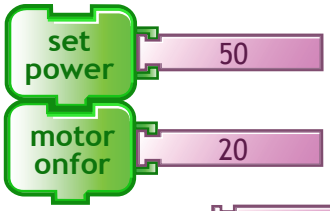


With Spacers



Use spacers to keep the blocks from overlapping. (Adding spacers does not change the way the program runs.)

Numbers Blocks

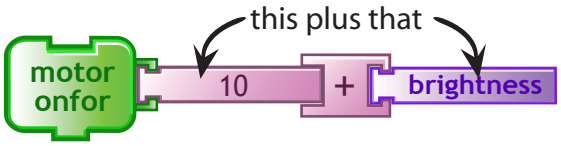


sets motor power to 50 (half power)

turns on motor for 20 ticks (2 seconds)

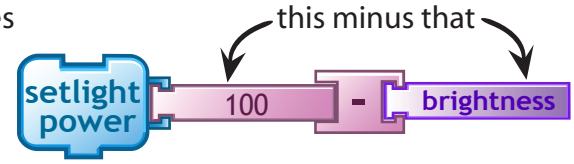
Click on  to type in a number.  accepts negative numbers.
Default Value: **10**
Numbers in PicoBlocks are limited to integers between -32768 and +32767.

adds two values



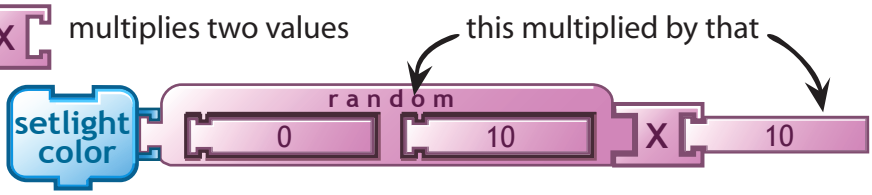
Turns on motor for 10 plus the value of the brightness sensor (for example, if the brightness sensor is 30, motor turns on for 40 ticks).

subtracts two values



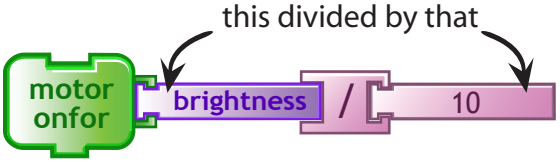
Turns on light with a power of 100 minus the value of the brightness sensor (for example, if the brightness sensor is 60, light power will be 40).

multiplies two values



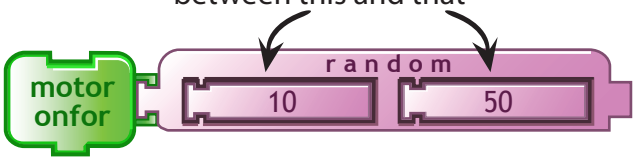
Sets the light's color to a random number multiplied by 10 (for example, if the random number is 7, sets the color to 70 which is cyan).

divides the first value by the second value



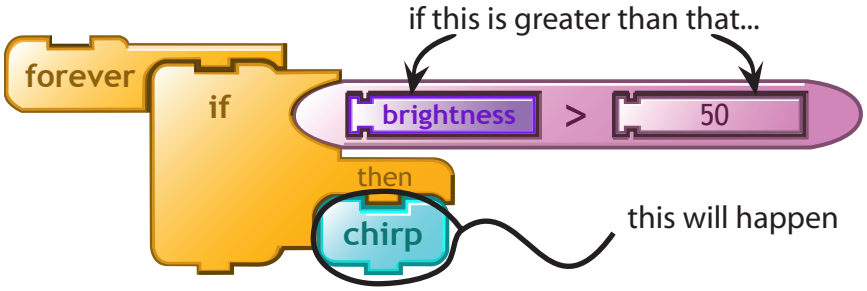
Turns on motor for the value of brightness sensor divided by 10 (for example, if the brightness sensor is 50, motor turns on for 5).

reports a random number between this and that

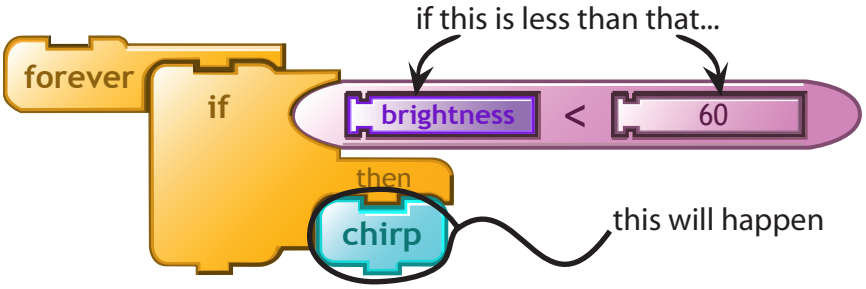


turns on motor for a random number of ticks (in this case it could be 10, or 50, or anything in between...)

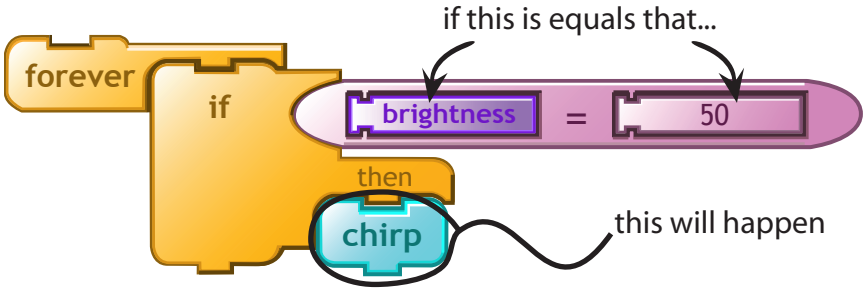
Default value: **random 0 100**



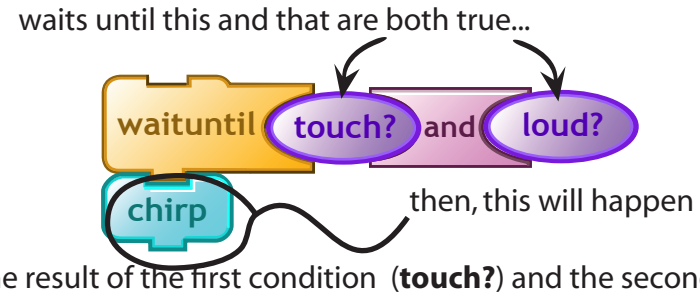
number1 > number2 reports true if number1 is greater than number2.



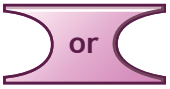
number1 < number2 reports true if number1 is less than number2.

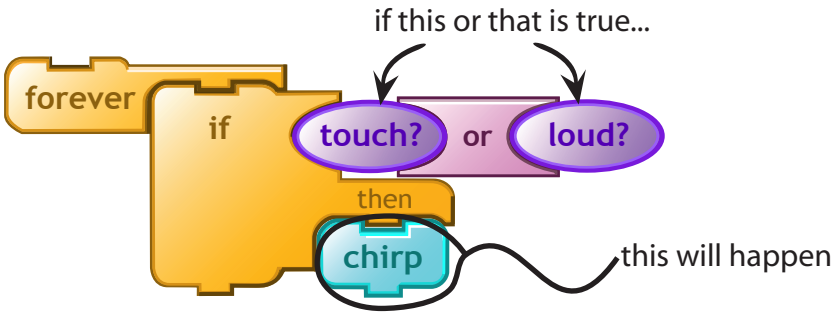


number1 = number2 reports true if the two numbers are equal.

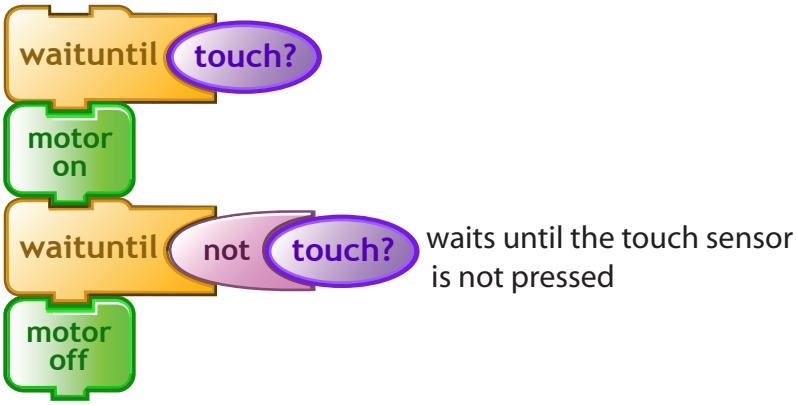


and reports true if the result of the first condition (**touch?**) and the second condition (**loud?**) are both true.





or reports true if the result of the first condition (**touch?**) or the second condition (**loud?**) is true.

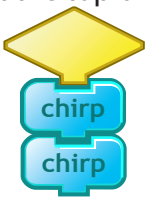


not reports true if the condition is false. not reports false if the condition is true.

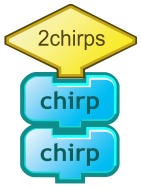
My Blocks

You can use this block to give a name to a stack of blocks – and create a new block that does the same thing as the entire stack. Here's how:

1. Attach the block at the top of the stack you want to name.

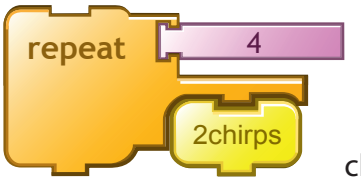


2. Click and type a name.

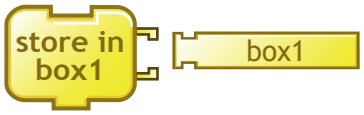


3. A new block with that name appears in 

4. Use it in other stacks.



chirps 8 times

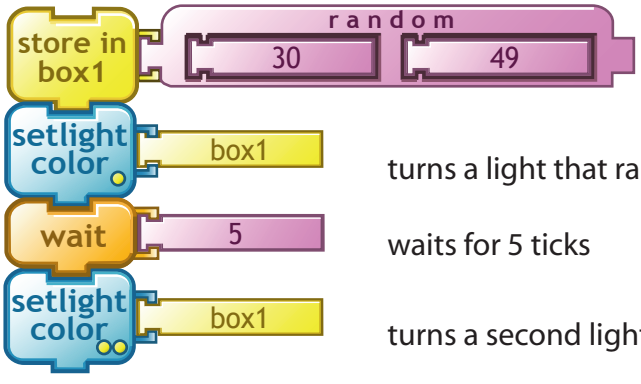


Use these blocks for setting and retrieving the values of variables.

Use 

to store a value, and use 

to retrieve it.



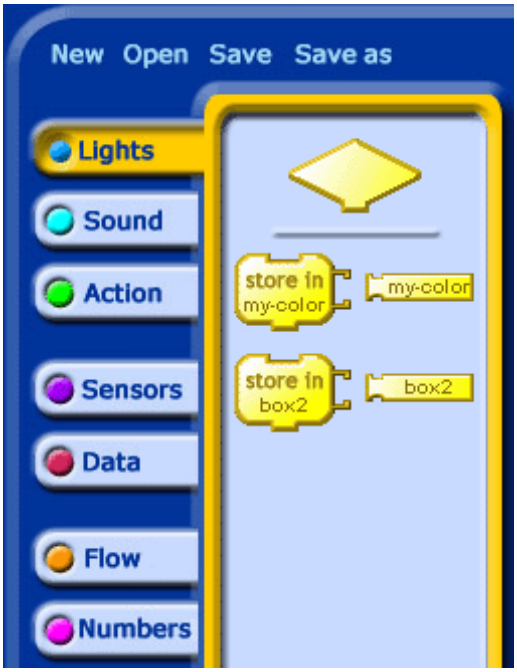
box1 stores a random number

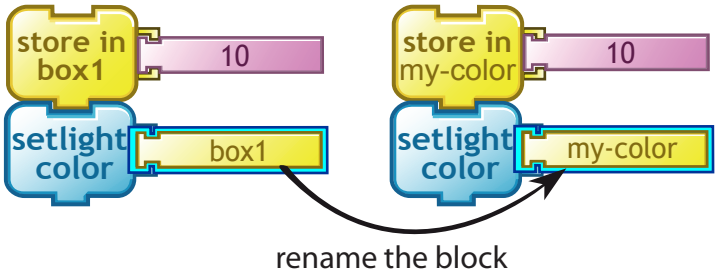
turns a light that random color

waits for 5 ticks

turns a second light the same color

To change the name of a variable, drag it into the workspace, click on it, and type in the new name.





rename the block

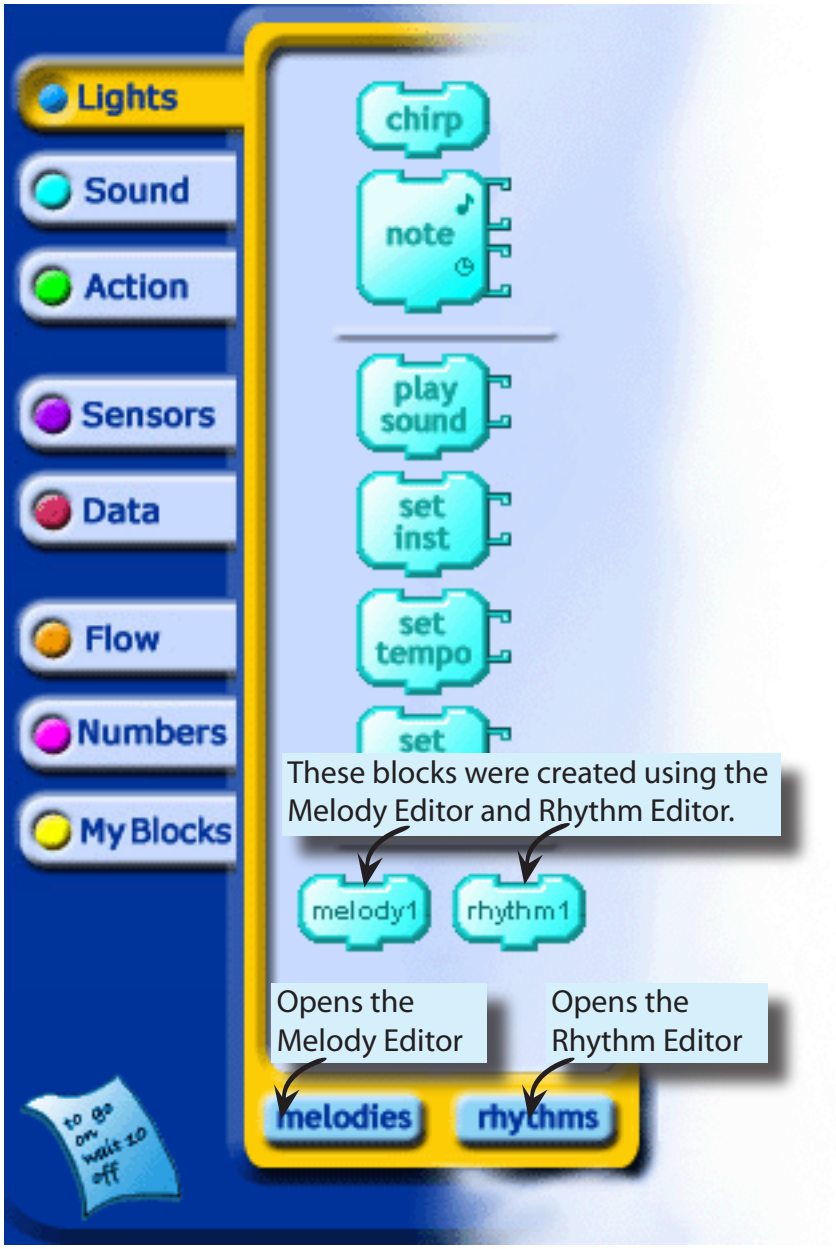
When box1 is renamed in the workspace, the blocks in the palette are automatically updated.

Melody and Rhythm Editors

PicoBlocks has two editors for creating music: a Melody Editor and a Rhythm Editor.

To create a new melody or rhythm (or to edit an existing one), first click on the Sound tab. At the bottom of Sound palette are two buttons, one for opening the Melody Editor, the other for opening the Rhythm Editor.

After you create a new melody or rhythm, it will appear as a new block in the Sound palette. You can drag these music blocks into the workspace, and connect them to stacks, just as you would with any other block in PicoBlocks.



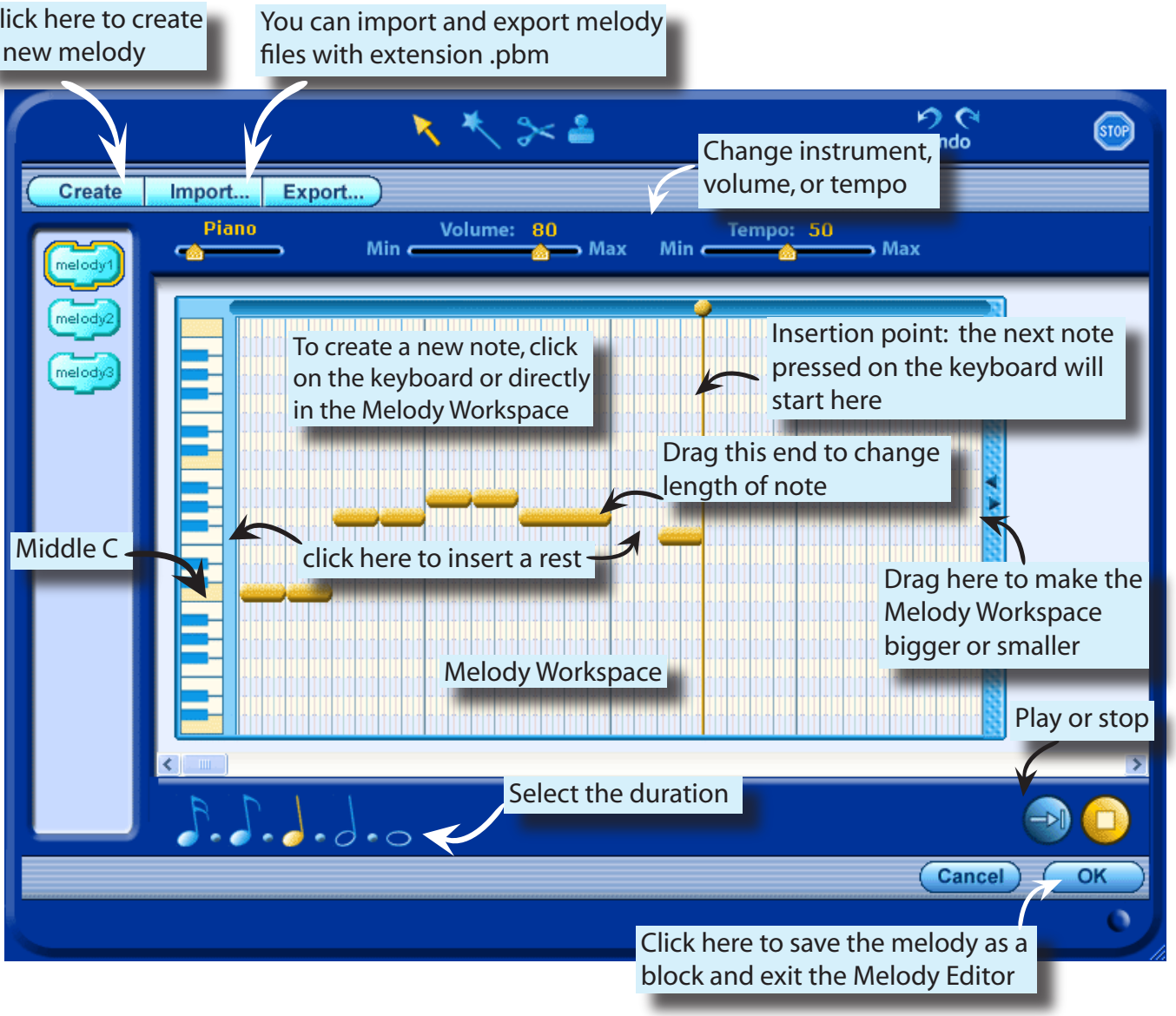
Melody Editor

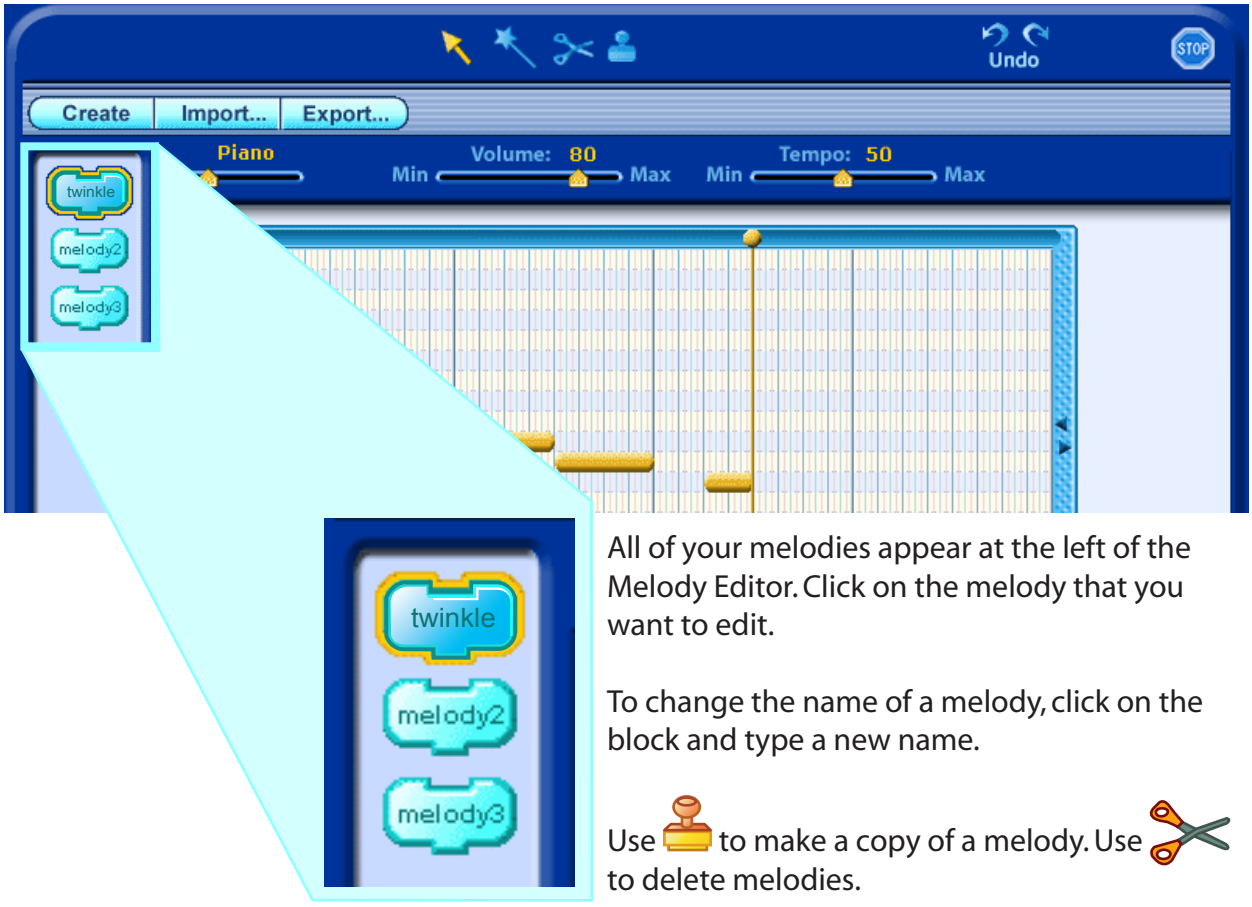
Click on melodies to open the Melody Editor.

If this is your first melody, you will see a blank Melody Workspace for creating your melody. If you have previously created melodies, you will see one of your existing melodies in the Melody Workspace. You can edit this melody – or select one of your other existing melodies to edit (by clicking on a block in the palette on the left side) – or create a new melody (by clicking on the "Create" button at the top-left).

To add notes to your melody, either click on the keyboard, or click directly in the Melody Workspace.

When you are finished creating your melody, click OK to turn your melody into a block and exit the Melody Editor.

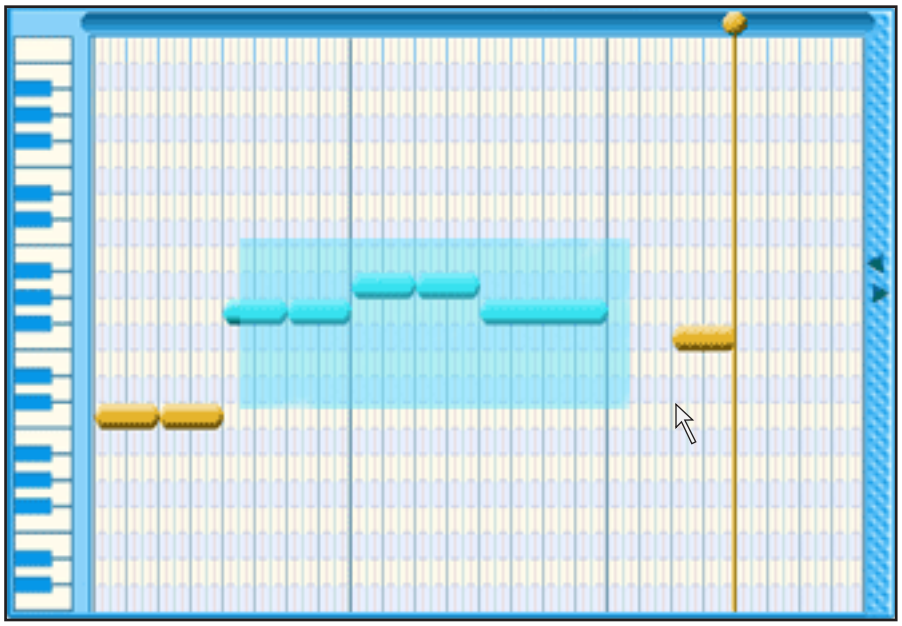




All of your melodies appear at the left of the Melody Editor. Click on the melody that you want to edit.

To change the name of a melody, click on the block and type a new name.

Use to make a copy of a melody. Use to delete melodies.



Drag on the background to select notes. Move the selected notes by dragging them to other location.

You can also copy  , cut  and play  the selection.

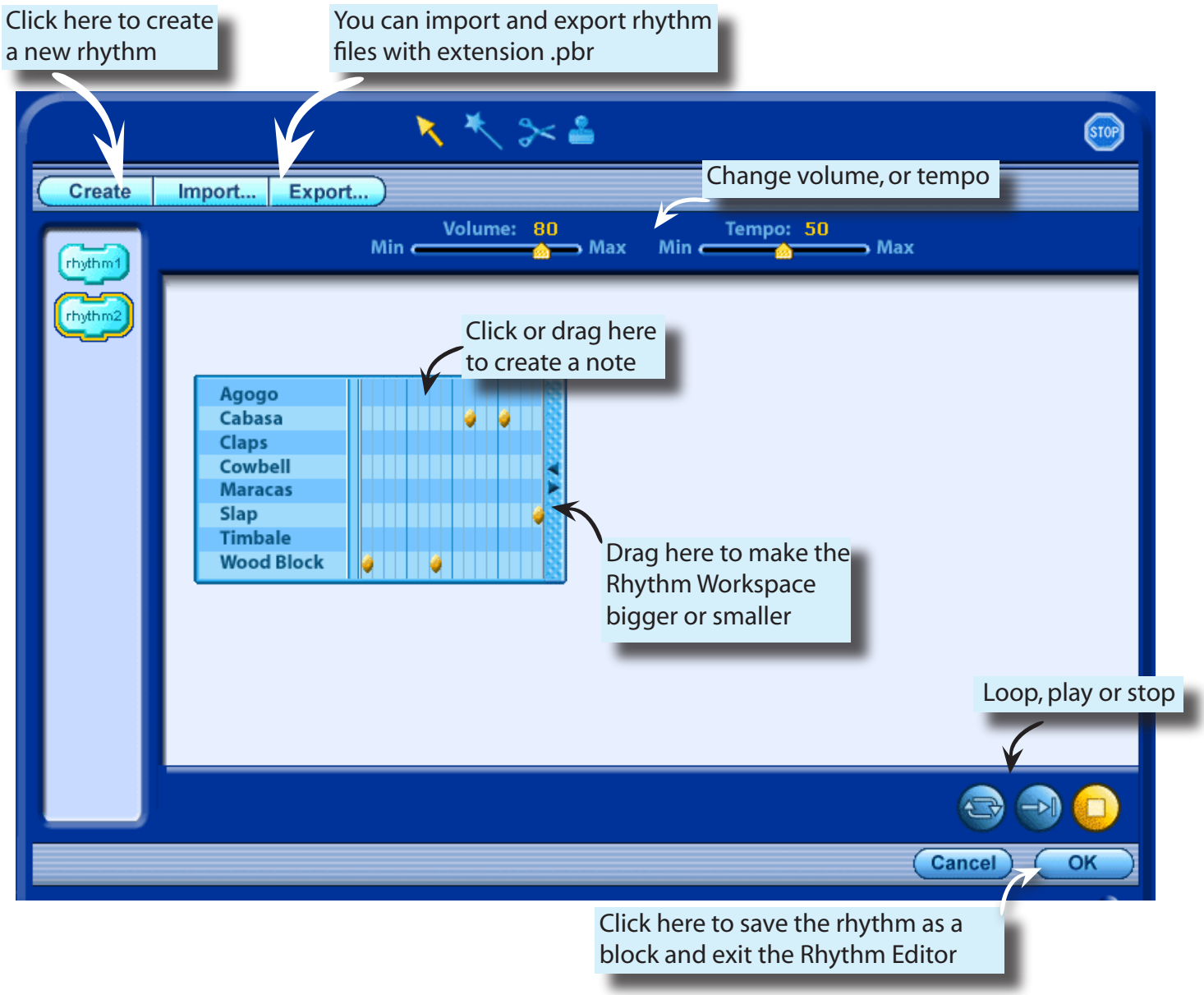
You can also play the selection by double clicking on it.

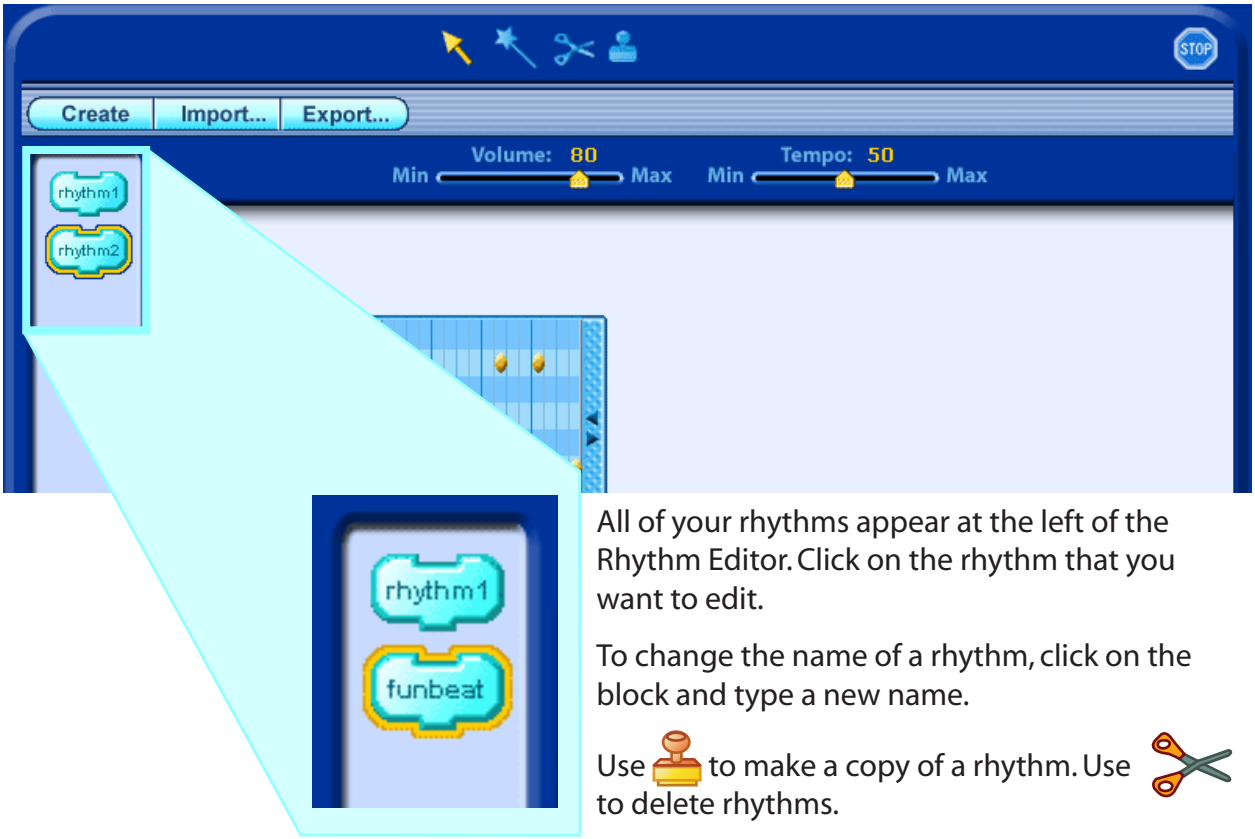
Rhythm editor

Click on rhythms to open the Rhythm Editor.

If this is your first rhythm, you will see a blank Rhythm Workspace for creating your rhythm. If you have previously created rhythms, you will see one of your existing rhythms in the Rhythm Workspace. You can edit this rhythm – or select one of your other existing rhythms to edit (by clicking on a block in the palette on the left side) – or create a new rhythm (by clicking on the "New Rhythm" button at the top-left).

When you are finished creating your rhythm, click OK to turn your rhythm into a block and exit the Rhythm Editor.



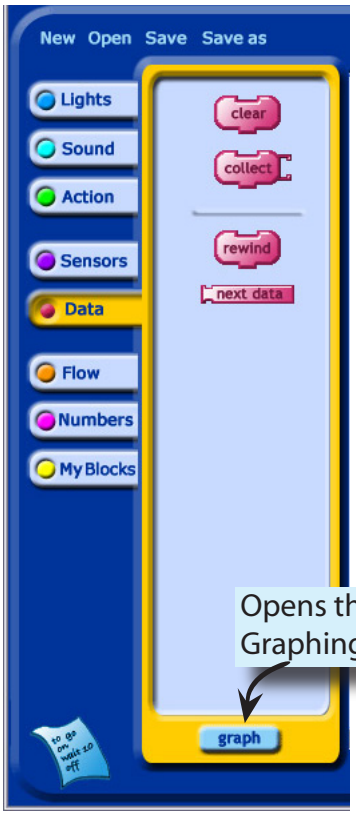


All of your rhythms appear at the left of the Rhythm Editor. Click on the rhythm that you want to edit.

To change the name of a rhythm, click on the block and type a new name.

Use to make a copy of a rhythm. Use to delete rhythms.

Graphing Data

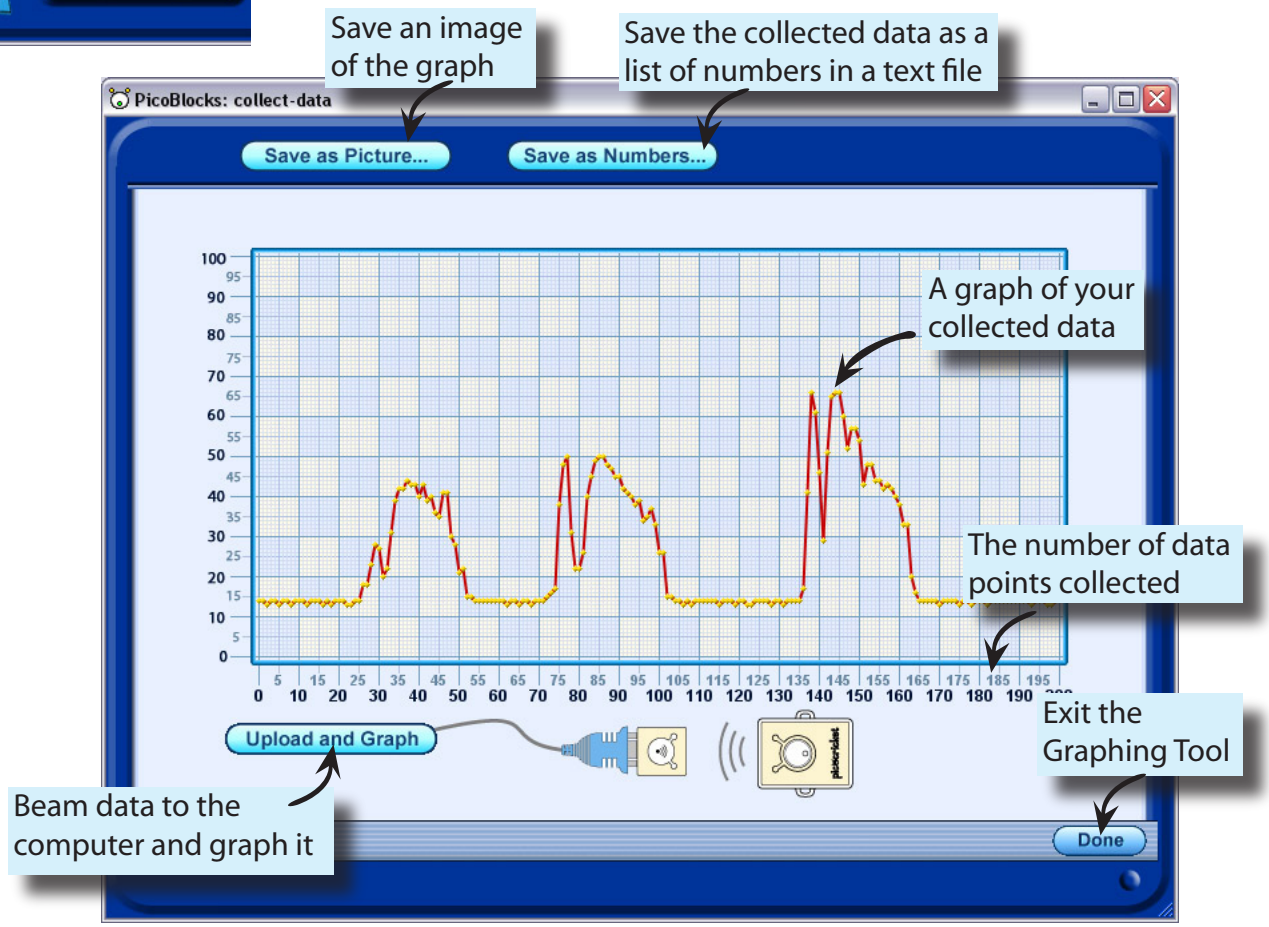


The Graphing Tool lets you view a graph of data that you have collected on your PicoCricket.

To open the Graphing Tool, first click on the Data tab, then click on the **graph** button at the bottom of the Data palette.

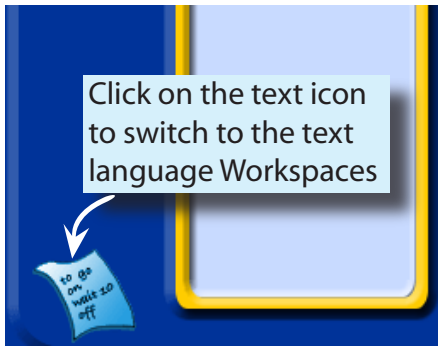
To see a graph of the collected data, turn on your PicoCricket and aim it at the Beamer, then click on the **Upload and Graph** button at the bottom of the Graphing Tool.

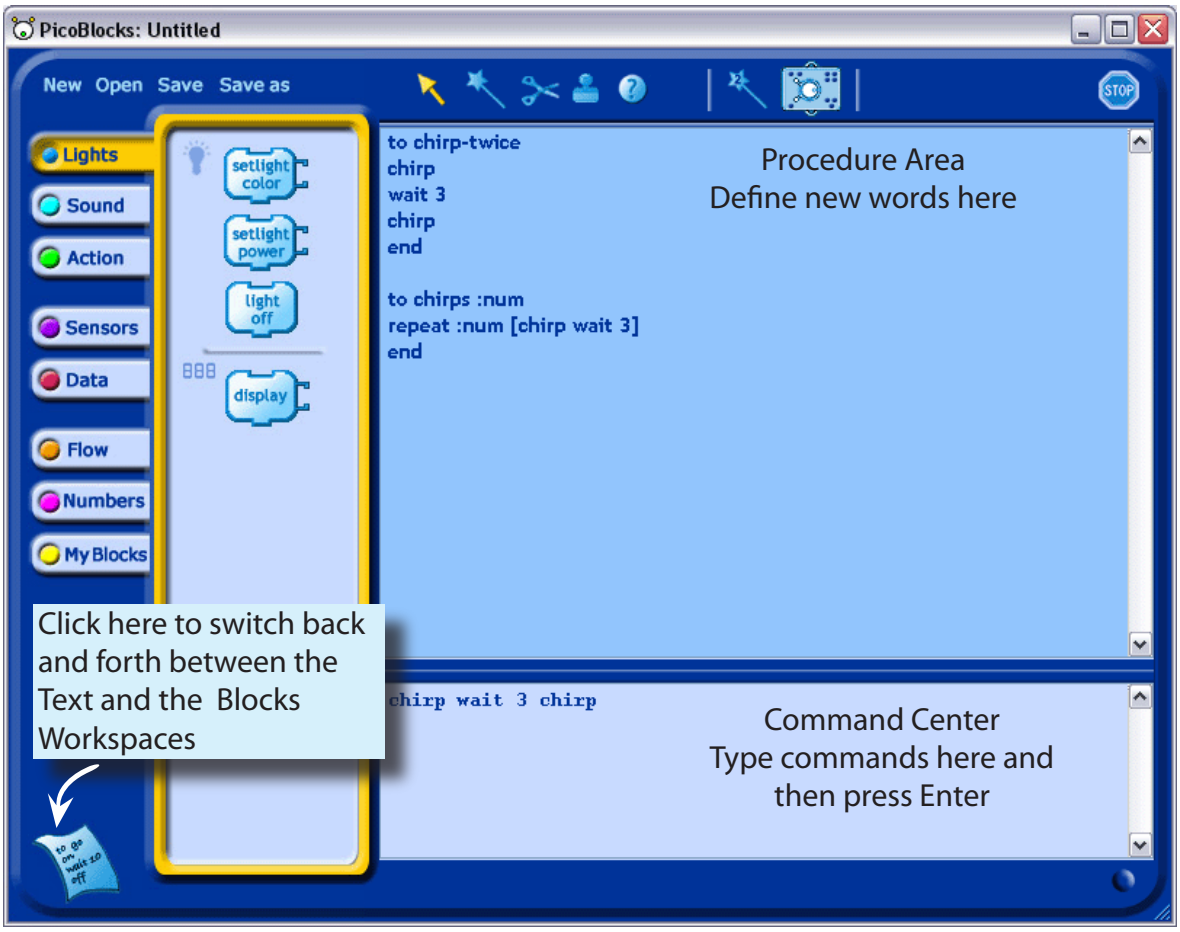
You can collect and view up to 200 data points, where each data point is a number from 0 to 100.



Overview

PicoBlocks lets you construct computer programs by snapping different blocks together, like pieces of a puzzle. This approach makes it easy to get started; different kinds of blocks have different shapes and can only snap together in certain ways. The shapes of the pieces provide a lot of guidance as to how structure your programs, helping you build programs that work the way you want them to work. But if you try to write longer programs you may find that using the blocks can get cumbersome. For example, all of your stacks may no longer fit a the screen at the same time. Also, there are some advanced programming features that are not available using the blocks. As your programs become longer and more complex, you may want to consider using the Text Language that is available from within the PicoBlocks software. The PicoBlocks Text Language is similar to the computer language Logo. (For more information on Logo see www.logofoundation.org.) To begin writing programs in the Text Language, click on the text icon located in the lower left hand corner of the PicoBlocks Workspace. The Text Language Workspace, shown in the figure below, will appear.





Try typing the following commands in the Command Center. (Press the Enter key to run each line.)

```
chirp                  The PicoCricket chirps!
chirp wait 2 chirp     The PicoCricket chirps twice.
```

Note that spaces are very important in the Text Language; they are used to determine where words start and end. For example, if you leave out the space between wait and 2 in the last example you will get an error message that says "I don't know how to wait2". This is because PicoBlocks does not understand the word `wait2`.

Each block in PicoBlocks has an associated word in the text language. The general rule for finding the name of the word in the text language that is associated with a particular block is a very simple one[1]:

Just copy what's written on the block, leaving out a space if there is one.

For example, plug a light into your PicoCricket and type the following in the Command Center:

```
setlightcolor 20     The light turns red
```

Note that there are no spaces in the word `setlightcolor`.

Now try typing the following line in the Command Center:

```
repeat 5 [chirp wait 2]
```

In the Text Language square brackets are used to enclose the list of words that are to be repeated. You can get guidance about how the text word corresponding to a particular block is meant to be used by clicking on that block, which you can find on the left hand side of the Text Language Workspace. For example if you click on the "repeat" block the following text will appear in the Command Center:

```
repeat 10 [ WHATEVER ]
```

In this message "WHATEVER" is meant as a place holder for the list of commands that you want repeated.

Other Examples

Plug in a touch sensor and a sound box and type:

```
waituntil [touch?] playsound 24
```

You should hear a "meow" when you press the touch sensor on the touch sensor.

If you type: `forever [waituntil [touch?] playsound 24]`
you should now hear the "meow" each time you press the touch sensor. In these last two examples you will need to make sure you type the square brackets in the proper places.

Plug in a display and type: `display 7 * 9 + 6`

The Text language uses parentheses to determine the order of in which things are done. Compare the above result to what you get if you type:

```
display 7 * (9 + 6)
```

---

1 Exceptions to this rule occur for the cases of the `if` and `ifelse` words; since the text word does not include "then". For a complete list of the blocks and corresponding text words, see the Summary of Text Language Words chart at the end of this section.

Procedures

You can "teach" your PicoCricket to understand new words by defining procedures in the Procedures Area of the Text Language Workspace. Procedures are defined using the following general form:

```
to procedure-name
procedure-body
end
```

The procedure definition starts with the keyword `to`, followed by the name of the procedure. Next comes the body of the procedure, which is a list of words that describe what the procedure is to do. The keyword `end` is used to complete the procedure definition.

For example, in the Procedure Area type:

```
to chirp-twice
chirp wait 5 chirp
end
```

You've now taught your PicoCricket a new word; if you type the word `chirp-twice` in the Command Center, the PicoCricket will chirp twice.

Procedures with Inputs and Outputs

You can create procedures that take inputs or produce an output. For example, you can create a procedure named `chirps` that takes an input that is used as the counter in a repeat loop. Note that the name of the input must begin with a colon.:

```
to chirps :num
repeat :num [chirp wait 5]
end
```

Typing

```
chirps 10
```

in the Command Center will cause the PicoCricket to chirp 10 times.

You can create a procedure that takes two inputs that will determine both the number of chirps and the duration of the pause between chirps:

```
to chirps2 :num :pause
repeat :num [chirp wait :pause]
end
```

Typing

```
chirps2 10 3
```

in the Command Center will cause the PicoCricket to chirp 10 times, with a pause of 3 tenths of a second between chirps.

Procedures may return values using the output command. For example, you can define a procedure called `half` by:

```
to half
output brightness / 2
end
```

Then, with a display and a light sensor plugged in, try typing in the Command Center:

```
display half
```

Or, you can define a procedure called dark? that returns a true of false result:

```
to dark?
output (brightness < 20)
end
```

Now if you try typing in the Command Center:

```
forever [if dark? [chirp]]
```

your PicoCricket should chirp when it is dark enough.

Make Your Own Blocks

You can use the Text Language to make different kinds of blocks, which you can then use to build programs in the PicoBlocks Workspace. This feature allows you to continue doing much of your programming using the Blocks Language, with the Text Language being used as a supplement when its advanced features are needed.

New blocks are defined by typing in the Procedures Area. The block definitions begin with the keyword `block`. For example:

`block chirp1`
`chirp wait 3 chirp`
`end`
	
	Makes a block that chirps twice.

Blocks that you have defined will automatically be created and placed in the "My Blocks" area. You can create blocks with up to three inputs. For example, to create a block with one input:

`block chirp2 :num`
`repeat :num [chirp wait 3]`
`end`
	
	Makes a block that chirps a number of times.

To create a block with two inputs:

`block chirp3 :num :pause`
`repeat :num [chirp wait :pause]`
`end`
	
	Makes a block that chirps a number of times, with the ability to vary the length of the pause between chirps.

When you define a block that outputs a number, PicoBlocks will automatically create a number–shaped reporter block:

`block bright2`
`output 2 * brightness`
`end`
	
	Reports a number twice as big as the brightness measured by the light sensor.

Use the keyword `bblock` when you want to make a block that outputs the result of a true/false condition:

`bblock quiet?`
`output loudness < 5`
`end`
	

Using Tags in the Text Language

PicoBlocks "tags" are used when you are plugging in more than one of the same kind of part, two lights or two motors for example, and you want these parts to act differently. (See the previous section on Tags on pages 10 and 11.) In programs written in the Text Language, a word without a tag will address all parts of the same type. For example, if two lights are plugged into your PicoCricket, the command

```
setlightcolor 90
```

will turn both lights blue.

If you want to refer only to the light plugged into the ● port, add a period to the end of the word, without a space:

```
setlightcolor. 90
```

Similarly, to refer only to the light plugged into the ●● port, add two periods to the end of the word, without spaces:

```
setlightcolor.. 90
```

To refer only to the light plugged into the  port, add a period and a colon to the end of the word, without spaces:

```
setlightcolor.: 90
```

To refer only to the light plugged into the  port just add two colons to the end of the word, without spaces:

```
setlightcolor:: 90
```

This method of tagging text words will work with other words[2] . For example

```
display.: 57
```

will display the number 57 on a display plugged into the  port and

```
forever [if touch?.. [chirp]]
```

will cause the PicoCricket to chirp if a touch sensor that is plugged into the ●● port is pressed.

Global Variables

In the "My Blocks" tab you will find blocks for storing numbers in two different "global variables" called box1 and box2. In the Text Language you can use the keyword `global:` to create up to five additional global variables. For example, by including the line:

```
global: times, pause
```

[2] **Note**: Tags will not work with words related to the sound box.

in the Procedures Area you will create two new global variables called `times` and `pause`. Now, try typing the following in the command center:

```
storeintimes 5 storeinpause 3
repeat times [chirp wait pause]
```

The PicoCricket should chirp 5 times, with pauses of 3 tenths of a second between chirps.

If you click on the My Blocks tab you will also find that new blocks corresponding to the new variables times and pause have been created.

Local Variables

The word `make` allows you to change the value of an input to a procedure. For example, if you define a procedure called rainbow by:

```
to rainbow :a
repeat 30 [setlightcolor :a make "a :a + 1 wait 2]
end
```

then, with a light plugged into your PicoCricket, typing

```
rainbow 20
```

in the Command Center will cause colors 20 through 49 to flash.

Variables of this kind are called "local variables" because they are only available for use by the procedure in which they are defined. Because PicoBlocks has a very limited number of global variables (7), local variables can be helpful because they do not use any of the global variable slots.

Data Memory

A PicoCricket has 200 bytes of memory used for storing collected data. These memory locations can be accessed sequentially using the `collect` and `nextdata` blocks, as explained on page 22.

Alternatively, data memory locations can be randomly accessed using `readdata` and `writedata` as follows:

`readata` *`address`* - reports the value of the one-byte number that has been stored at a particular *`address`* in data memory.

`writedata` *`address number`* - stores a one-byte number at a particular *`address`* in data memory.

For example, typing:

```
writedata 147 75
```

stores the number 75 at address 147 in data memory. To verify this, plug a display into your PicoCricket, and type:

```
display readdata 147
```

The number 75 should appear on the display.

Tool Not Available in the Text Language

The "second wand" is not available in the Text Language.

Summary of Text Language Words

The following table shows the text word that corresponds to each PicoBlocks block and gives an example of how the word can be used.

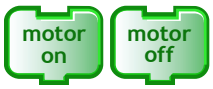
Light		
Block	**Word**	**Example Usage**
	`setlightcolor` *number*	Setlightcolor takes an input from 0 to 100. `setlightcolor 70` The light changes to cyan and turns on.
	`setlightpower` *number*	Setlightpower takes an input from 0 to 100. `setlightpower 50` The light turns on at half power.
	`lightoff`	`lightoff` The light turns off.
	`display` *number*	Displays a value on the digit display: `display 709` The display shows the number 709.
Text only	`setrgb` *number number number*	Sets the color of the light. Setrgb takes 3 inputs (red, green, and blue), each with a range from 0 to 100. The three inputs mix to give one particular light color. `setrgb 0 100 100` The light turns cyan.

Sound		
Block	**Word**	**Example Usage**
	`chirp`	`chirp wait 3 chirp` The PicoCricket chirps twice.
	`note` *number number*	Note takes two inputs. The first input (a number between 0 and 100) determines the pitch of the note and the second input determines the duration of the note (in tenths of a second). `note 36 5` The sound box plays a note for half a second.
	`playsound` *number*	Plays a sound on the sound board. `Playsound` takes any number between 0 and 100. There are 24 built-in sounds. `Playsound` repeats the list in sequence for numbers greater than 24. `playsound 24` The sound box meows.

Sound		
Block	**Word**	**Example Usage**
	`setinstrument` *`number`*	Sets the instrument for the next note, or melody to be played on the sound board. Setinstrument takes any number between 0 and 100: `setinstrument 4 note 36 5` The sound box plays violin note.
	`settempo` *`number`*	Sets the tempo at which the next rhythm or melody will be played on the sound board. Settempo takes any number between 0 -lowest pace- and 100 -fastest pace. `settempo 50 melody1` The sound box plays a melody at the standard tempo.

	`setvolume` *`number`*	Sets the volume at which the next note, sound, rhythm or melody will be played on the sound board. Setvolume takes any number between 0 -lowest volume- and 100 -highest volume:
		`setvolume 30 playsound 24`
		`setvolume 100 playsound 24`
		The sound box meows softly, then loudly.

In addition to the blocks above can add your own blocks to the Sound tab by creating melodies and/or rhythms in their respective editors. The melody or rhythm name becomes a text word that you can use.		

Action		
Block	**Word**	**Example Usage**
	`motoron` `motoroff`	Turns a motor on or off. `motoron wait 10 motoroff` The motor spins for 1 second.
	`motoronfor` *`number`*	Turns the motor on for a set period of time (in tenths of a second). `motoronfor 10` The motor spins for 1 second.
	`reverse`	Change the direction in which the motor spins. `repeat 6 [motoronfor 3 reverse]` The motor wiggles back and forth.

	`thisway`
	`thatway`
		Set the motor to spin in a specific direction.
		`thisway motoronfor 10`
		`thatway motoronfor 10`
		The motor spins one way for 1 second, then the other way for 1 second.

	`setpower` *`number`*	`Setpower` takes an input from 0 to 100.
		`setpower 100 motoronfor 10`
		The motor spins quickly.
		`setpower 30 motoronfor 10`
		The motor spins slowly.

Action		
Block	**Word**	**Example Usage**
text only	`brake`	Causes the motor to stop immediately. This is slightly different from `motoroff`, which does a short `brake` followed by a `coast`. `motoron wait 10 brake` The motor spins for 1 second, then immediately comes to rest.
text only	`coast`	Turns off the power to the motor but does not brake it, so that the motor slowly comes to rest. `motoron wait 10 coast` The motor spins for 1 second, then slowly comes to rest.

Sensors		
Block	**Word**	**Example Usage**
	`touch?`	Reports true if the touch sensor is pressed. `waituntil [touch?] chirp` The PicoCricket waits until the touch sensor is pressed before chirping.
	`dark?`	Reports true if the value measured by the light sensor is less than 15. `waituntil [dark?] chirp` The PicoCricket will chirp after the light sensor detects little light.
	`brightness`	Reports the value measured by the light sensor as a number from 0 to 100. `forever [display brightness wait 1]` The display shows, and continually updates, the light level measured by the light sensor.
	`loud?`	Reports true (the number 1) if the value measured by the sound sensor is greater than 60. `waituntil [loud?] chirp` The PicoCricket will chirp after the sound sensor detects a loud sound.
	`loudness`	Reports the value measured by the sound sensor as a number from 0 to 100. `forever [display loudness]` The display shows, and continually updates, the sound level measured by the sound sensor.
	`connected?`	Reports true if the value measured by the resistance sensor is less than 50. `waituntil [connected?] chirp` The PicoCricket waits until the alligator clips on the resistance sensor connect before chirping.

Sensors		
Block	**Word**	**Example Usage**
	`resistance`	Reports a number from 0 to 100. `forever [display resistance wait 1]` The display shows, and continually updates, the electrical resistance measured by the resistance sensor.
text only	`rawresistance`	Reports the value measure by the resistance sensor as a number between 0 and 1023; `rawresistance` provides finer resolution than `resistance`. `forever [display rawresistance wait 1]` The display shows, and continually updates, the electrical resistance measured by the resistance sensor on a scale of 0 to 1023. (Numbers of 1000 or greater appear as dashes.)

text only	`rawrange`	Rawrange is used to adjust the sensitivity of the resistance sensor. It takes as an input either the number 0 , 1, or 2. An input of 0 results in the highest sensitivity and should be used when measuring resistances of 1000 ohms or less. An input of 1 is medium sensitivity and is the default setting. It works best for resistances of about 10,000 ohms. 2 is the lowest sensitivity and should be used to measure resistances of 100,000 ohms or more.
		`rawrange 0`
		`display rawresistance`

	`beamir` *number*	Beams a number from the PicoCricket's infrared transmitter. `beamir 4`
	`newir?`	Reports true (the number 1) if the PicoCricket's infrared receiver has received a new value. `waituntil [newir?] chirp` The PicoCricket chirps when a new number is beamed to it.

	`ir`	Reports the value of the most recent number beamed to the PicoCricket.
		`to test`
		`waituntil [newir?]`
		`if ir = 20 [chirp]`
		`end`
		The PicoCricket chirps if the number beamed to it is equal to 20.

	`resett`	Resets to zero the value of the PicoCricket's internal timer. See next example.

	`timer`	Reports the PicoCricket's timer value. Timer measures time in hundreths of a second.
		`to test`
		`resett`
		`chirp`
		`waituntil [touch?]`
		`display timer`
		`end`
		The display shows the amount of time that has elapsed between when the PicoCricket chirps and when the touch sensor is pressed.

Data		
Block	**Word**	**Example Usage**
	`clear`	Permanently erases all collected data. Use clear before starting to collect new data. See next example.

	`collect` *`number`*	Stores a data point (a number from 0 to 100) in the PicoCricket's memory.
		`clear`
		`repeat 200[collect loudness]`

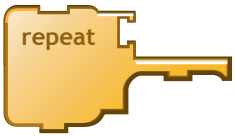
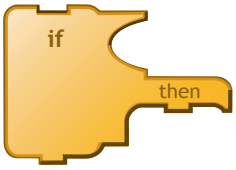
	`rewind`	Prepares the PicoCricket to "play back" collected data, starting with the first data point.
		`rewind`
		`repeat 200[display nextdata wait 5]`

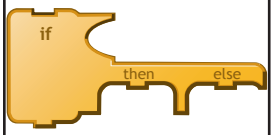
	`nextdata`	Reports the value of the next number stored in the PicoCricket's memory.
		`rewind`
		`repeat 200[display nextdata wait 5]`

text only	`datalength`	Reports the total number of data points that have been collected. `display datalength`
text only	`writedata` *`address number`*	Stores a one-byte number at a particular address in the data memory. `writedata 47 75`
text only	`readdata` *`address`*	Reports the value of the one-byte number stored at a particular address in the data memory. `display readdata 47`

Flow		
Block	**Word**	**Example Usage**
	`wait` *`number`*	Waits a certain amount of time (in tenths of a second). `chirp wait 10 chirp` The PicoCricket pauses for a second between the two chirps.
text only	`mwait` *`number`*	Waits a certain amount of time (in milliseconds). `setlightcolor 20 mwait 10 lightoff` The light flashes very briefly.
text only	`no-op`	Does nothing for about 40 microseconds. `repeat 10 [no-op]` The PicoCricket waits for 400 microseconds.
	`waituntil` `[`*`condition`*`]`	Waits until the condition is true. `waituntil [touch?] chirp` The PicoCricket waits until you press the touch sensor before chirping.

Flow

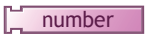
Block	Word	Example Usage
	`forever [list]`	Repeats a list of instructions forever. `forever [chirp wait 3]` The PicoCricket chirps continuously.
	`repeat number [list]`	Repeats a list of instructions a set number of times. `repeat 5 [chirp wait 2]` The PicoCricket chirps five times.
	`if condition [list]`	Runs a list of instructions if a certain condition is met. `forever [if touch? [chirp wait 1]]` The PicoCricket chirps if you press the touch sensor and is quiet if you do not press it.

	`ifelse condition [list1] [list2]`	Runs the first list of instructions if a certain condition is met and the second list if it is not.
		`to test`
		`forever [ifelse touch? [setlightcolor random 0 99] [lightoff]]`
		`end`
		The light flashes random colors if you press the touch sensor and turns off if it you do not press it.

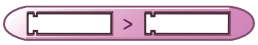
	`stopall`	Stops everything: programs, motors, etc. Stopall is equivalent to pressing the button on the PicoCricket.
		`to test`
		`motoron`
		`forever [if touch? [stopall] setlightcolor random 0 99]`
		`end`
		The lights and motors stop when you press the button.

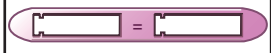
	`stopstack`	Terminates execution of a procedure, returning control to the calling procedure.
		`to test`
		`forever [if touch? [stopstack] setlightcolor random 0 99]`
		`end`

		There is no need for spacers in the text language.
		There is no need for spacers in the text language.

Numbers		
Block	**Word**	**Example Usage**
	*number*	Reports a number. Numbers in PicoBlocks are limited to integers between -32768 and +32767. `display 7` The display shows the number 7.
	*number* + *number*	Reports the sum of two numbers. `display 7 + 4` The display shows the number 11.
	*number* - *number*	Reports the difference of two numbers. `display 7 - 4` The display shows the number 3
	*number* * *number*	Reports the product of two numbers. `display 7 * 4` The display shows the number 28.
	*number* / *number*	Reports the quotient of two numbers, rounded down to the nearest integer. `display 7 / 4` The display shows the number 1.
text only	%	Reports the remainder when two numbers are divided. `display 7 % 4` The display shows the number 3.
	`random` *number number*	Report a random number, the two inputs determining the lower and upper limits. `display random 0 10` The display shows a random number from 0 to 10.

	*number* > *number*	Reports true (the number 1) if the value of the first input is greater than the value of the second input.
		`to test`
		`forever [if brightness > 30 [chirp]]`
		`end`
		The PicoCricket chirps if the light sensor measures a value greater than 30.

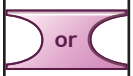
	*number* < *number*	Reports true (the number 1) if the value of the first input is less than the value of the second input.
		`to test`
		`forever [if brightness < 30 [chirp]]`
		`end`
		The PicoCricket chirps if the light sensor measures a value less than 30.

	*number* = *number*	Reports true (the number 1) if the value of the first input is equal the value of the second input. `forever [if brightness = 30 [chirp]]` The PicoCricket chirps if the light sensor measures a value exactly equal to 30.

Numbers

Block	Word	Example Usage

	*condition* and *condition*	Reports true (the number 1) if the first and second conditions are both true.
		`to test`
		`forever [if (brightness < 30) and touch?`
		`[chirp]]`
		`end`
		The PicoCricket chirps if the light sensor measures a value less than 30 *and* the touch sensor is also pressed.

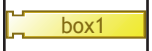
	*condition* or *condition*	Reports true (the number 1) if the first or the second conditions are both true.
		`to test`
		`forever [if (brightness < 30) or touch?`
		`[chirp]]`
		`end`
		The PicoCricket chirps if the light sensor measures a value less than 30 *or* the touch sensor is pressed.

	not *condition*	Reports true (the number 1) if the result of the condition is false (number 0).
		`to test`
		`forever [if not touch? [chirp]]`
		`end`
		The PicoCricket chirps if the touch sensor is *not* pressed.

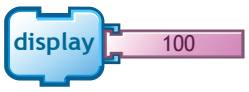
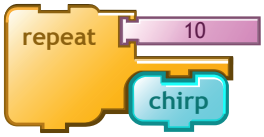
My Blocks

Block	Word	Example Usage
	`block` *name* *block-definition* `end`	You can use the text language to make your own blocks. (See section Make Your Own Blocks above.)

	`storeinbox1` *number*	Stores a number in the global variable called box1.
		`storeinbox1 57`
		`display box1`
		The display shows the number 57.

	`box1`	Reports the number stored in the global variable called box1. `storeinbox1 57`
text only	`global:`	You can use the text language to create new global variables. (See section Global Variables above.)
text only	`make "`*name value*	**Make** allows you to change the value of a local variable. (See section Local Variables above.)

Common Error Messages

Error Message	Explanation
The Beamer cannot see the PicoCricket	The Beamer is sending, but no PicoCricket is responding. Solution: Make sure the PicoCricket is turned on, and that the PicoCricket and the Beamer are facing each other. For more information, see www.picocricket.com/troubleshooting
Can't find the Beamer	PicoBlocks wasn't able to open the communication port. Solution: Make sure the Beamer is properly connected to your computer. If you are using Windows, make sure only one copy of PicoBlocks is running. For more information, see: www.picocricket.com/support
Can't save an empty score	You tried to export a melody or rhythm that is empty. Solution: Make sure the block contains notes, then click Export again.
Can't use _____ as a name	PicoBlocks does not allow that word as a name. Numbers, names starting with % or [, and existing words are considered invalid. Solution: Type another name.
Communication problem	There was a communication problem while PicoBlocks was downloading data to your PicoCricket. Solution: Make sure that the Beamer and the PicoCricket are facing each other, then try again. If the PicoCricket's yellow antenna lights keep flashing even when you are not downloading, the PicoCricket is probably receiving infrared interference from a monitor or other device. Shield the PicoCricket from the monitor. For more information, see www.picocricket.com/troubleshooting
Missing input to _____	One (or more) of the blocks requires input. Solution: Check that every block has something attached on its right side when required. (You can tell by the shape of a block whether it takes an input.) For example, **display** needs a number (or other value) attached as an input:  **Repeat** requires a number value at the top right. It also requires plus one or more blocks under its "arm" to repeat:  Tip: To check if a block needs inputs, click on the block with the Help tool

Error Message	Explanation
I don't know how to _____	PicoBlocks tried to run a name that doesn't exist. Solution: If you name a stack, then PicoBlocks creates a block with that name. To run the block, you need to keep the named stack in the Workspace, so PicoBlocks knows what to do.
The name ____ already exists	There is already an existing block with the same name. Solution: Type another name.
Number block doesn't like _____	You typed an invalid character in  Solution: Type only numbers.
Project contains too many blocks	Your project contains too many blocks. Solution: Delete all stacks, melodies and rhythms that are not being used.
Too many blocks in the stack	The stack contains too many blocks (and uses up too much memory). Solution: Use a **repeat** to do more with fewer blocks. Or, place a  on the top of the stack, and click on it to type in a name.
Too many music blocks: Limit of 24	You have made more than the maximum number of music blocks. The maximum number of melodies and rhythms is 24 blocks. Solution: Delete some of the melody or rhythm blocks so that the project has no more than 24 total.
Too many notes for one music block	The current melody or rhythm is too long. Solution: Divide the melody or rhythm into two blocks. To do this, first copy the current music block. In this block, delete the second half of the notes. In the other block, delete the first half of the notes. Now you can use these two blocks together to play the entire sequence.
waituntil needs input	The **waituntil** block needs an input block that fits. Solution: Attach a block that fits onto the right side of the **waituntil** block. Examples:  or 

Error Message	Explanation
You can't copy an empty music block	You tried to copy a melody or rhythm that is empty. Solution: Add notes, then copy the block.
You can't name a stack _____	The name typed on the  contains invalid characters. It cannot contain the following characters:. % " + - * /] [or a space. Numbers can only be used in combination with letters. Solution: Type letters on the 
You don't say what to do with _____	PicoBlocks tried to run a block that returns a value, but there was no block attached to receive that value. Solution: Attach a block that will fit that shape (and receive the value). For example: 

Text-Only Error Messages

The following error messages only appear when using the PicoBlocks Text Language.

Error Message	Explanation
_____: a block can't have more than 3 inputs	You can't make a block with more than 3 inputs. Solution: Store the other values as global variables, and use the names of these variables in your program. For more information, see Global Variables in the PicoBlocks Text Language section of this reference guide.
_____ has no value	PicoBlocks could not find a value for the specified name. Solution: In the Text Area, check that you have correctly typed the name of the input. Inputs should have a colon preceding them, but global variables should not.
_____: output block can only have 1 input	A block that outputs can only have 1 input. Solution: Store the other values as global variables, and use the names of these variables in your program. For more information, see Global Variables in the PicoBlocks Text Language section of this reference guide.
() error misplaced)	A parenthesis is missing or misplaced. Solution: Check that there are an equal number of open and closed parenthesis ( ), and that they are correctly placed.

Error Message	Explanation
Can't name a global _____	You need to type in a different name for the global variable. Solution: Use only letters and numbers as names for global variables. See Global Variables in the PicoBlocks Text Language section of this reference guide for more information.

Can't use _____ as name of an input	PicoBlocks doesn't like numbers as the name of an input.
	
	Solution: You need to type in a different name for the input. Avoid using numbers as input. Also, make sure to put a colon before the name of the input.
	
	For example:
	`block mydance :turns`
	`repeat :turns [motoronfor 10 reverse]`
	`end`

Missing [Missing]	There is a missing bracket:] or [. Solution: Make sure there are an equal number of open and closed brackets.

Missing name after **to**
Missing name after **block**
Missing name after **bblock**
	Solution: The words **to**, **block**, and **bblock** need to be followed by a valid name. For example:
	`block mylights`
	`setlightcolor 60`
	`wait 10`
	`lightoff`
	`end`

No output from _____	The word or block indicated does not provide output. Solution: Make sure every block has something attached on its right side when required. See the PicoBlocks Text Language section for more on how to use **output**.
Too many globals	There are too many global variables in the project. The maximum number of variables is 7 (including box1 and box2). Solution: Delete some of the global variables so that the project has no more than 7 total.

waituntil needs a list as input.	**waituntil** needs a list as input.
	
	Solution: Add a list in brackets after waituntil
	
	For example:
	`waituntil [touch?]`
	`chirp`

Error Message	Explanation

make needs a local variable	**Make** needs to be followed by the name for a local variable.
	
	Solution: Check that the word after **make** has a quotation mark before it, and is a local variable.
	
	For example:
	`block fastlight :n`
	`setlightcolor :n`
	`make "n :n / 10`
	`wait :n`
	`lightoff`
	`end`