

**MOONHACK 2020**

# SPACE CLEAN UP

**ENGLISH**

**BROUGHT TO YOU BY CODE CLUB AUSTRALIA  
POWERED BY TELSTRA FOUNDATION**



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## Space Clean Up

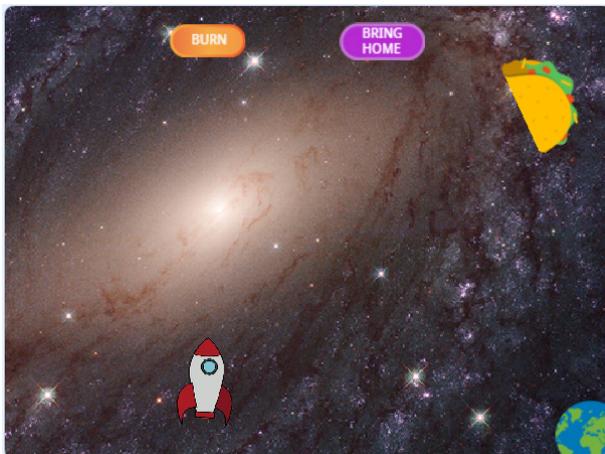


Humans have been sending objects into space for more than 60 years. A lot of rubbish has accumulated in orbit! Let's clean it up!

### INTRODUCTION

#### What you will make

You will make a simulation that uses two typical means of cleaning up rubbish in space.



#### What you will learn

- Add repeat and forever loops to your sprites
- Use conditional selection to respond to user input

Project created in partnership with



#### What you will need

##### HARDWARE

A computer capable of running Scratch 3

(You can use Scratch on an iPad, but some of the experience will be different)

##### SOFTWARE

Scratch 3:  
either online  
[rpf.io/scratchon](https://scratch.mit.edu)  
or offline  
[rpf.io/scratchoff](https://scratch.mit.edu)

##### DOWNLOADS

Offline starter project  
[bit.ly/mhspacecleanup](https://bit.ly/mhspacecleanup)



#### Additional notes for educators

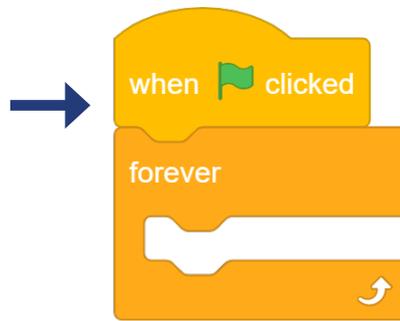
Here is a link to the completed project  
<https://scratch.mit.edu/projects/355416712/>

Check out our blog post for this project with tips, curriculum and supporting material at  
[medium.com/@codeclubau](https://medium.com/@codeclubau)

# 1. MAKE THE ROCKETSHIP FLY

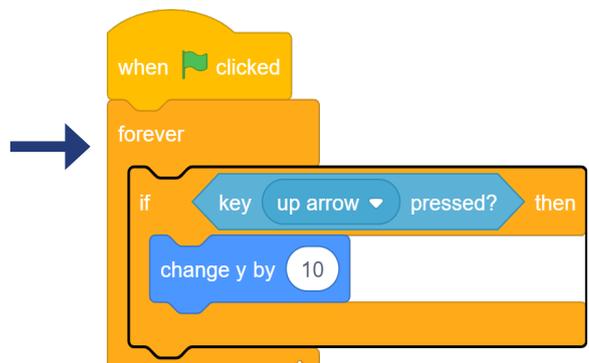
Let's code the Rocketship to respond to the arrow keys, so that we can fly it around space.

- Open the Starter Project - [bit.ly/mhspacecleanup](https://bit.ly/mhspacecleanup)
- Add this code to your Rocketship sprite.
- Add code to our forever loop so that the Rocketship goes forward when we press the up arrow.
- Test your code by clicking the green flag and then the up arrow. Your Rocketship should move upwards.
- Next, we want our Rocketship to be able to move left and right too. Add this code.
- *Hint: Did you know that you can duplicate code by right clicking?*
- Finally, we want our Rocketship to start at the same place every time we start a new game.



when green flag clicked

forever

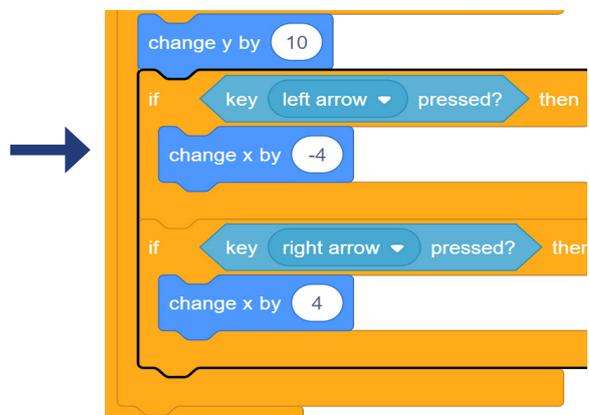


when green flag clicked

forever

if key up arrow pressed? then

change y by 10



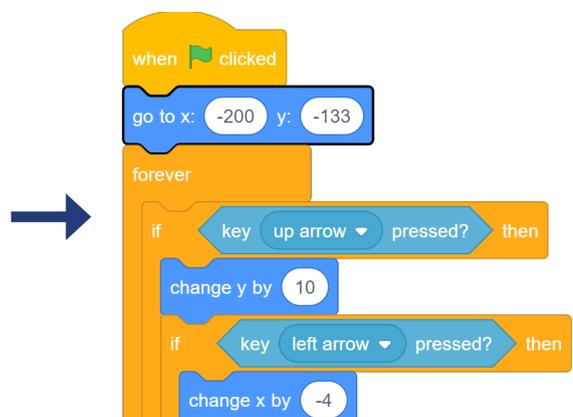
change y by 10

if key left arrow pressed? then

change x by -4

if key right arrow pressed? then

change x by 4



when green flag clicked

go to x: -200 y: -133

forever

if key up arrow pressed? then

change y by 10

if key left arrow pressed? then

change x by -4

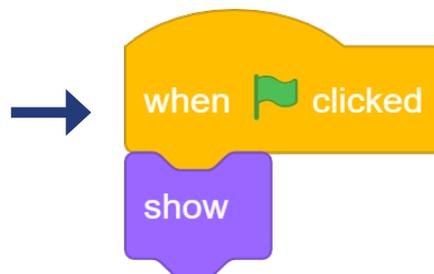
# Challenge: Make the Rocketship fly backwards

Your Rocketship should now be flying forwards, left, and right, when you press the arrow keys. Can you make it go backwards as well?

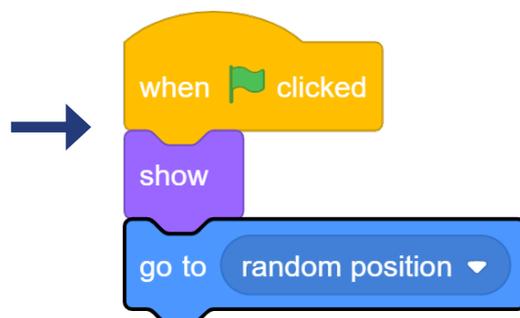
## 2. REACHING THE SPACE ROCKS

Now that our Rocketship can fly, we need to code our Rubbish to respond when it's reached by the Rocketship.

- Before we clear our Rubbish, we first have to find it.
- Add the following code to your Rocks sprite to make it appear.



- The game would be pretty boring if our rubbish was always in the same place, so we'll add a block that will make the Rocks reappear in a different position in each game.





- Now, we don't want our rubbish to do anything until the Rocketship gets to it. It can just sit there, like a big ol' pile o' rocks.



```

when clicked
  show
  go to random position
  wait until touching Rocketship ?
  
```



- When the Rocketship does reach the Rocks, we need to tell our other sprites that this has happened. We can do this using a broadcast block.



```

show
go to random position
wait until touching Rocketship ?
broadcast message 1
  
```



- It's always a good idea to name our messages to make them easier to follow later on. Let's call this one 'Contact'.
- Click the dropdown arrow next to "message 1", click "New message", and type in 'Contact'.

```

wait until touching Rocketship ?
broadcast message 1
  
```

**New message**

✓ message 1

New Message ✕

New message name:

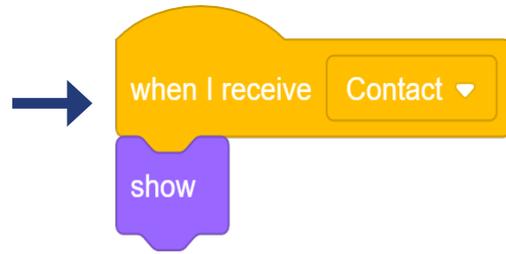
Contact

Cancel
OK

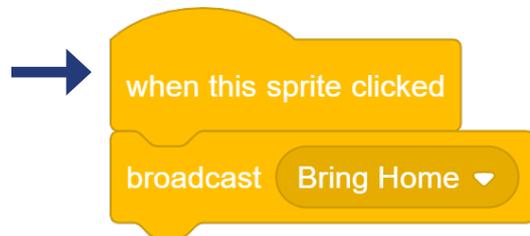
### 3. BRING HOME?

Now that we've reached the Space Rubbish in our Rocketship, we can send it back to the Earth.

- First, we're going to show the user a button with the option to bring home the Space Rubbish.
- Click on the Bring Home Button sprite (you may only see a shortened name). Add code to show the button when the contact message has been received.



- Next, we'll add code that will send another message when the button is pressed. We'll call this message "Bring Home".

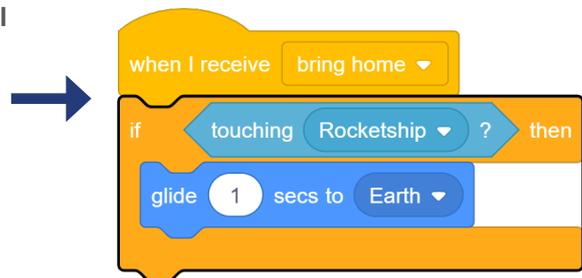


- Let's add code to the Rocks sprite. This code responds to the "Bring Home" message. First, we'll need an event block which will notice the message



- Next, we get to start adding code that will deal with the Space Rubbish.

- First we want to check that the sprite that's receiving the "Bring Home" message is the right one (it's pretty obvious now, because there's only one, the Rocks, but we'll add more later), then we can send it back to Earth.





- Test your code.
- When your Rocks reach the Earth, they just hang around, like a bad smell. Let's hide the rocks sprite when it reaches the Earth.

```

when I receive bring home
  if touching Rocketship then
    glide 1 secs to Earth
    hide
  
```



- Test your code again!
- You may have noticed that the Bring Home Button is now always there.
- Let's add new code to your Bring Home Button to make it disappear at the start of the game, so that it will only appear when needed.

```

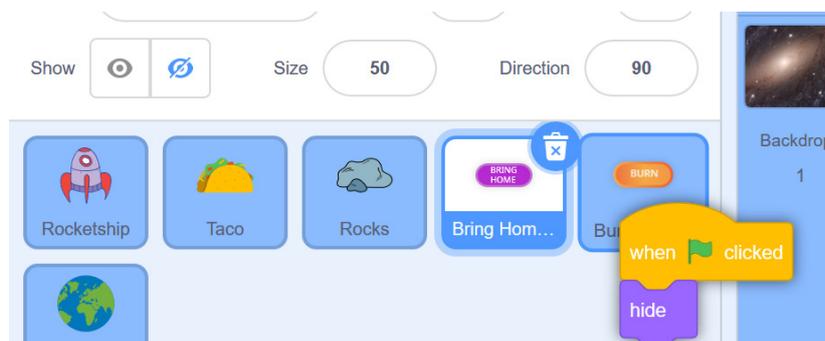
when green flag clicked
  hide
  
```

## 4. BURN BABY BURN!

Now for the part we've all been waiting for. Let's send flaming Space Rubbish to Earth!



- First, let's set up the Burn Button.
- We could re-write all the code, but the code is very similar to the Bring Home Button, so let's just reuse that.
- Click on the Bring Home Button sprite and click and drag each of the three piece of code from that sprite onto the Burn Button sprite. This will copy them across.
- (The Sprite will jiggle when it has copied. The blocks will all copy on top of each other, so you'll have to separate them to see them).





- Go to your Burn Button code. Change the broadcast message to “Burn”. (you’ll need to create a new message)



```

when this sprite clicked
  broadcast Burn
  
```



- To start off with, our code for burning our Rocks will be quite similar to our code for bringing them home. Add the following code to the Rocks sprite:



```

when I receive Burn
  if touching Rocketship ? then
    point towards Earth
    hide
  
```



- Unfortunately, there’s no block for “send back to Earth while burning to a crisp”, so we’ll have to add this code ourselves. We’ll start with a loop block that will repeat until our sprite gets to the earth.



```

point towards Earth
repeat until touching Earth ?
  hide
  
```



- Next, let’s add the code that will send our rocks back to Earth, along with a wait block to slow this loop down (we need to give ourselves time to really savour the flaming goodness).



```

repeat until touching Earth
  move 20 steps
  wait 0.2 seconds
  hide
  
```



- Now, let's make things spectacular!
- Add the code to change the look of the rock as it comes towards Earth to make it look like it's burning.
- Test your code by clicking the green flag, flying to the rocks, and clicking the Burn Button.
- The result should be AMAZING! What happens if you try and play your game again? Is your Rocks sprite tiny, and possibly on



```

next costume
wait 0.2 seconds
change color effect by 10
change size by -1
hide
  
```



- Let's reset our Rocks sprite whenever we click our green flag. Add the following code to the Green Flag code stack that we made back in Step 2.



```

when green flag clicked
switch costume to Rocks
set size to 50 %
show
go to random position
wait until touching Rocketship
broadcast Contact
  
```

# Challenge: Talking Rocketship

Can you make the Rocketship say something when you make contact with the Rubbish?

Hint: you could use these two blocks?

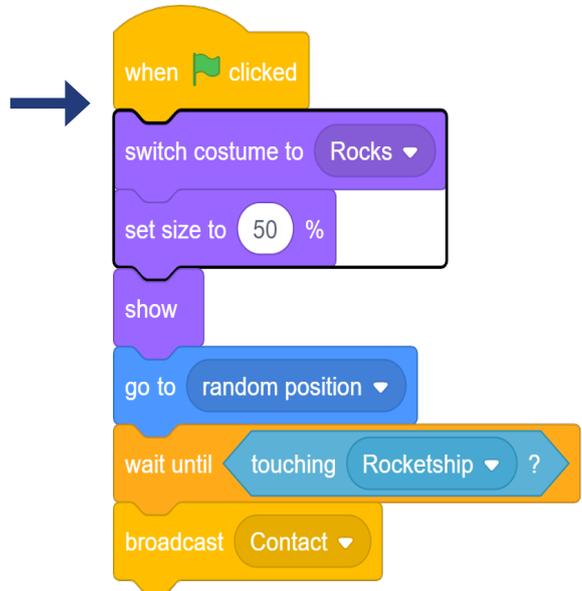
```
say [ ] for 2 seconds
```

```
when I receive contact
```

## 5. FLAMING TACO!

You've probably already noticed the Taco sprite. Let's make a Flaming Taco in one easy step!

- The code for the Flaming Taco is almost exactly the same as the code for the Rocks.
- Click and drag ALL the code from your Rocks sprite to your Taco sprite, to copy it across.
- Now we just need to change our default costume of the Taco sprite to the Taco.
- Test your code by clicking the Green Flag, navigating to the taco, and clicking the Burn button. You should now be able to send a flaming taco back to Earth!



## Challenge: More Rubbish

Now that you've seen how easy it is to make more flaming Space Rubbish, can you add another couple of sprites?

You could make a flaming Basketball, or a flaming Trampoline!

Hint: to make flames, you can select the flames from another object, like the flaming Taco, and copy and paste them across. You'll need at least two costumes (one flaming, one not) to make the flaming effect

## Challenge: Hide your buttons

Can you add code that hides both buttons when one of them is clicked? Remember: the code to make them reappear again when you make contact with another piece of Space Rubbish is already set up.

## Challenge: Make the Rocketship

It's cool to have your Rocketship gently drifting around space, but can you make the rocket engines fire when the up arrow is pressed using this block?



next costume

Congratulations you're a  
Moonhack changemaker!

Don't forget to talk to an adult  
about registering your  
participation at  
[moonhack.com](https://moonhack.com)

