NETLOGO TUTORIAL III

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GOOGLE DOCS

- We will write all of our code in a Google doc

- We can then copy and paste this code into the 'NetLogo Code' section

- Remember to click 'Recompile Code' after you make your changes!

PROCEDURES

- A set of instructions is known as a procedure or a function

- Today we will write all of the procedures for our coral-algae model in a Google Doc

CORAL-ALGAE MODEL: VERSION 1.0

```
to setup-algae
    ask n-of 10 patches [set pcolor green]
end

to grow-algae
    ask patches with [pcolor = green]
        [ ask neighbors [if pcolor = black [set pcolor green] ]
end
```

- Go back to the Command Center in the observer view
- Enter **setup-algae** in the Command Center
- Enter **grow-algae** ….Try entering **grow-algae** several times
-

ALGAE GROWTH

- Go back to the 'NetLogo Code' tab
- Type the following and then press 'Recompile Code'

```
to setup-coral
    ask n-of 10 patches [set pcolor pink]
end
```

- Let's change our code so that algae and coral can only grow on 'free space', which we represent with our black patches

```
to grow-algae
    ask patches with [pcolor = green]
        [ ask neighbors [if pcolor = black [set pcolor green] ]
end
```

- Let's change our code so that algae and coral can only grow on 'free space', which we represent with our black patches

```
to grow-algae
    ask patches with [pcolor = green]
        [ ask neighbors [if pcolor = black [set pcolor green] ]
end


to grow-coral
    ask patches with [pcolor = pink]
        [ ask neighbors [if pcolor = black [set pcolor pink] ]
end
```
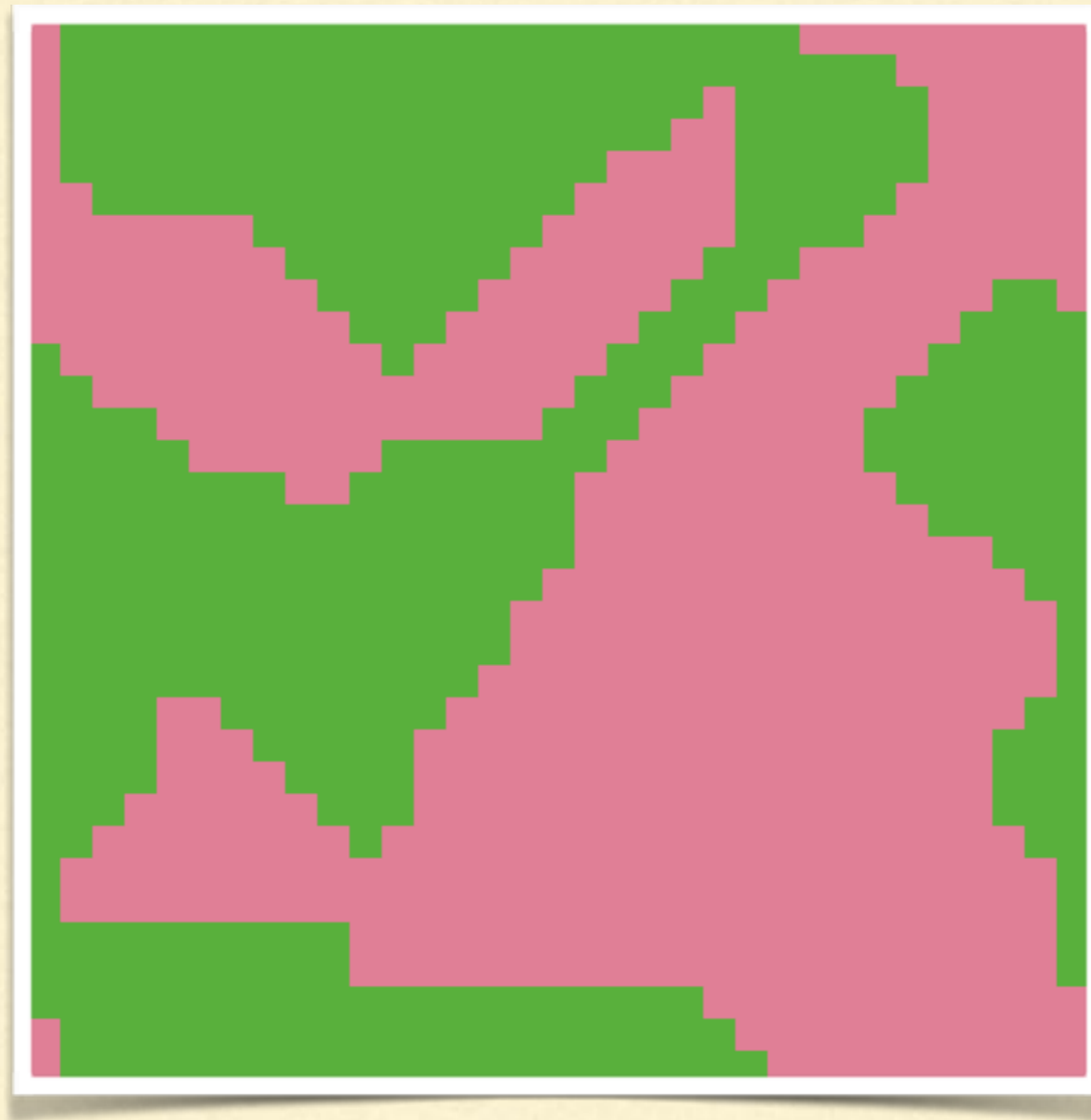
- Here are the **setup** and **go** procedures that call on our other procedures

```
to setup
    clear-all
    setup-algae
    setup-coral
    reset-ticks
end

to go
    if ticks >= 50 [ stop ]
    grow-coral
    grow-algae
end
```
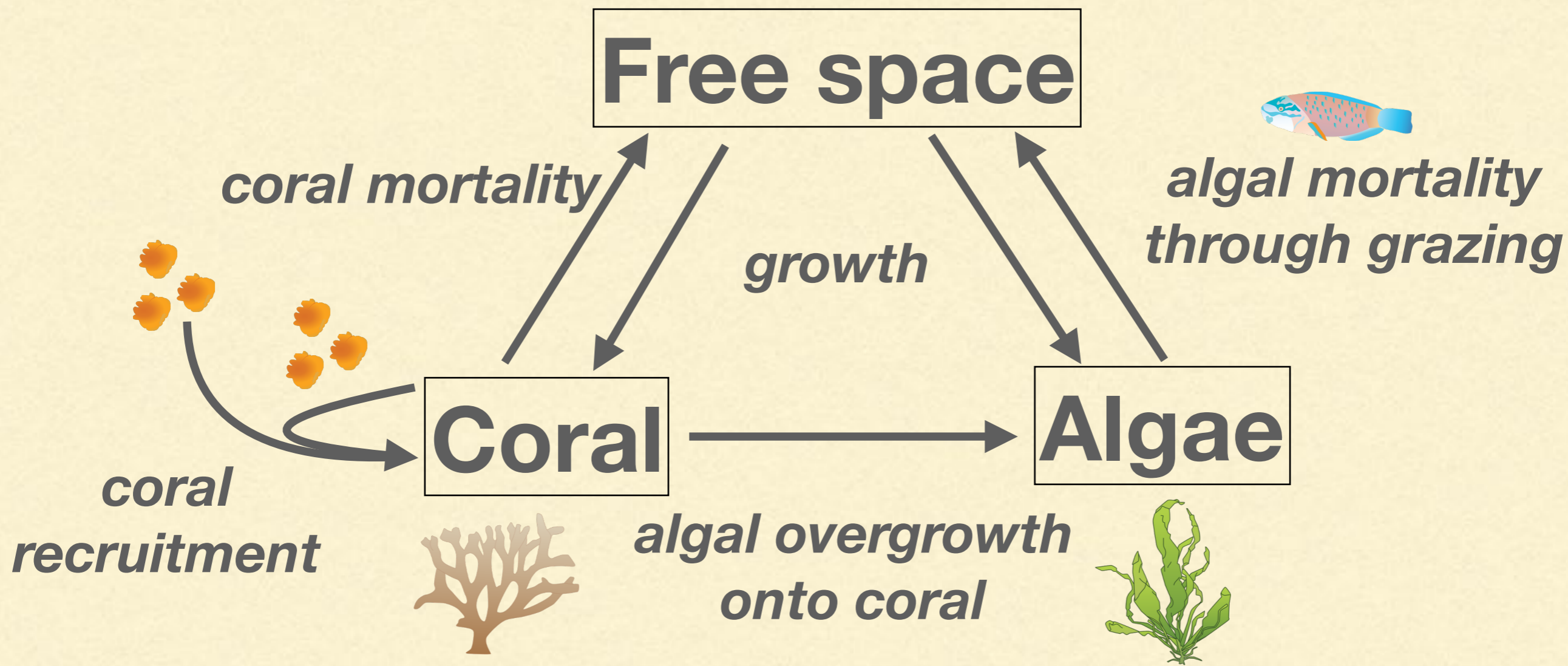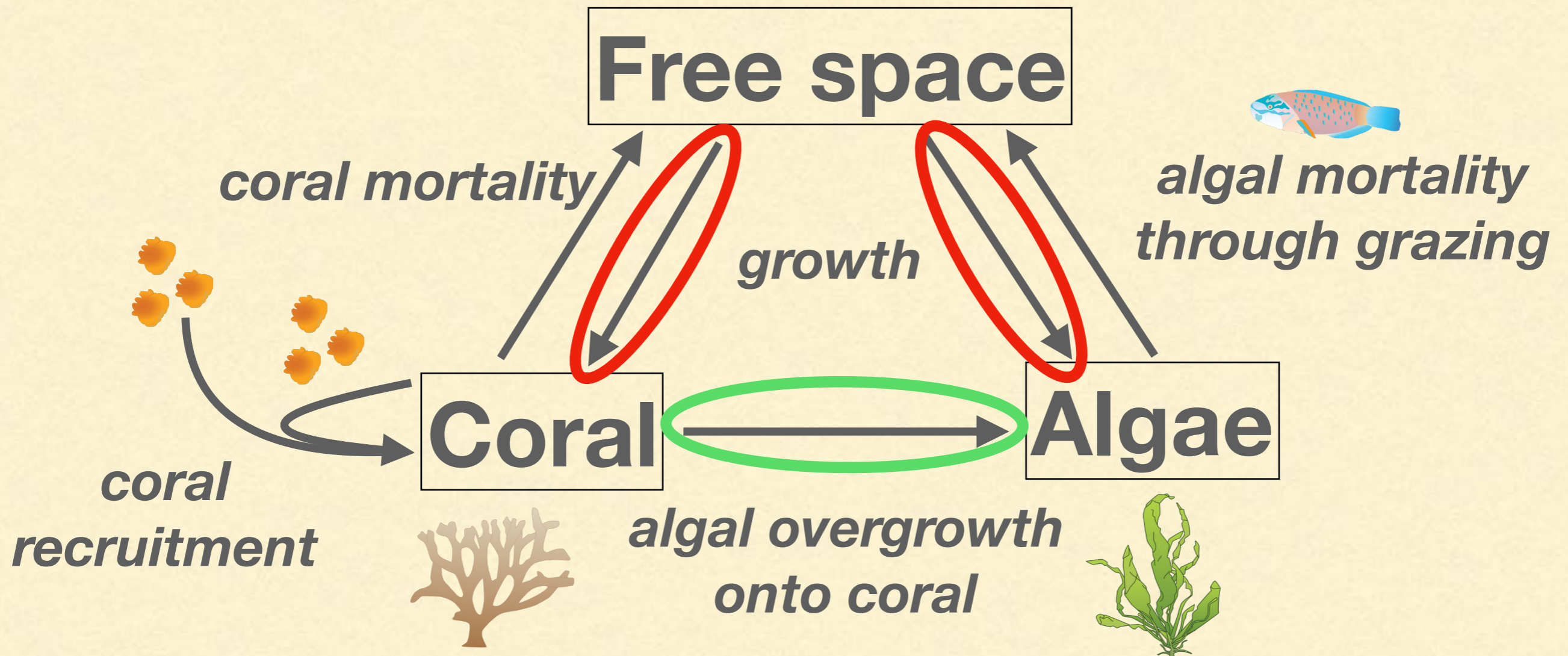
REEF PLOT

SLIDERS

- In our model, we have the following sliders called **time-steps**, **initial-algae** and **initial-coral**

- These are variables in our model

- What do we need to change in the code in order to make these sliders 'live'?

ADDING REALISM

- Algae grow faster than corals

- Algae can also grow over corals, although not as fast as they can over free space

- How can we modify our code to reflect this?

Free space

coral mortality

growth

algal mortality through grazing

coral recruitment

Coral

Algae

algal overgrowth onto coral

- Let's change our code so that at every time step, algae grows on free space with a probability of 40/100

- Note: 'random' is a NetLogo primitive that "rolls the dice" and gives you a value between 0 and the number you set

```
to grow-algae
  if random 100 < 40 [
    ask patches with [pcolor = green] [
      ask neighbors [if pcolor = black [set pcolor green] ]
    ]
  ]
end
```
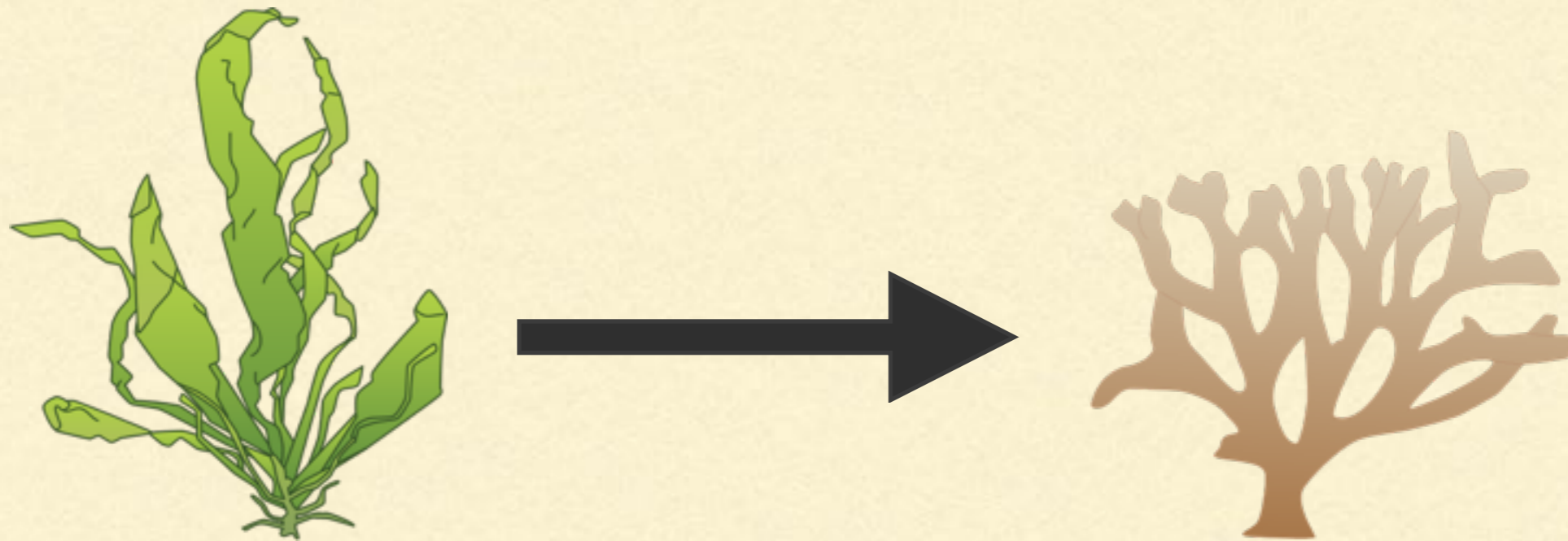
- Let's change our code so that at every time step, algae can grow on coral at a probability of 20/100

```
to grow-algae-coral
  if random-float 100 < 20 [
    ask patches with [pcolor = green] [
      ask neighbors [if pcolor = pink [set pcolor green] ]
    ]
  ]
end
```