

Using the micRO*Bi*OT: concluding the investigation

(Module 3 of What is Engineering?)

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Yesterday

- Step-by-step instructions on putting **plasmid** inside *E. coli* cells
(**transformation**)
- Inoculating media with transformed cells
(Plating)

Plasmid

(genetic program carrier)

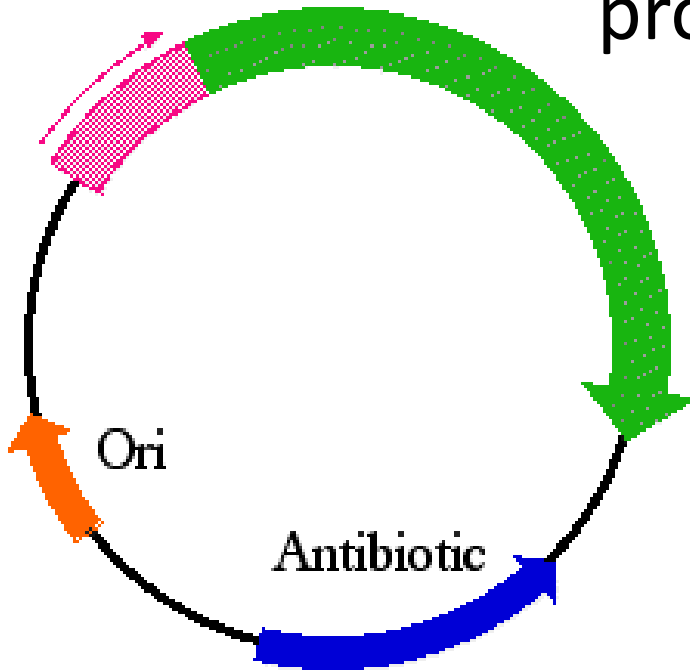
Arabinose-responsive

Promoter

Fluorescent protein



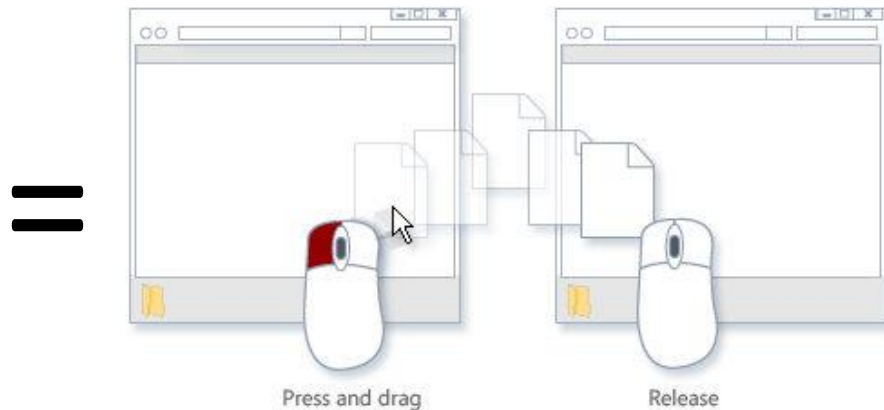
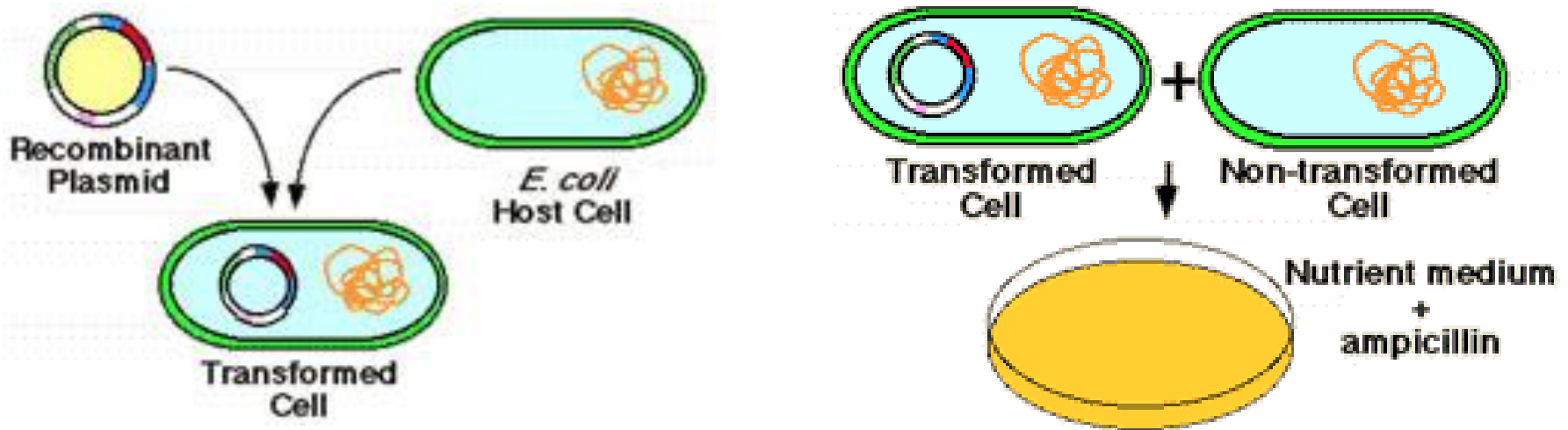
+



```
for i in people.data.users:
    response = client.api.statuses.user_timeline.get(screen_name=i.screen_name)
    print 'Got', len(response.data), 'tweets from', i.screen_name
    if len(response.data) != 0:
        ltdate = response.data[0]['created_at']
        ltdate2 = datetime.strptime(ltdate, '%a %b %d %H:%M:%S')
        today = datetime.now()
        howlong = (today-ltdate2).days
        if howlong < daywindow:
            print i.screen_name, 'has tweeted in the past', daywindow - howlong
            totaltweets += len(response.data)
            for j in response.data:
                if j.entities.urls:
                    for k in j.entities.urls:
                        newurl = k['expanded_url']
                        urlset.add((newurl, j.user.screen_name))
        else:
            print i.screen_name, 'has not tweeted in the past', daywindow - howlong
```

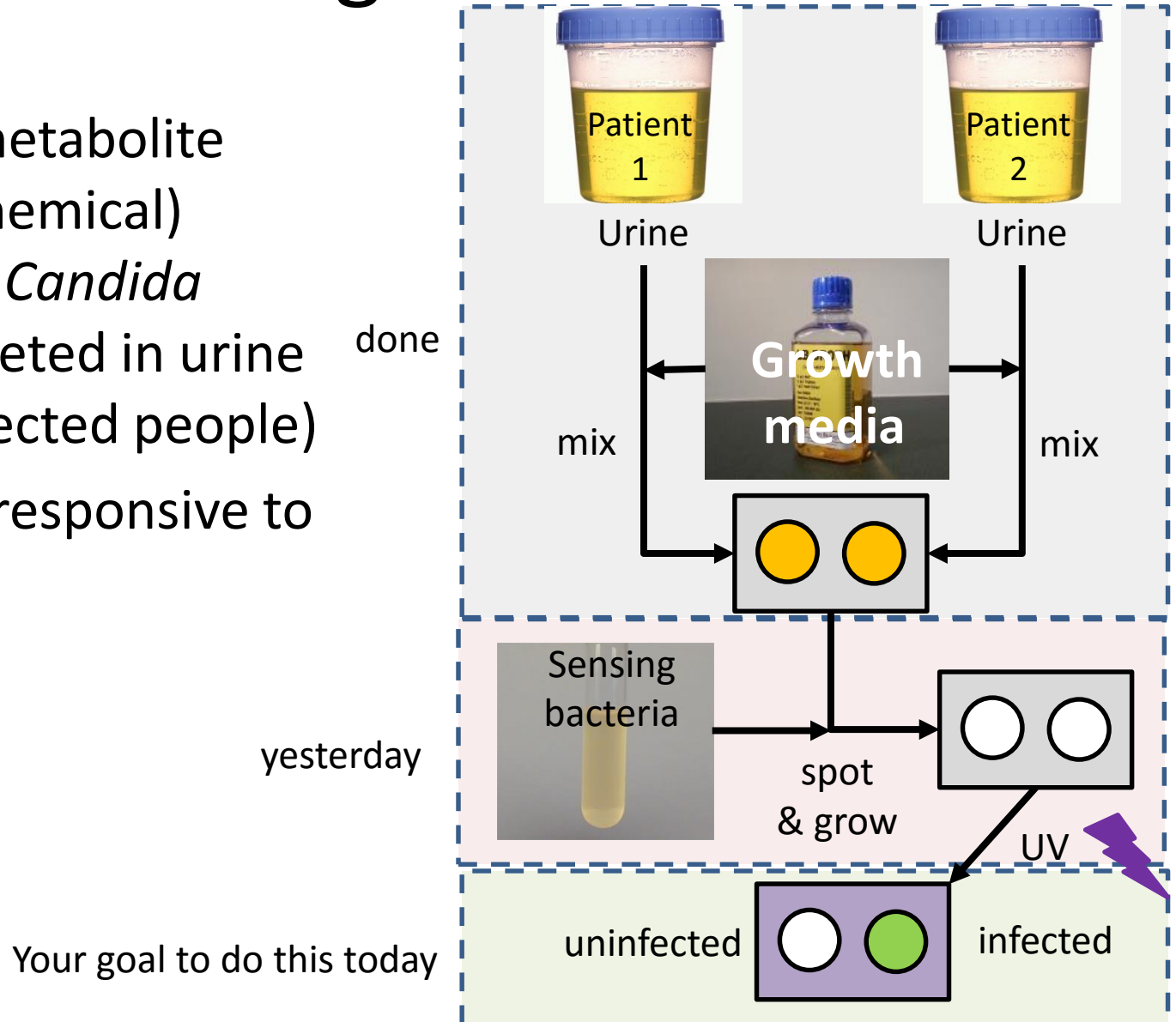
Transformation

(moving programming into cells)



Forensic investigation of infection

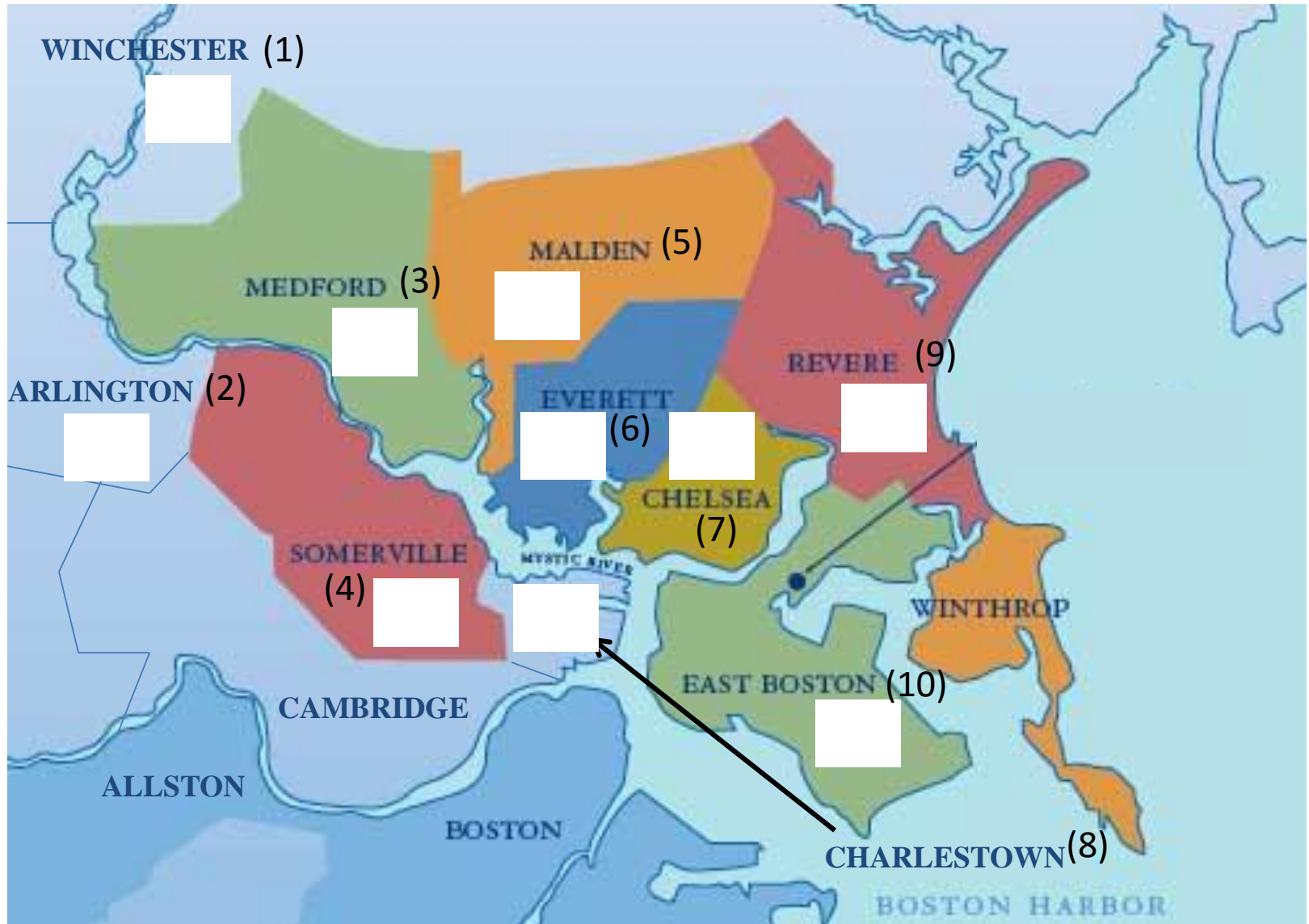
- Arabinose: metabolite (biological chemical) produced by *Candida albicans* excreted in urine (not in uninfected people)
- Biosensor is responsive to arabinose



Where is “patient zero” from?

- Patients with symptoms of Candidiasis test for the diagnosed with the biosensor
- # of cases vary with town
- Seem to be clustered in certain towns around Boston
- Hypothesis: infection travels downriver

Find “ground zero”

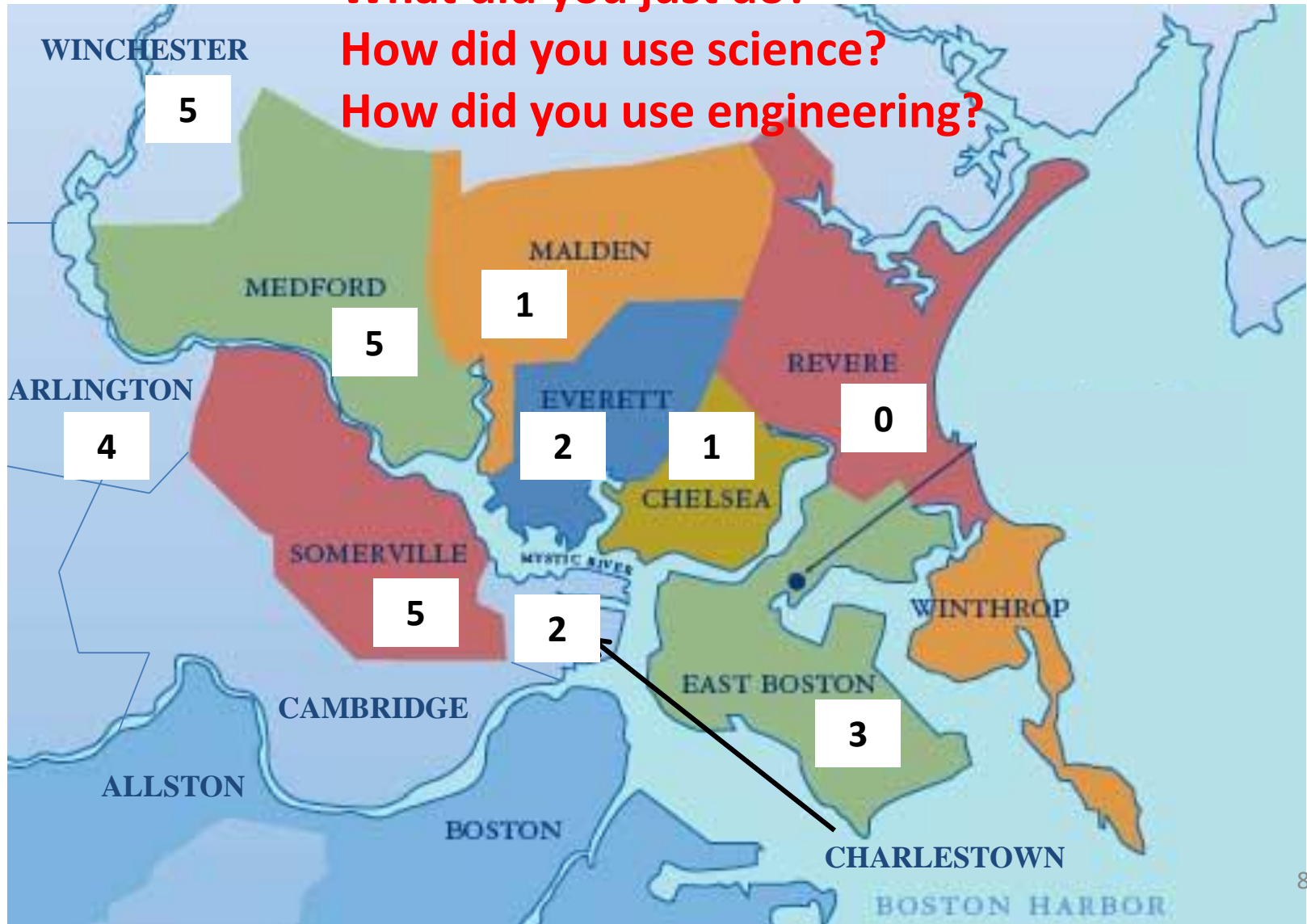


“Ground zero” is Winchester

What did you just do?

How did you use science?

How did you use engineering?



Summary

- Introduction to chemical engineering, synthetic biology
 - How is it different than science?
- Used molecular biology techniques to make sensing micRO*Bi*OT
- Used it to find source of IC infection
 - Combination of engineering and science

Discussion

- Can talk about:
 - Why they went into engineering
 - What made them choose Chemical Engineering and/or Synthetic Biology
 - What their day is like
 - Anything else you'd like to know about their experience

Survey

- Participation in the survey is optional
- The purpose of the survey is to help us understand how effective we were at explaining the concepts of engineering
- The survey should take <10 min
- The survey will not affect your grade in any way
- The survey will remain completely anonymous – please don't write your name or any other identifying information
- If you have any questions or concerns, please contact Ms. Feitor, Mr. Cieri, or Dr. Nair

More questions about engineering?

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