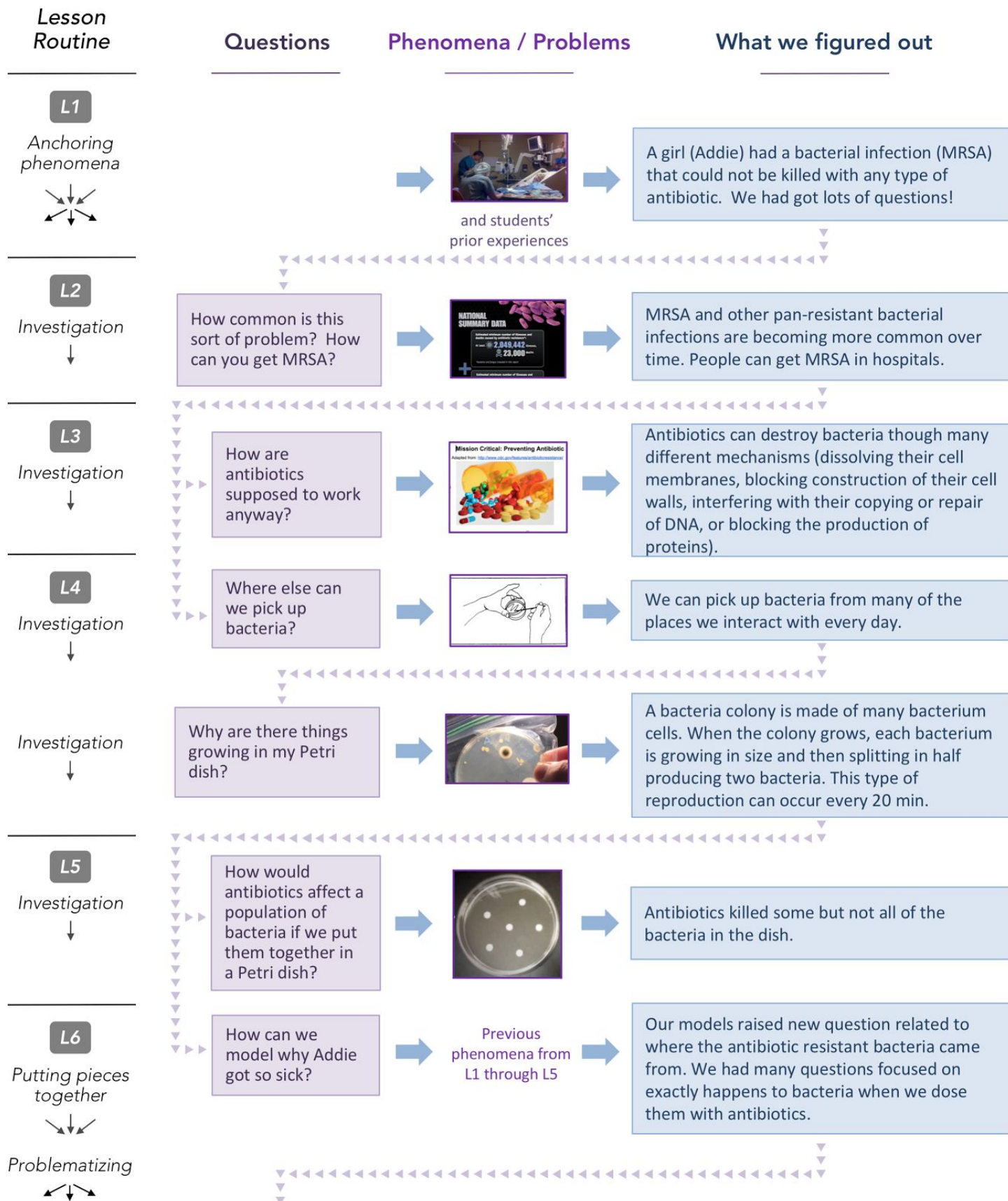




# Why Don't Antibiotics Work Like They Used To?

High School  
LS4 Evolution  
Storyline Skeleton  
[1.0 field trial version -Feb. 2017]





## Questions

## Phenomena / Problems

## What we figured out

L7

## Investigation

## How do different doses of antibiotics affect a bacteria in a simulated infection?



There were heritable variations (different types) in the bacteria population before antibiotics. When antibiotics were added, some variations survived more often than others due to differences in heritable traits. This led to an increase in the relative proportions of bacteria with these variations across multiple generations.

L8

## Putting pieces together

## Problematizing

How does what happened inside of Addie compare to what happened in our simulation?

Previous  
phenomena from  
L1 through L7

The same mechanisms and outcomes in the simulation were also at work in Addie. Although the initial doses of antibiotics seemed to reduce her infection at first, the bacteria population as a whole became more resistant to antibiotics within Addie, as each subsequent dose didn't wipe them all out, and the survivors reproduced. We wondered whether this type of change could happen in populations of other types of organisms.

L9

## Investigation

Could studying some other creatures help us figure out what we think is missing from our explanation of why bacteria have changed over time?

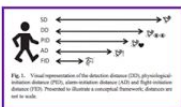


We found another population of organisms that looks like it too may have changed over time. The mountain juncos normally migrate from the mountains to the coast for winter. But 40 years ago, a population of mountain Juncos began to stay on the coast year-round, on the UCSD campus.

L10

## Investigation

What exactly makes some of these UCSD juncos “city birds”?

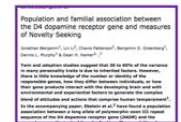


The UCSD Juncos have become bolder than their mountain relatives over a few generations.

L11

## Investigation

Do each generation of juncos just learn to be bolder or is their behavior something they inherited?



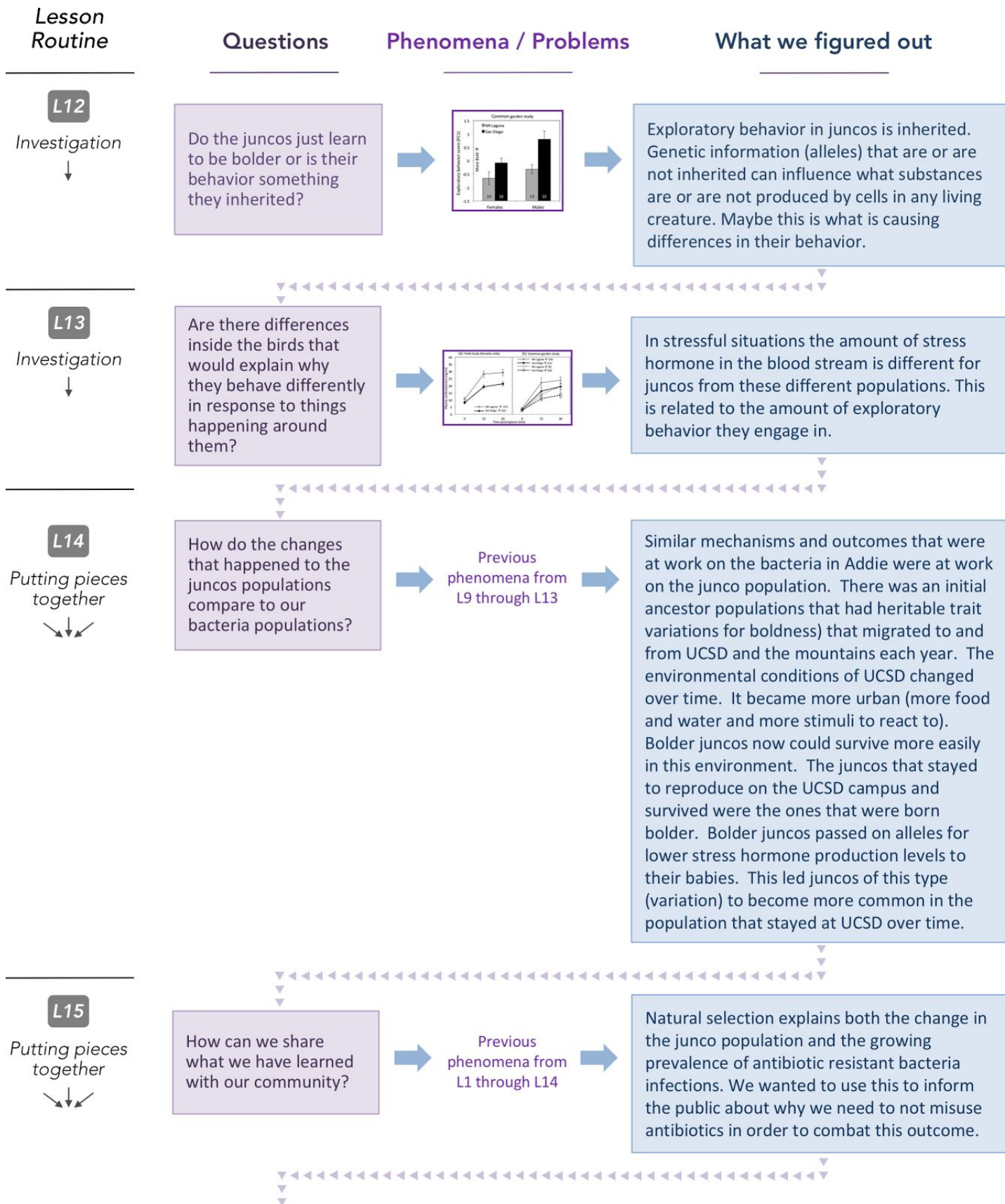
We can test if a behavior is inherited or learned by taking some individuals born into one environment and raising them in a different environment and seeing what traits they have.





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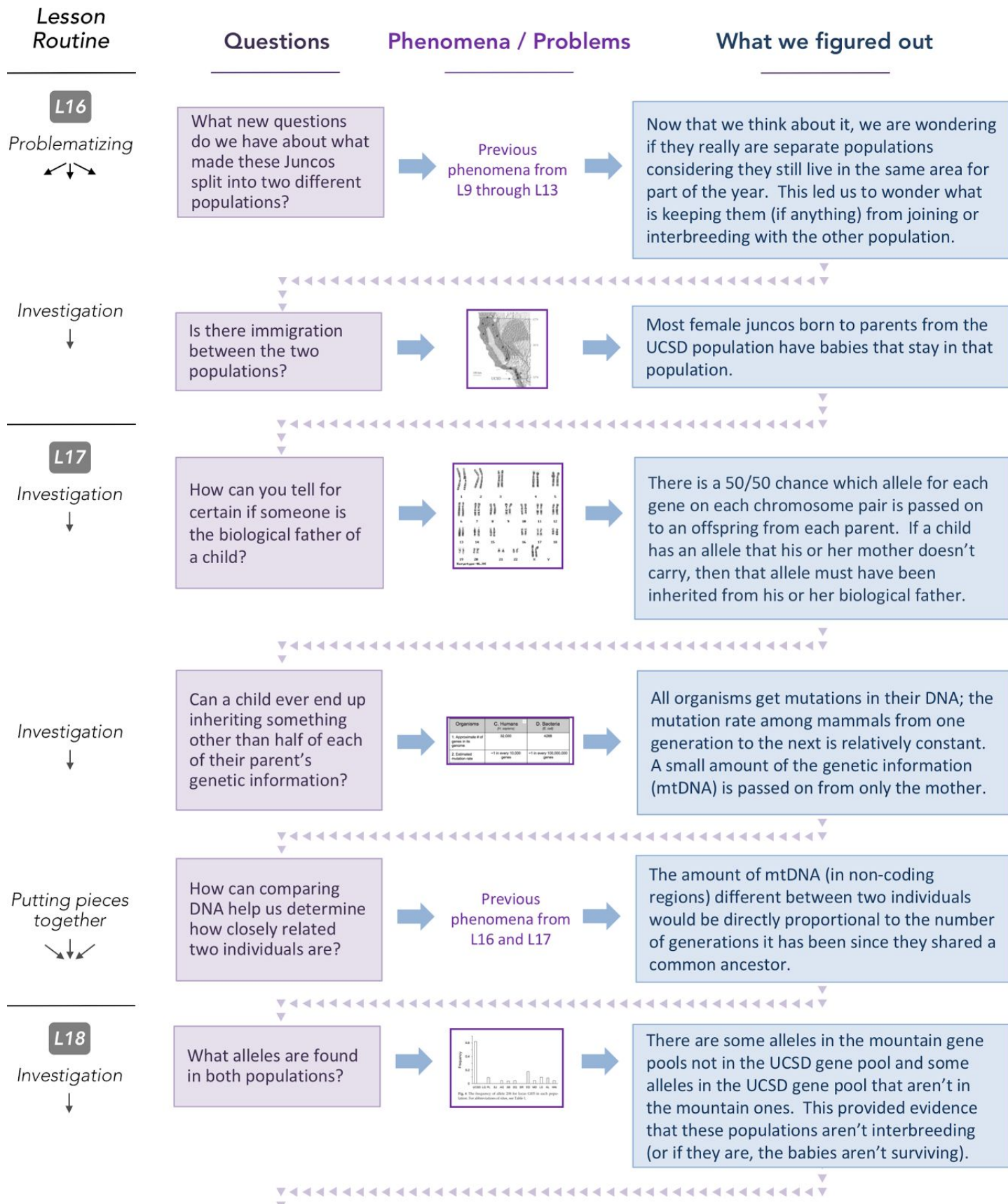
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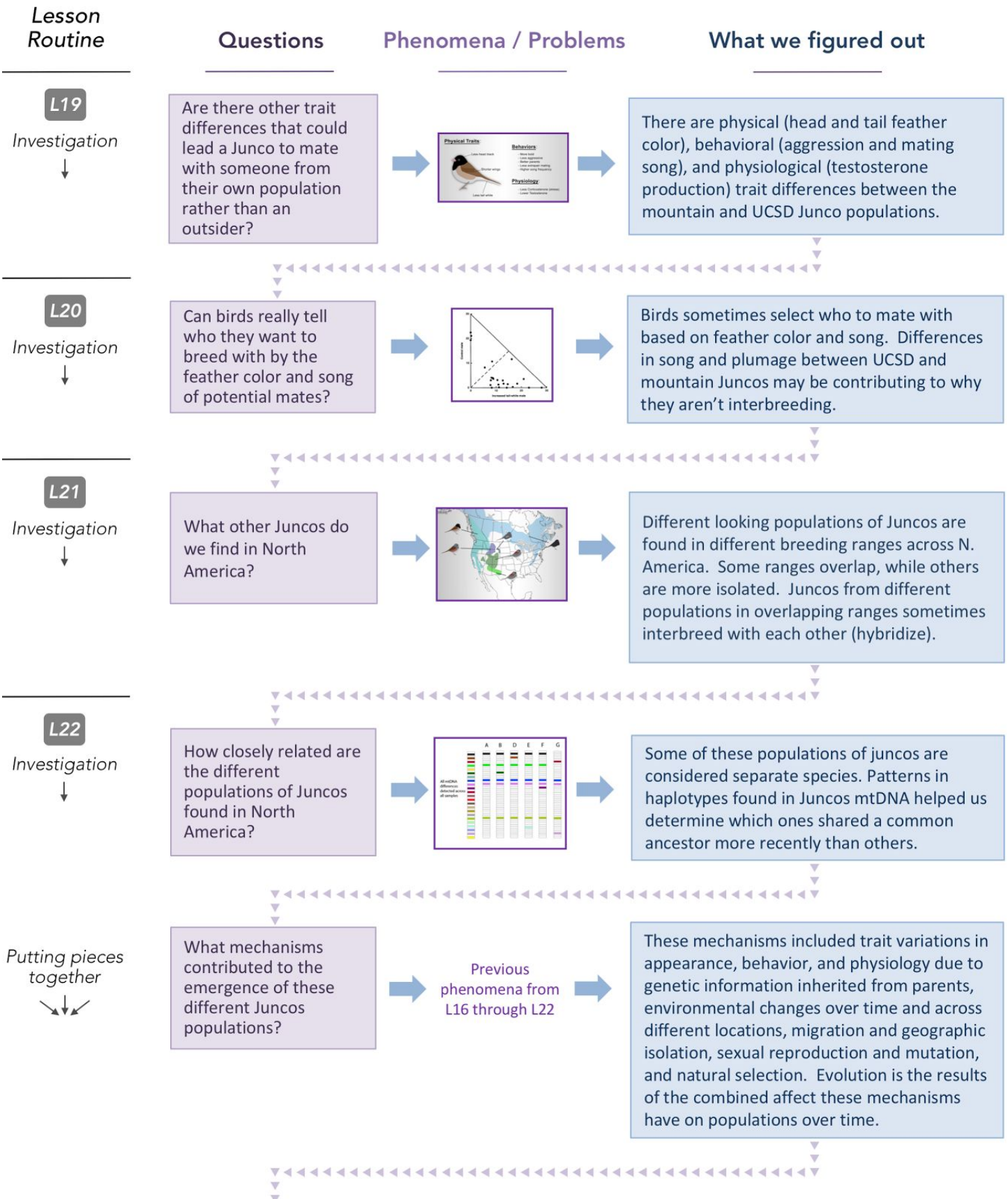






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