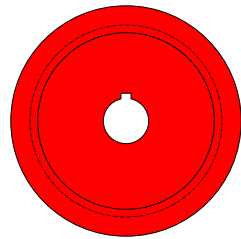# Population is 5 Gears in a Box
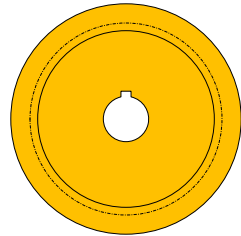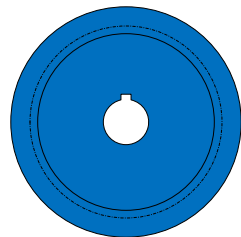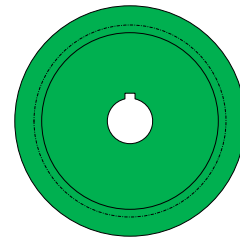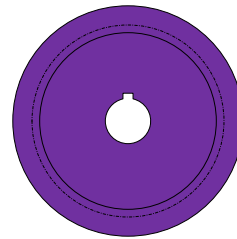
61mm

14mm

104mm

52mm
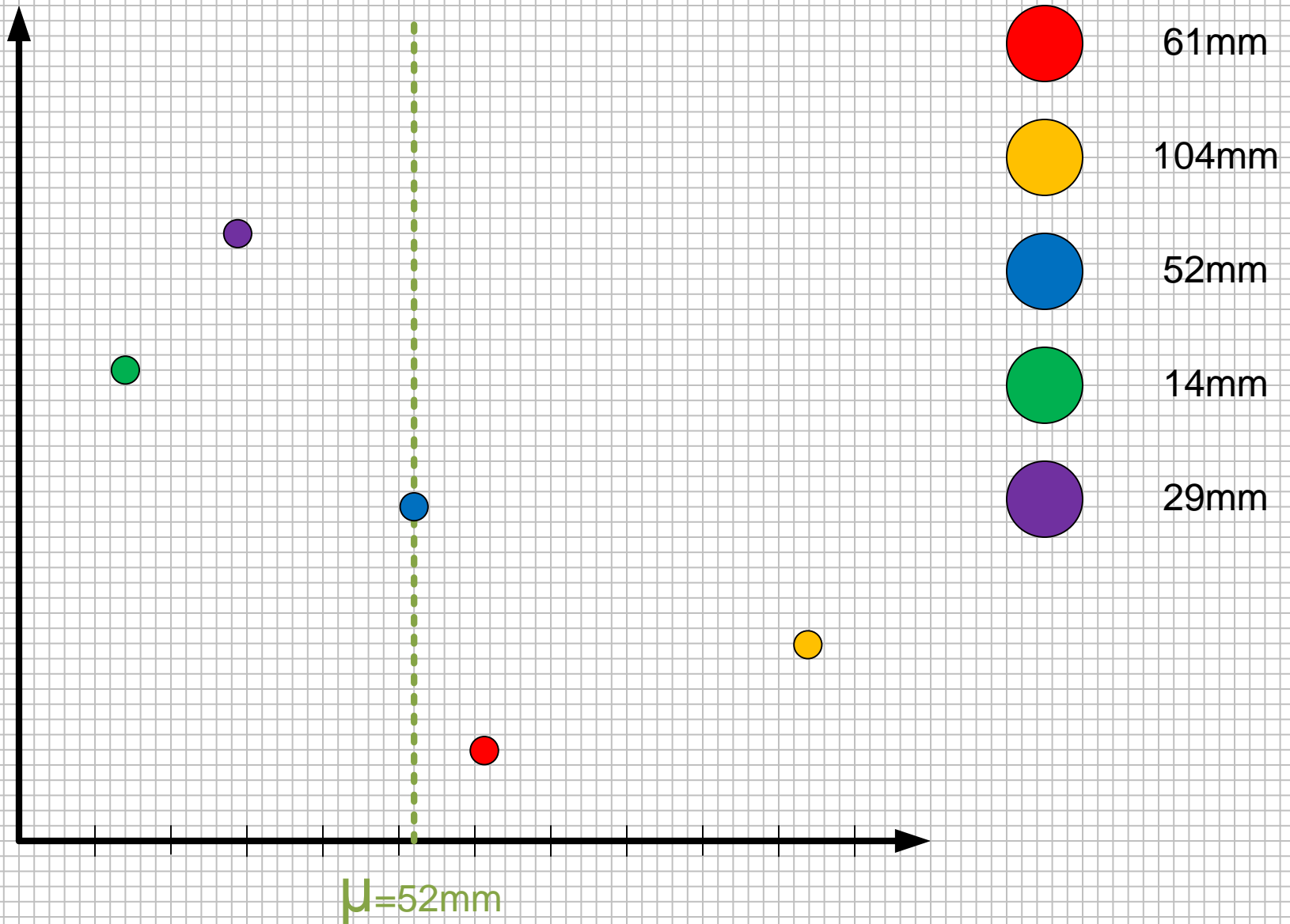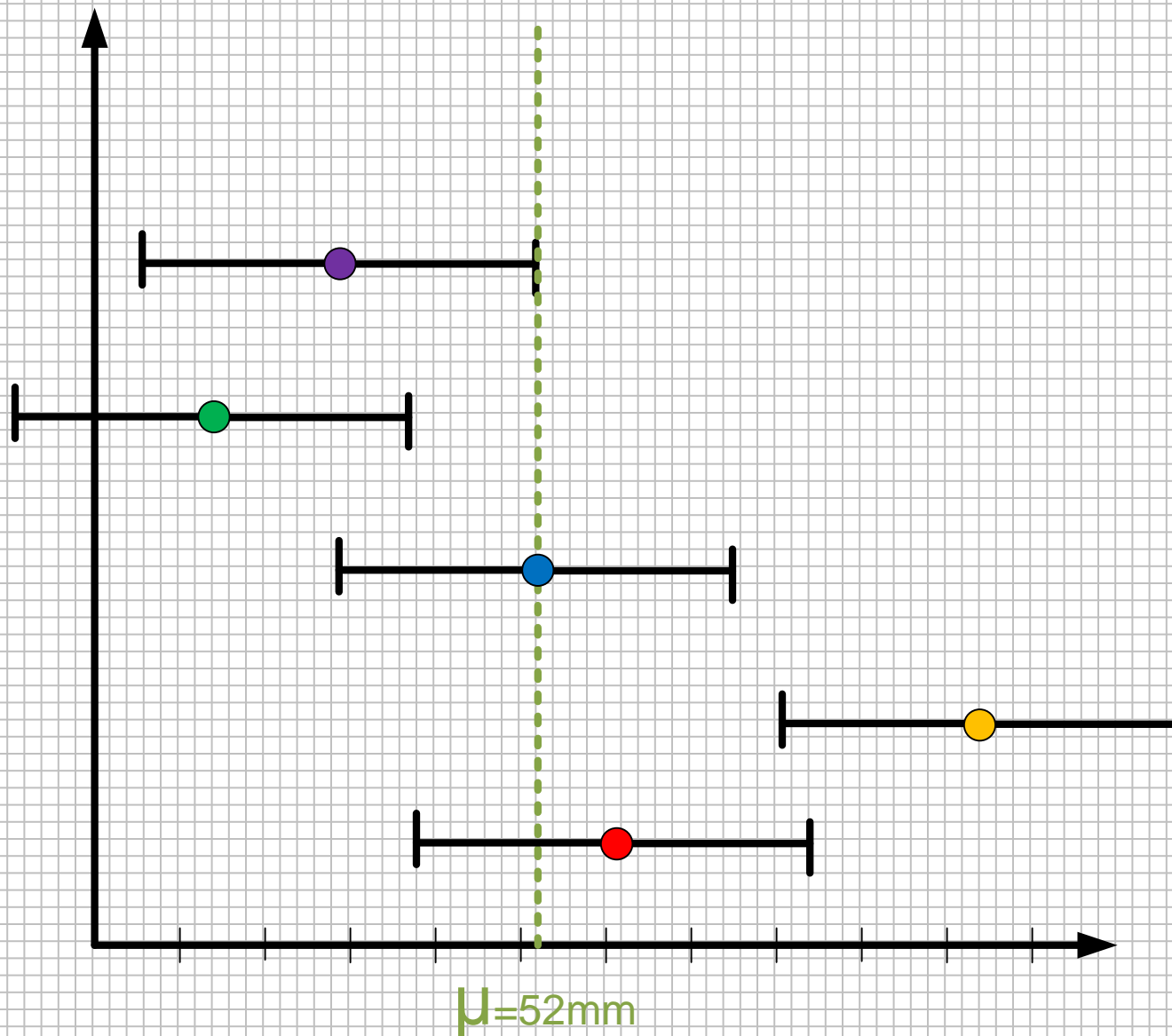
29mm

μ=52mm

There are only 5 ways to sample 1 gear from the population

- 61mm (red)
- 104mm (orange)
- 52mm (blue)
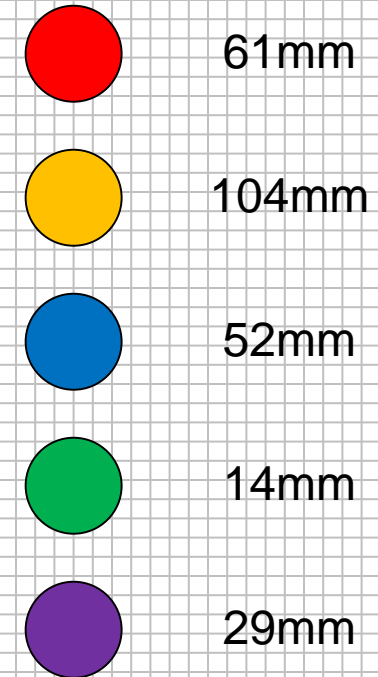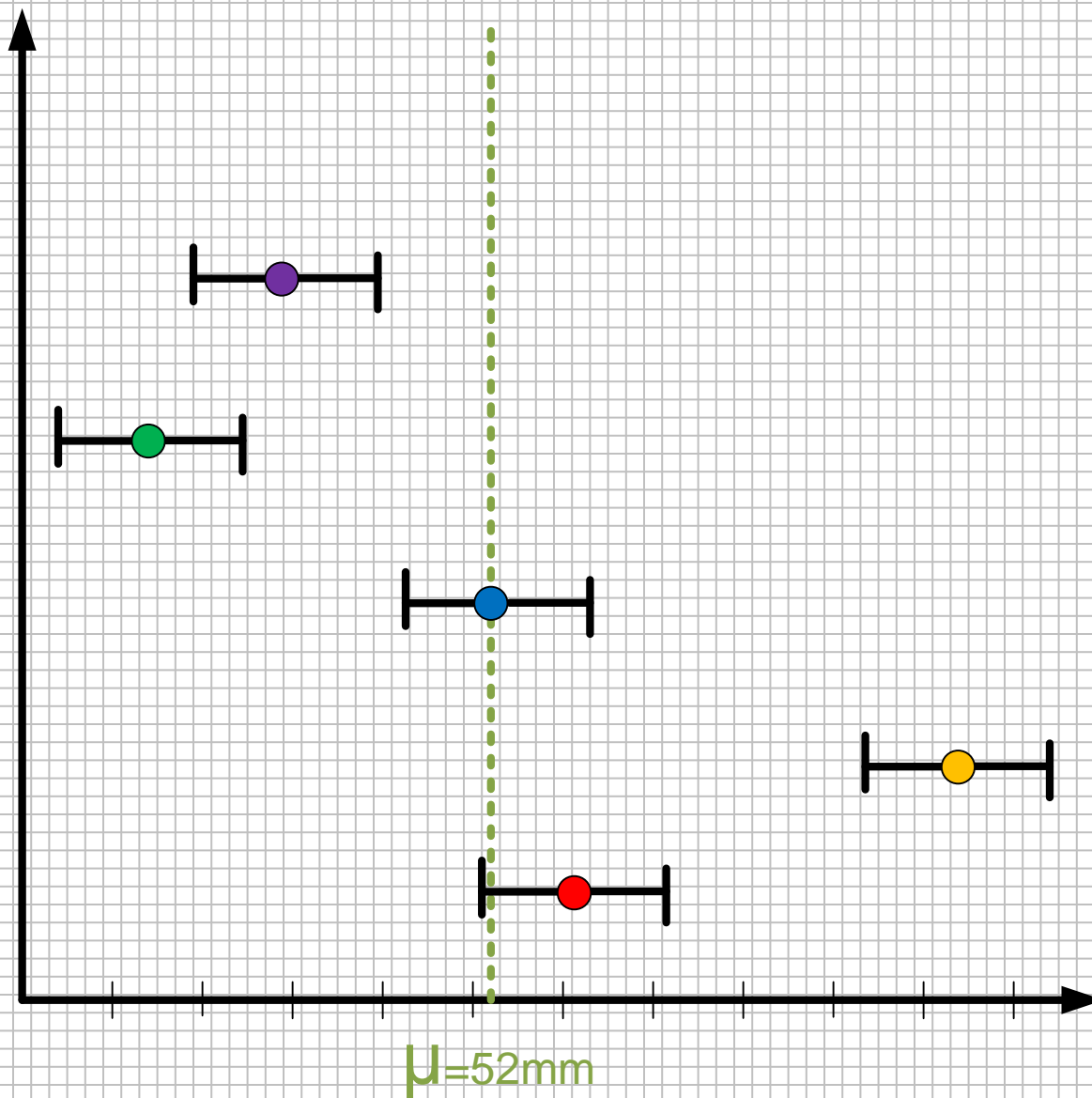- 14mm (green)
- 29mm (purple)

$\mu = 52mm$

There are only 5 ways to sample 1
gear from the population

61mm

104mm

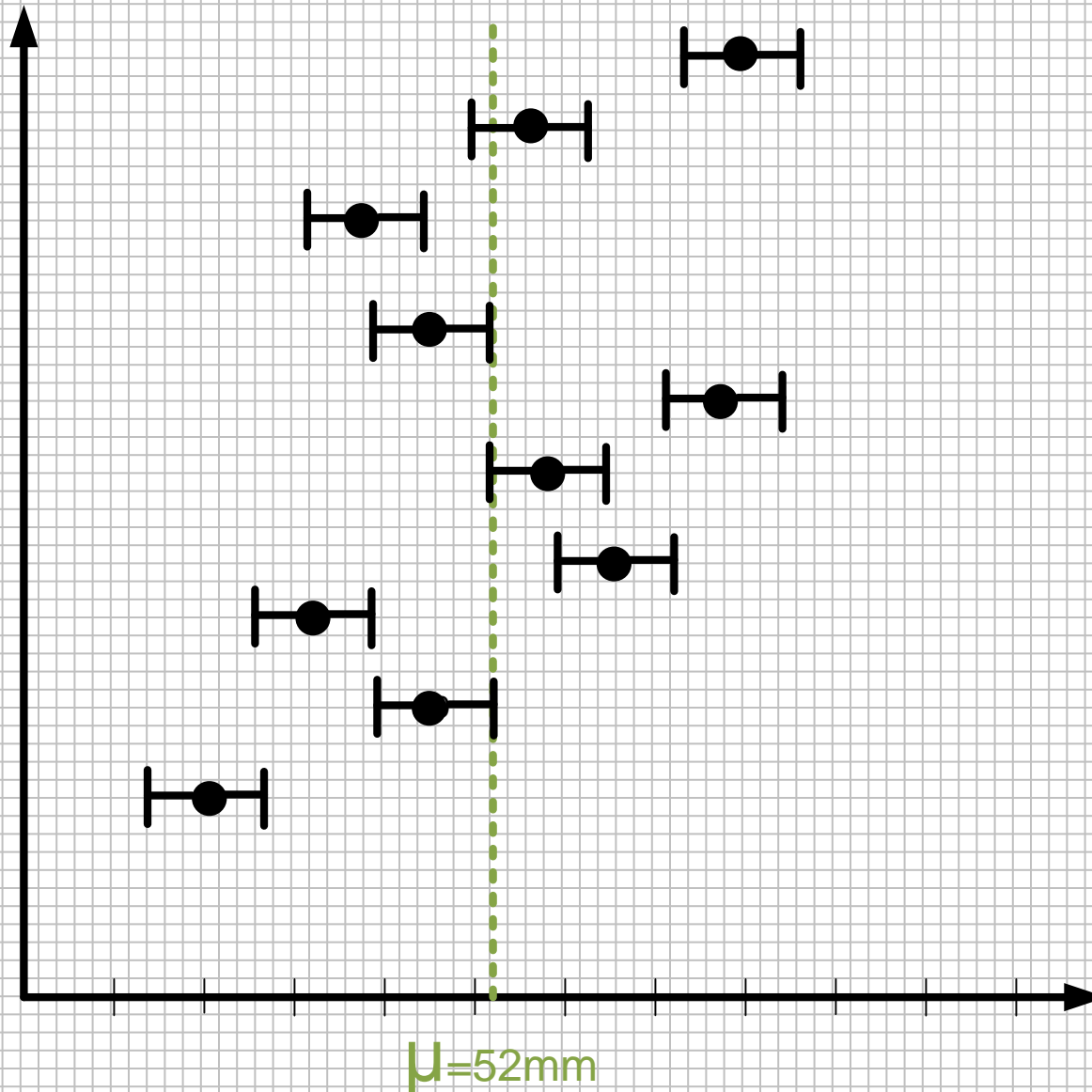52mm

14mm

29mm

μ=52mm

The 60% CI is how wide
you need to make the
"Wings" to ensure 60% of
all the samples possible
at this size will contain μ

There are only 5 ways to sample 1
gear from the population

🔴 61mm

🟡 104mm

🔵 52mm

🟢 14mm

🟣 29mm

μ=52mm

IF you want a lower CI%
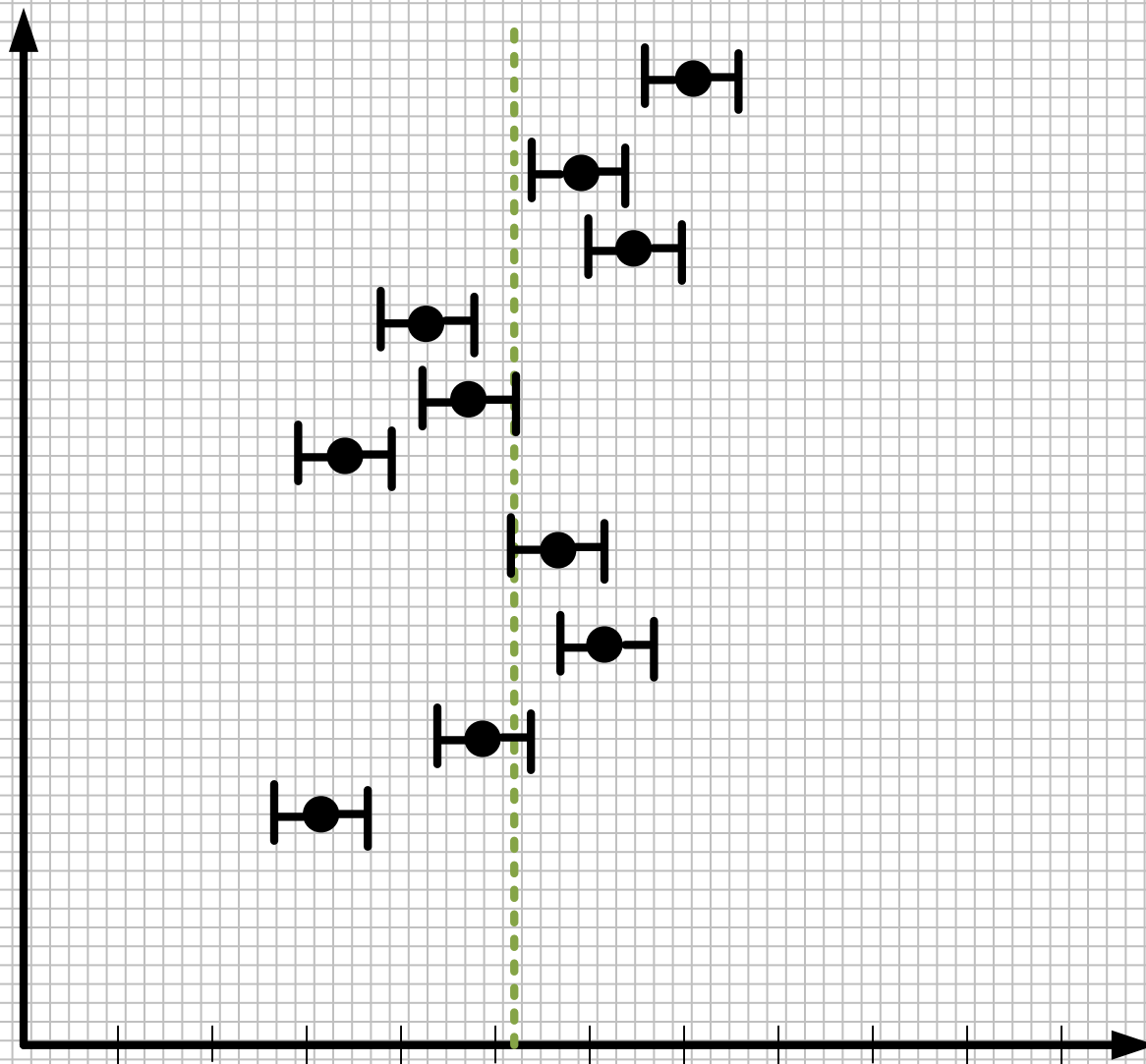[like 40%] the "Wings"
can get smaller. Likewise
a higher CI% requires
wider "wings"

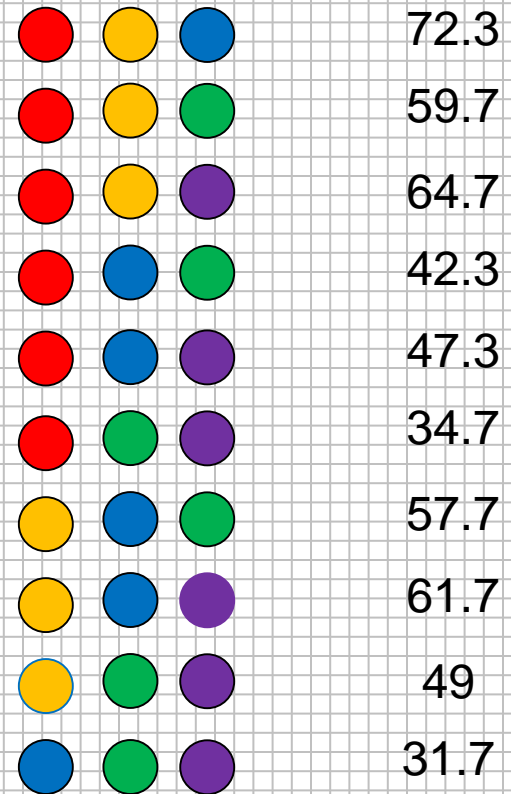There are only 10 ways to sample 2
gears from the population

(61+104)/2=82.5

(61+52)/2=56.5

(61+14)/2=37.5

(61+29)/2=45

(104+52)/2=78

(104+14)/2=59

(104+29)/2=66.5

(52+14)/2=33

(52+29)/2=45.5

(14+29)/2=21.5

μ=52mm

You can also get smaller
"wings" if you increase
the sample size

There are only 10 ways to sample 3 gears from the population

red	yellow	blue	72.3
red	yellow	green	59.7
red	yellow	purple	64.7
red	blue	green	42.3
red	blue	purple	47.3
red	green	purple	34.7
yellow	blue	green	57.7
yellow	blue	purple	61.7
yellow	green	purple	49
blue	green	purple	31.7

μ=52mm

You can also get smaller "wings" if you increase the sample size

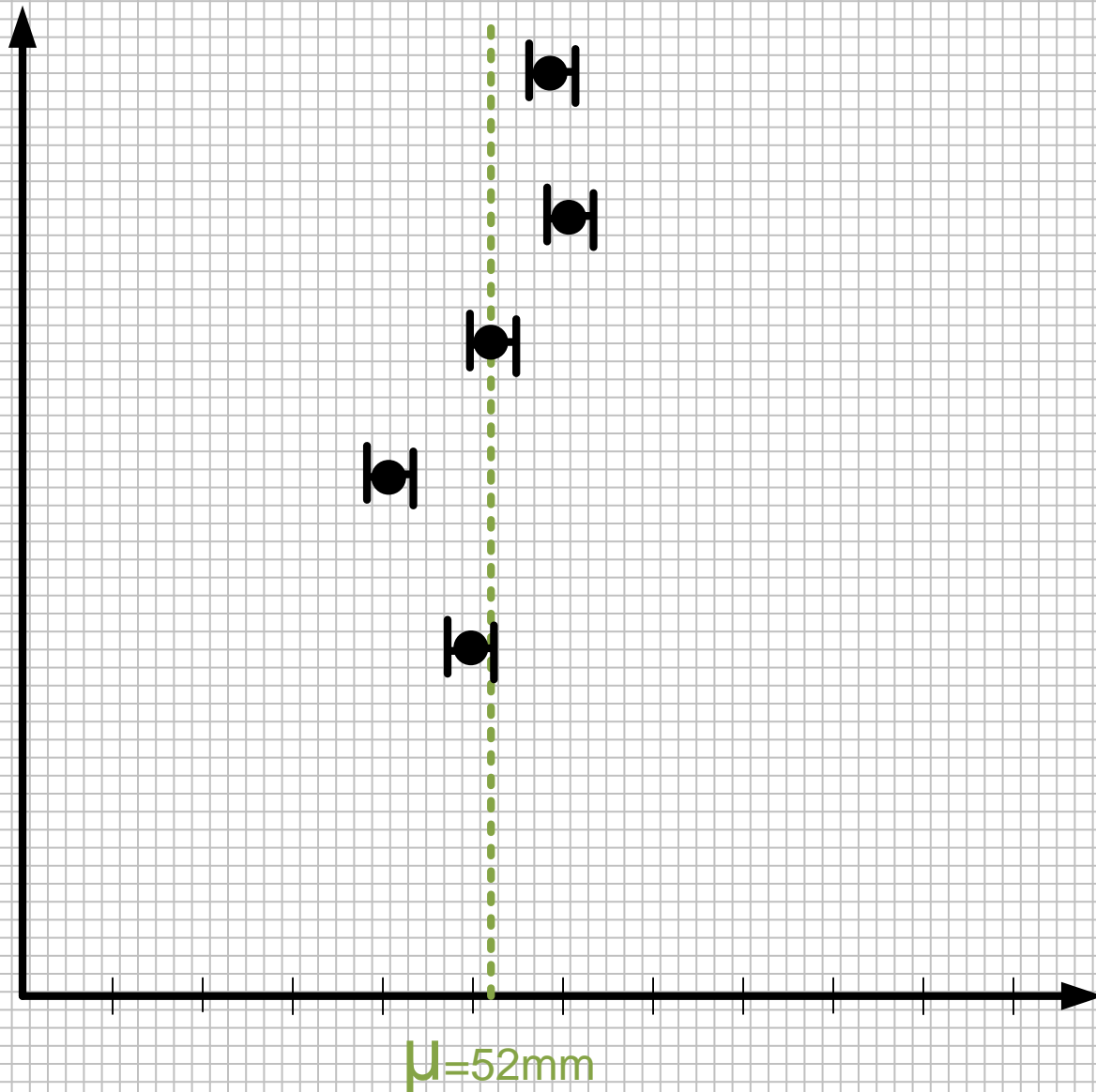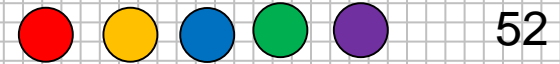There are only 5 ways to sample 4
gears from the population

μ=52mm

57.8

61.5

52

39

49.8

You can also get smaller
"wings" if you increase
the sample size

There is only 1 way to sample 5 gears
from the population

🔴 🟡 🔵 🟢 🟣 52

Until you sample the
whole population and you
have no wings. You are
100% confident that the
population mean is the
sample mean at this point

μ=52mm