

Measurement

The Act of Measuring

&

The Metric System

Dimensions, quantity, or capacity as
ascertained by comparison with a
standard

Length
Meter

Time
Seconds

Mass
Gram

What can we Measure?

Temperature
°C (Celsius)

Force
Newton

Volume
Liter

The Metric System

Prefixes

Kilo___ = 1000 times

Centi___ = 1/100

Mili___ = 1/1000

Suffixes

___meter (**length**)

___liter (**volume**)

___gram (**mass**)

Based on multiples of 10!

Scale: system of ordered marks at fixed intervals used as a reference standard in measurement

Intervals of 1

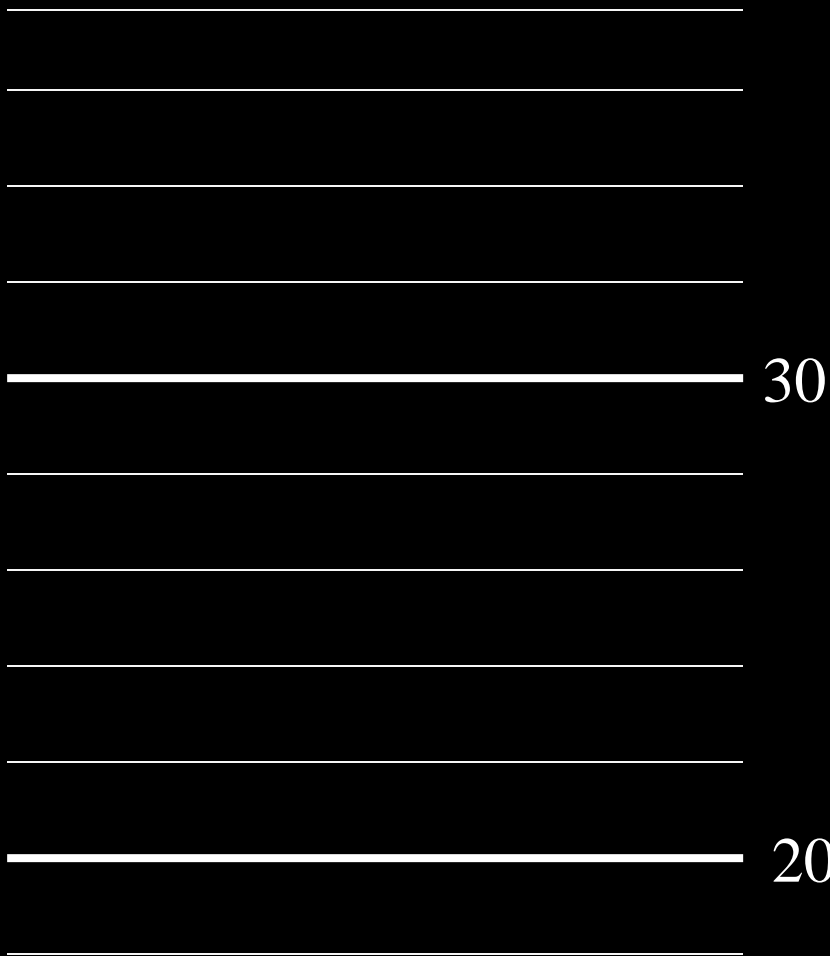
0
10

What is the interval of this scale?

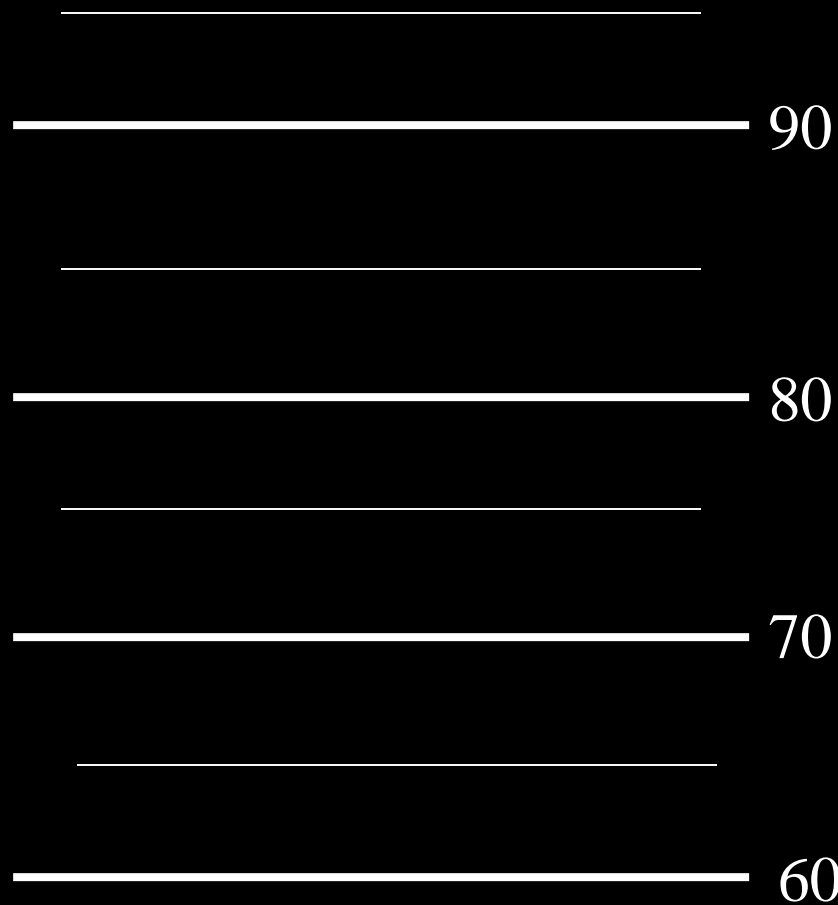
Interval
is.....

2

units



And on this scale?



Interval
is.....

5

units

MASS (g)

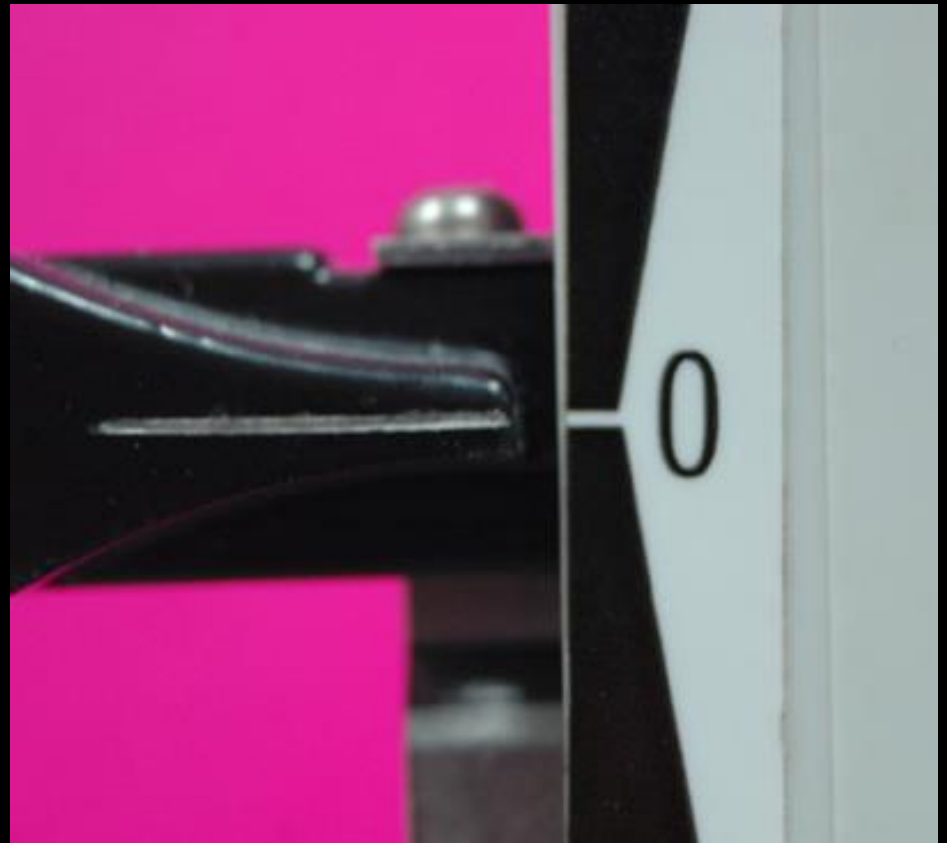
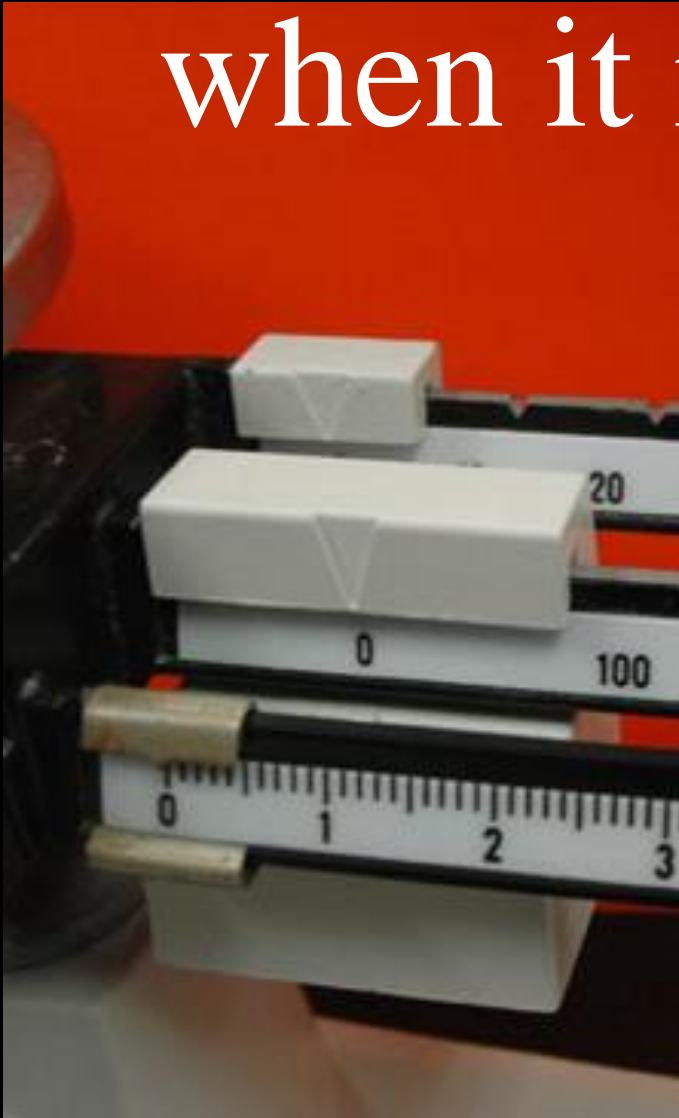
How much matter does it
contain?

Measured with a Triple Beam Balance
Milligrams, Grams, & Kilograms

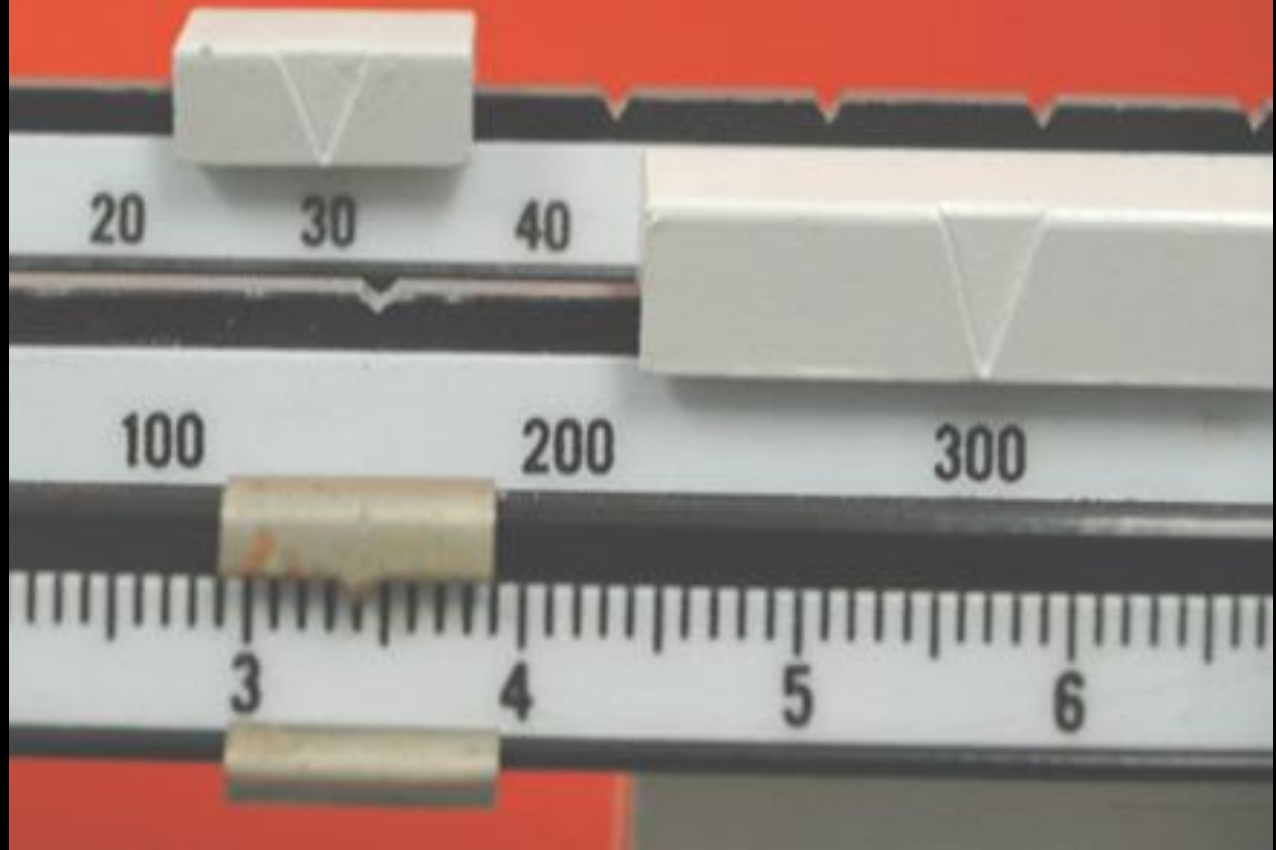
Tips on using the Triple Beam Balance

- Move the 100s first, then 10s, then 1s.
- Make sure the 100s and 10s slider is in a groove.
- Use the tip of a pen or pencil to move the small 1s slider.
- Last make sure the lines are even!

A balance is ready to use
when it is zeroed out!



What's the Mass?



$$\begin{array}{r} 300 \\ + 30 \\ + 3.4 \\ \hline \text{?????} \end{array}$$

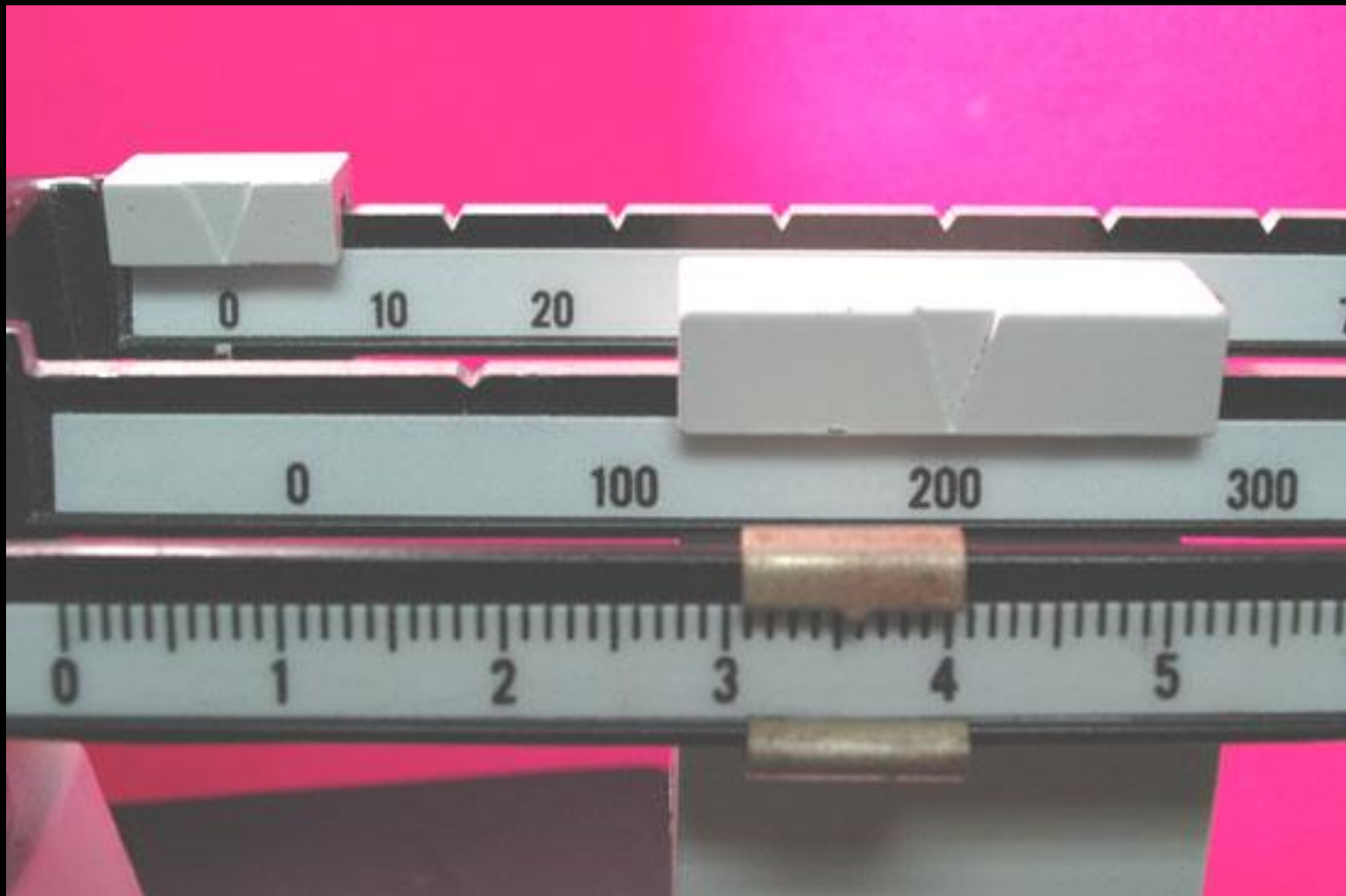
Final Answer: 333.4g

What's the Mass?

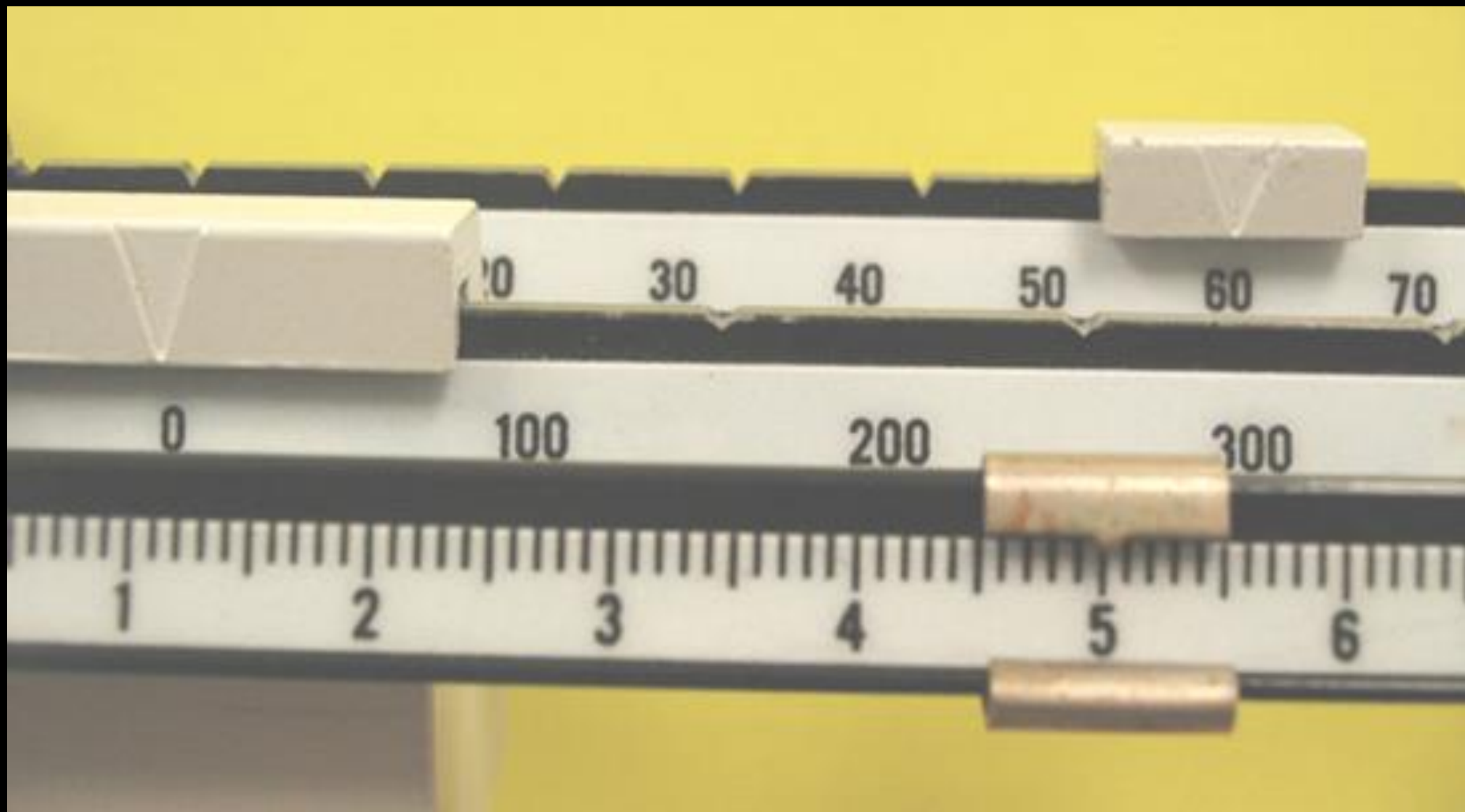


$$\begin{array}{r} 400 \\ 50 \\ + 7.6 \\ \hline \text{?????} \end{array}$$

Final Answer: 457.6g



203.6 g



65.0 g

Force (N)

How much effort does it
take?

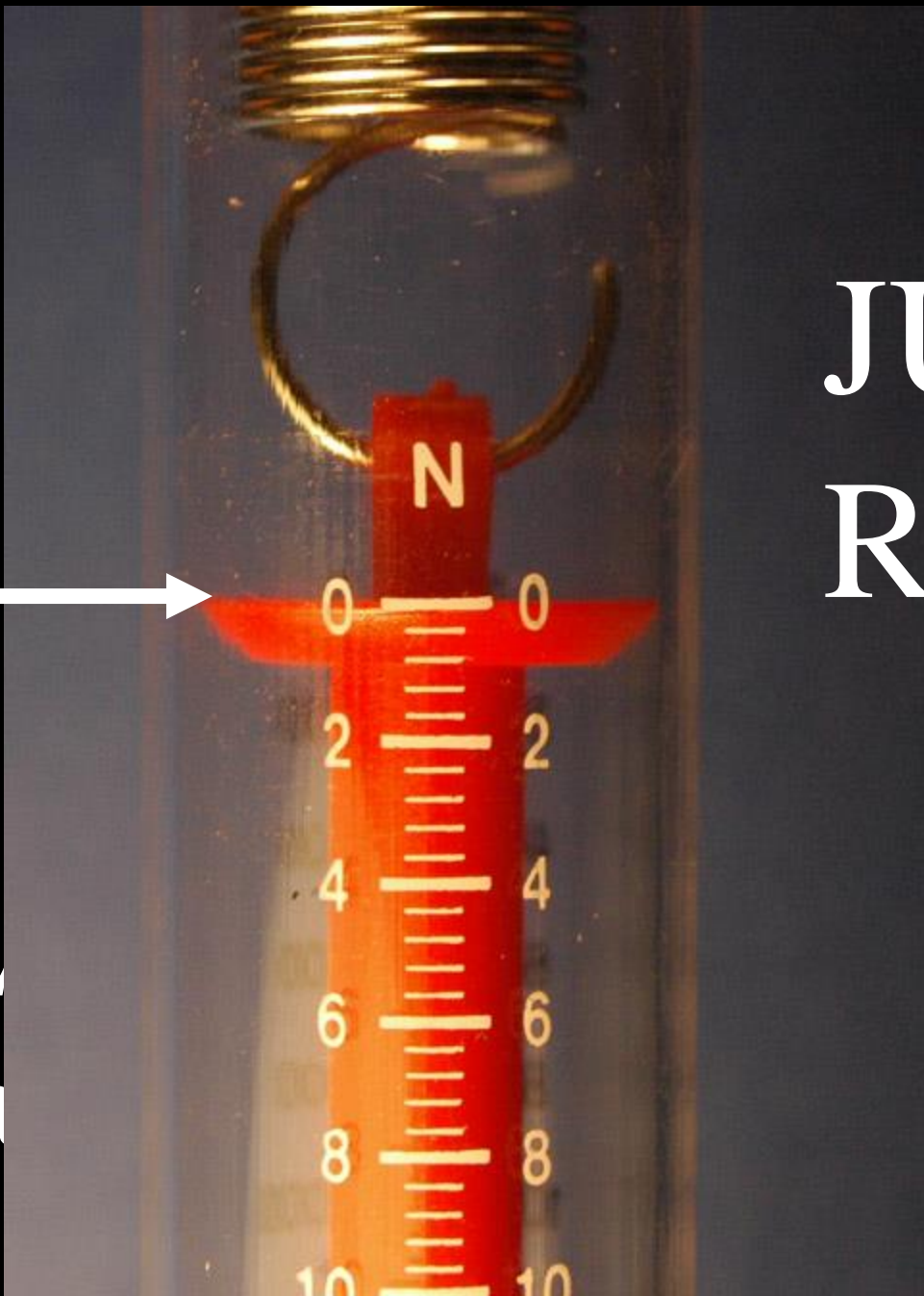
Measured with a spring scale

Measured in Newton's

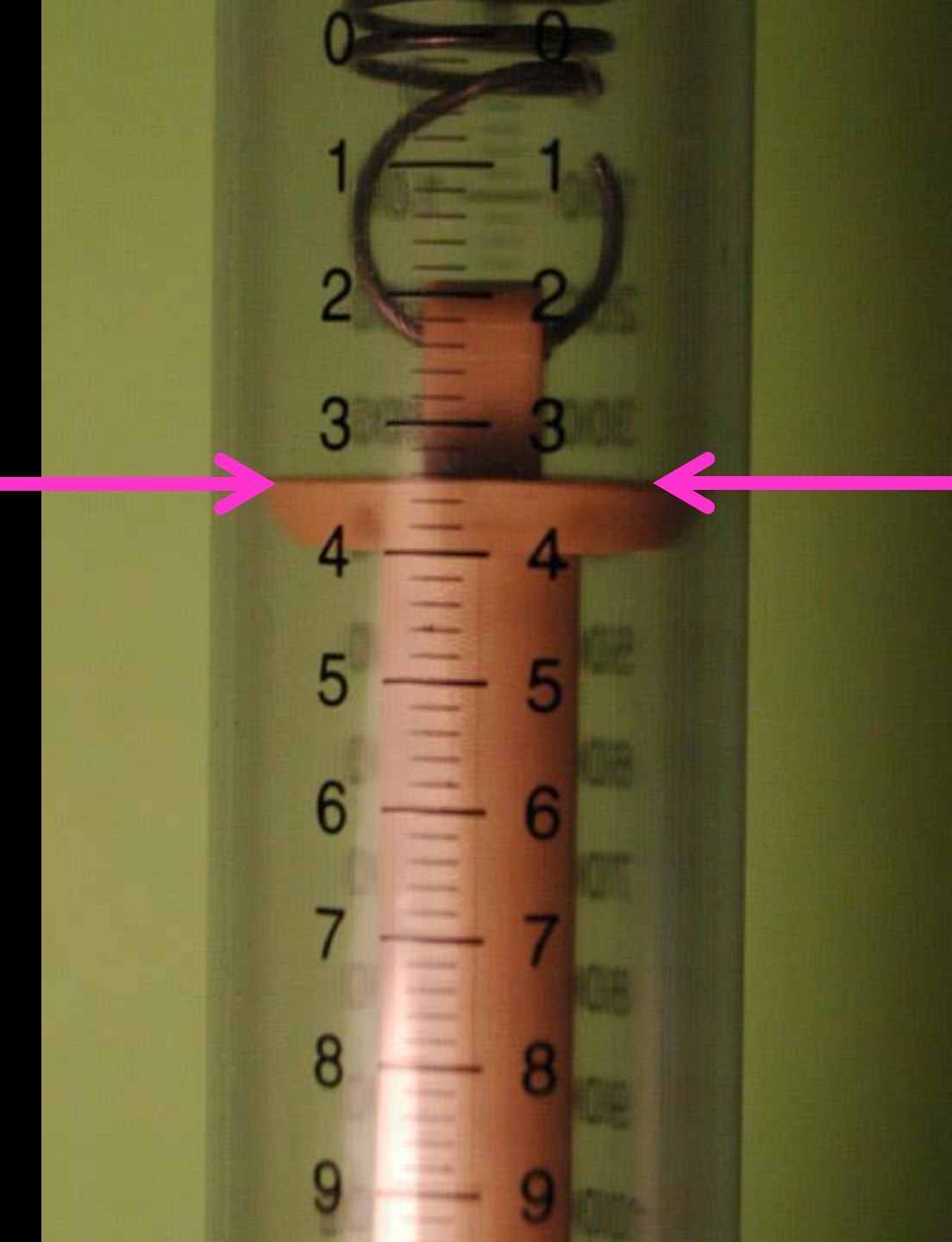
**JUST
RIGHT!!**



**L
ma**

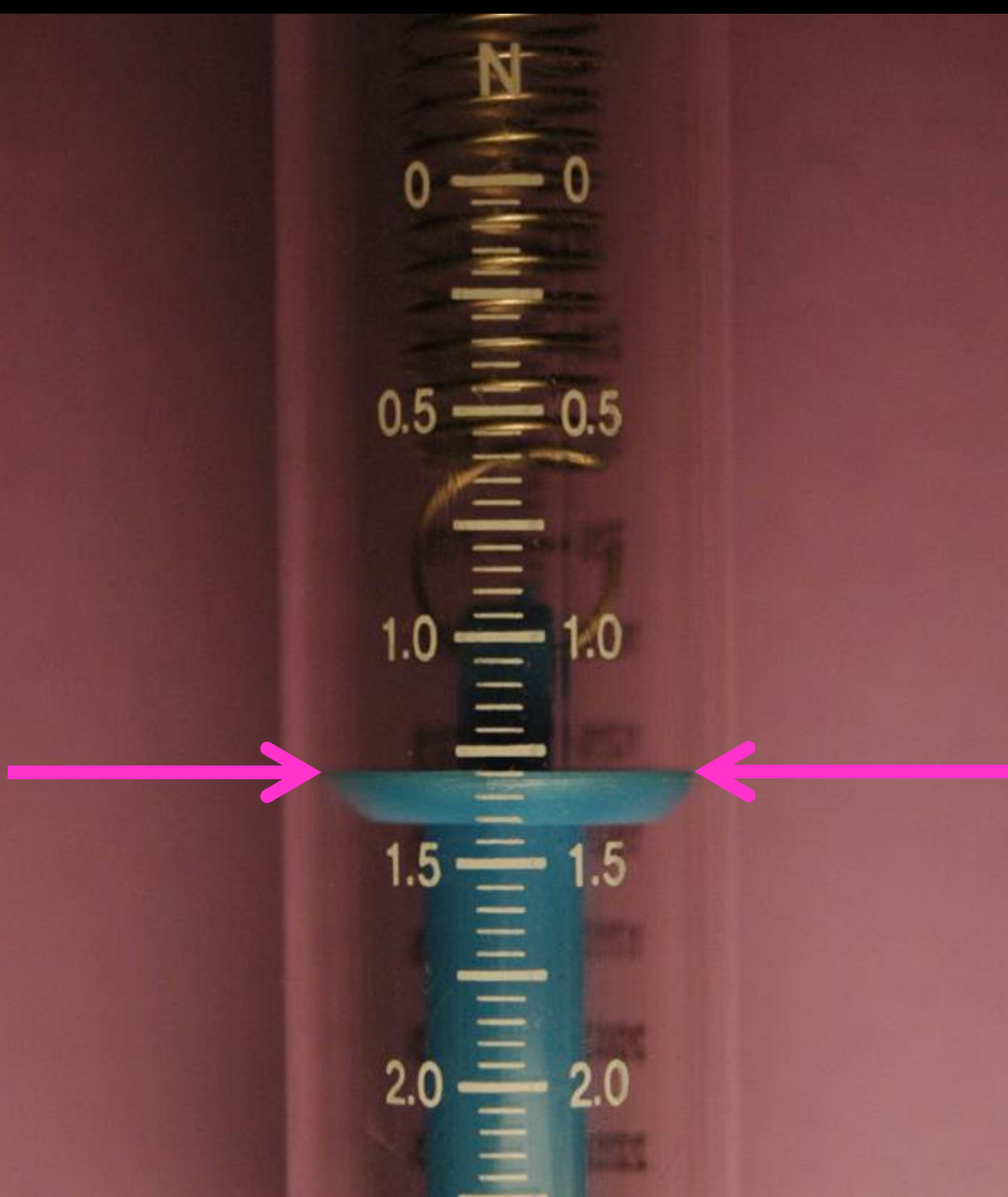


**m balance,
g scale reads
use it!!**



3.4 N

**(What is the
scale?)**



1.3 N
**(careful
with the
scale)**



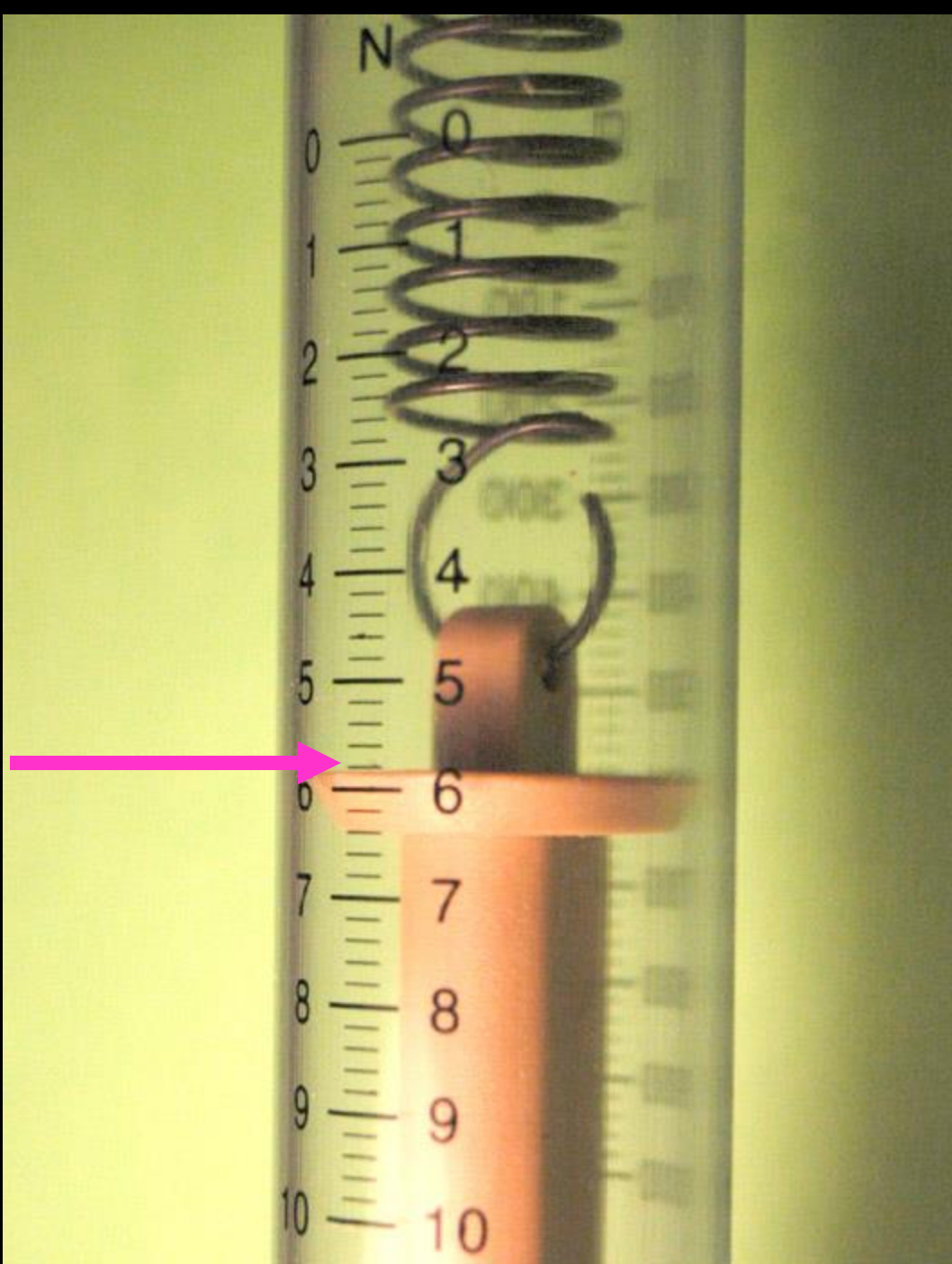
14.4 N

Scale is 0.4!!!

2.0 divided

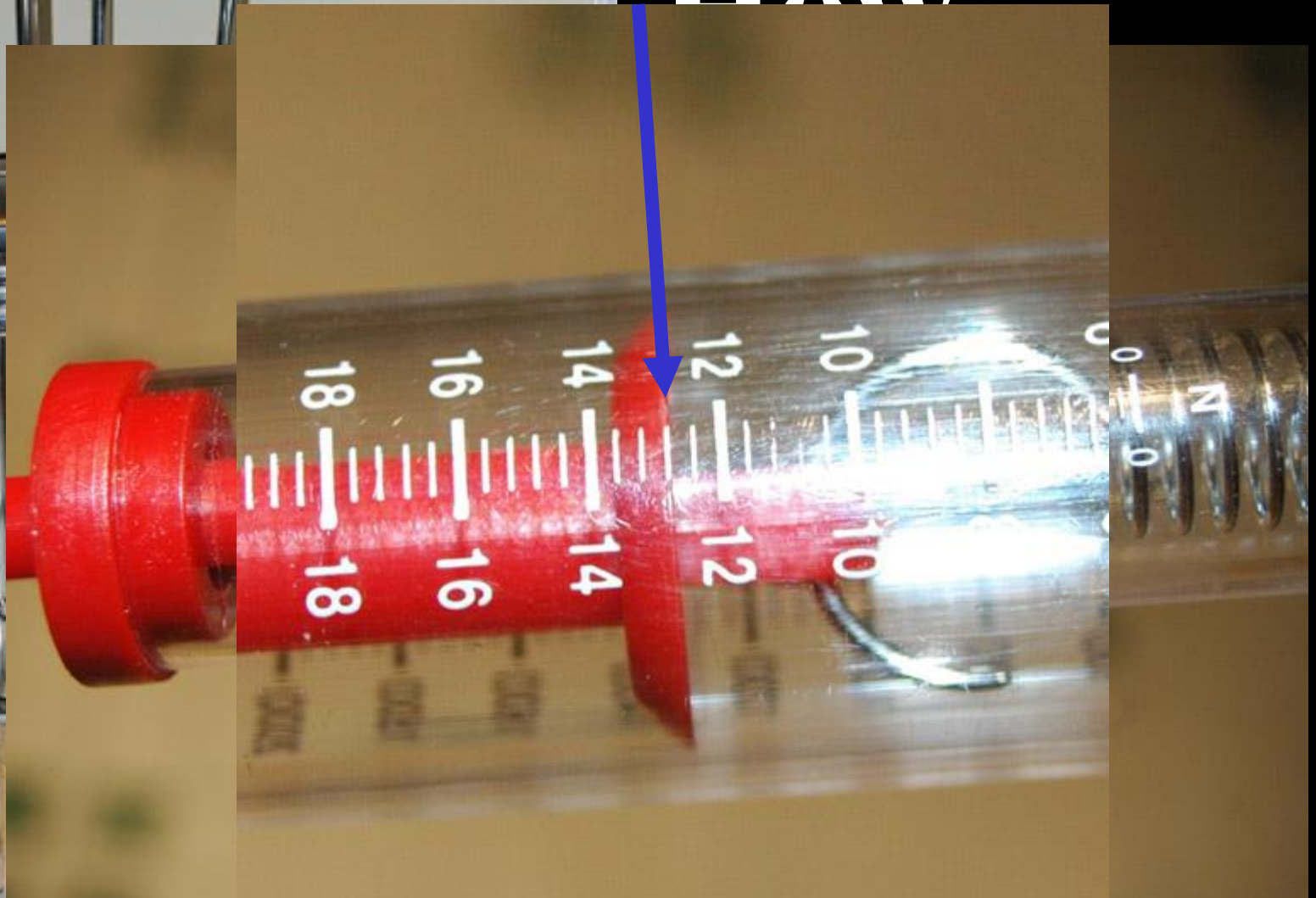
by 5 units =

0.4



5.8 N

How



12.8 Newtons

Length & Distance (m)

How long is it?

How far is it?

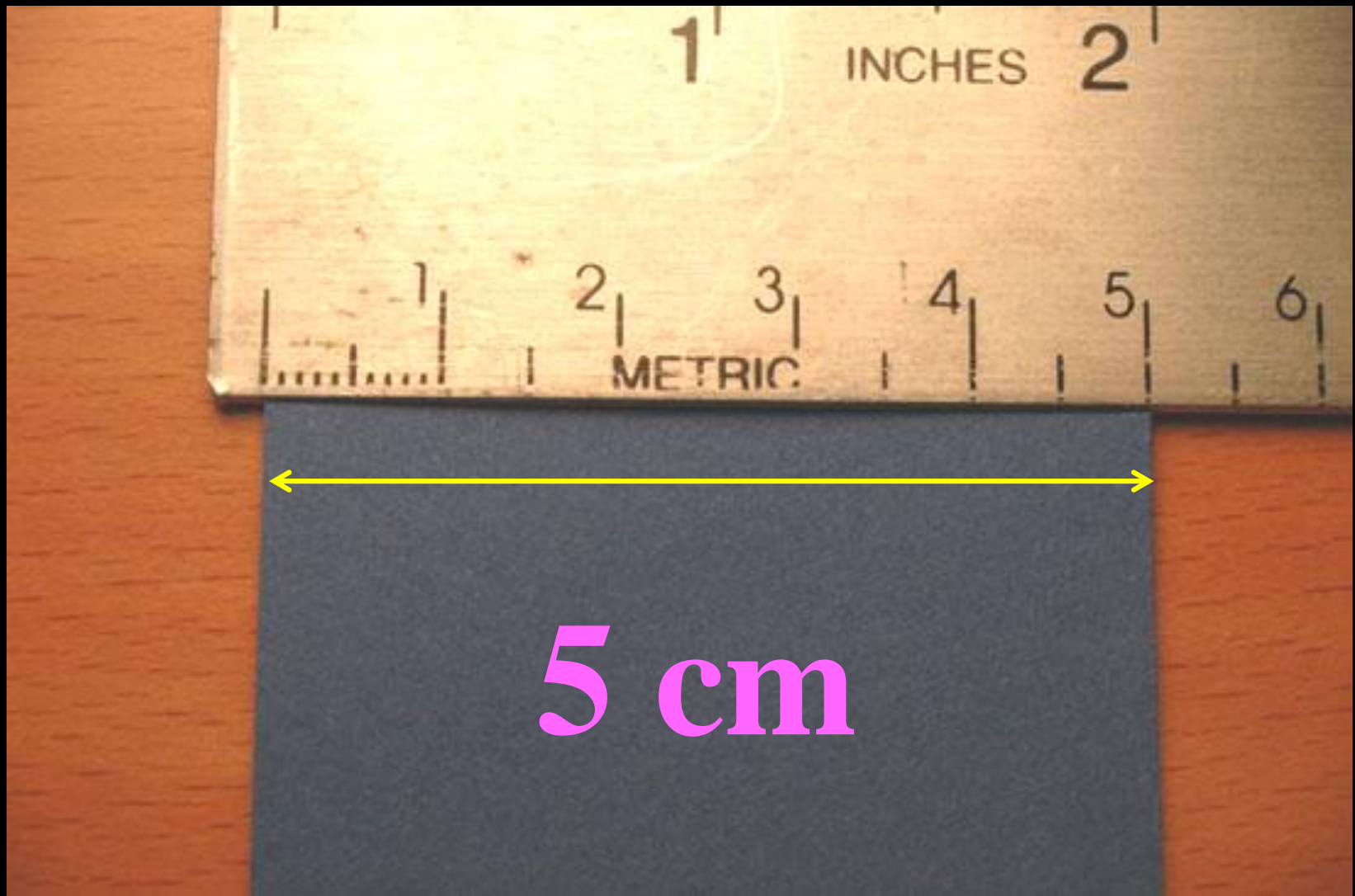
Measured with a ruler or meter stick.

Millimeter Centimeter, & Kilometer

When measuring Length

Remember to:

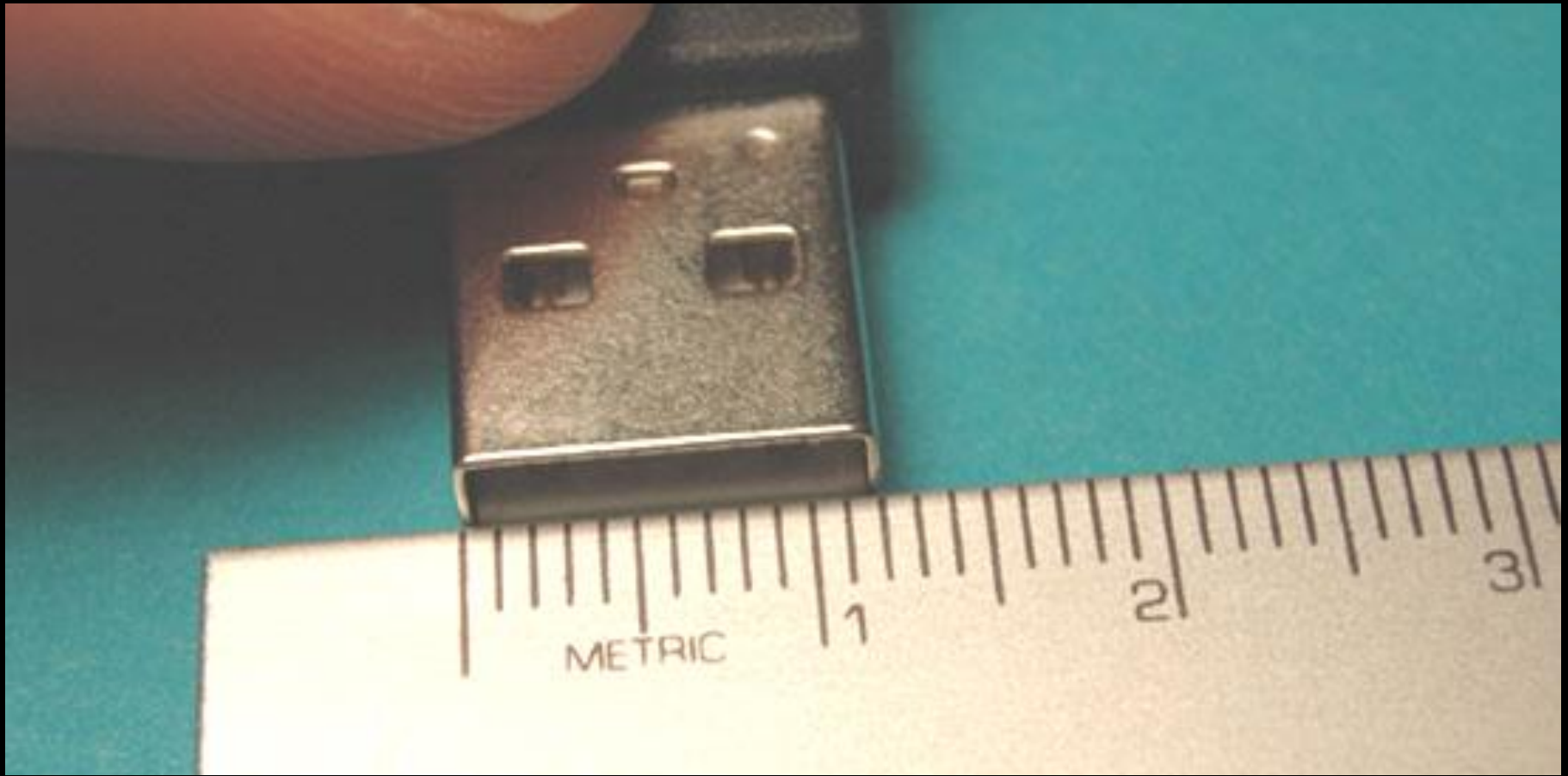
- Make sure you know the units of your ruler or measuring instrument.
- Identify the scale
- Line up the object up at the zero mark



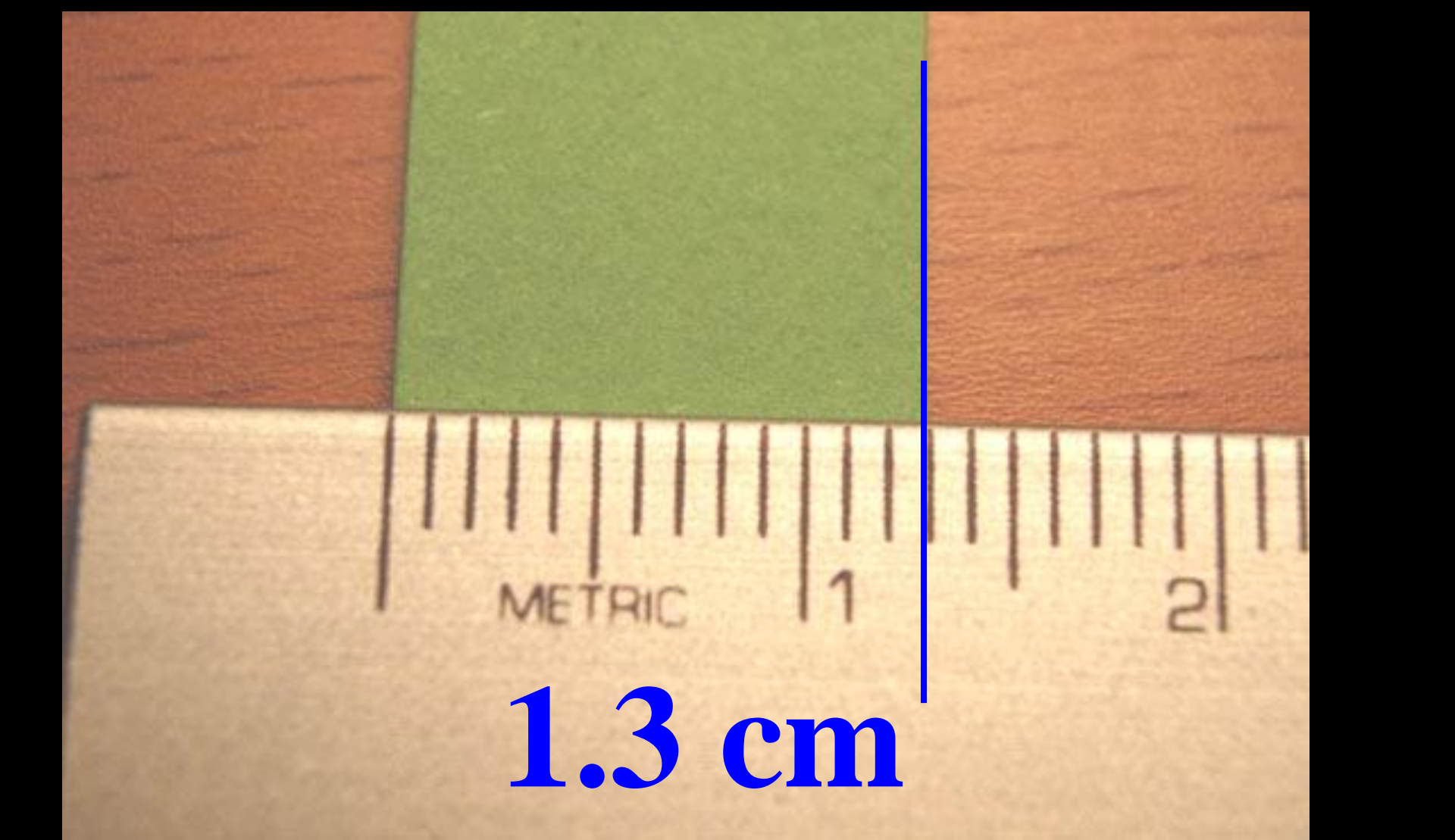
How **long** is the side?



4.2 cm or 42mm



1.2 cm or 12 mm



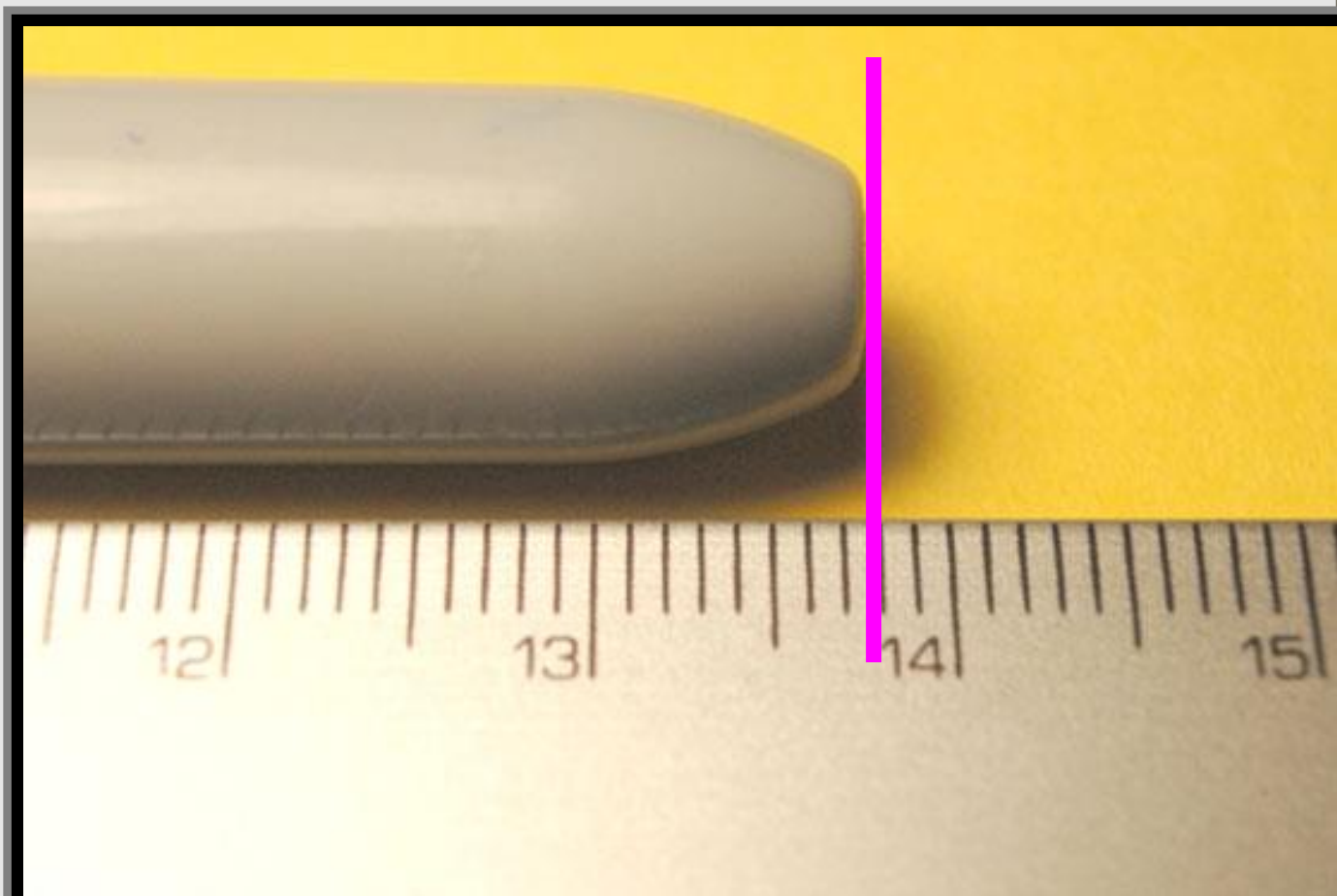
1.3 cm

How many millimeters?...13mm



7 cm

13.8cm or 138mm





How wide is a CD?

52 mm or 5.2 cm

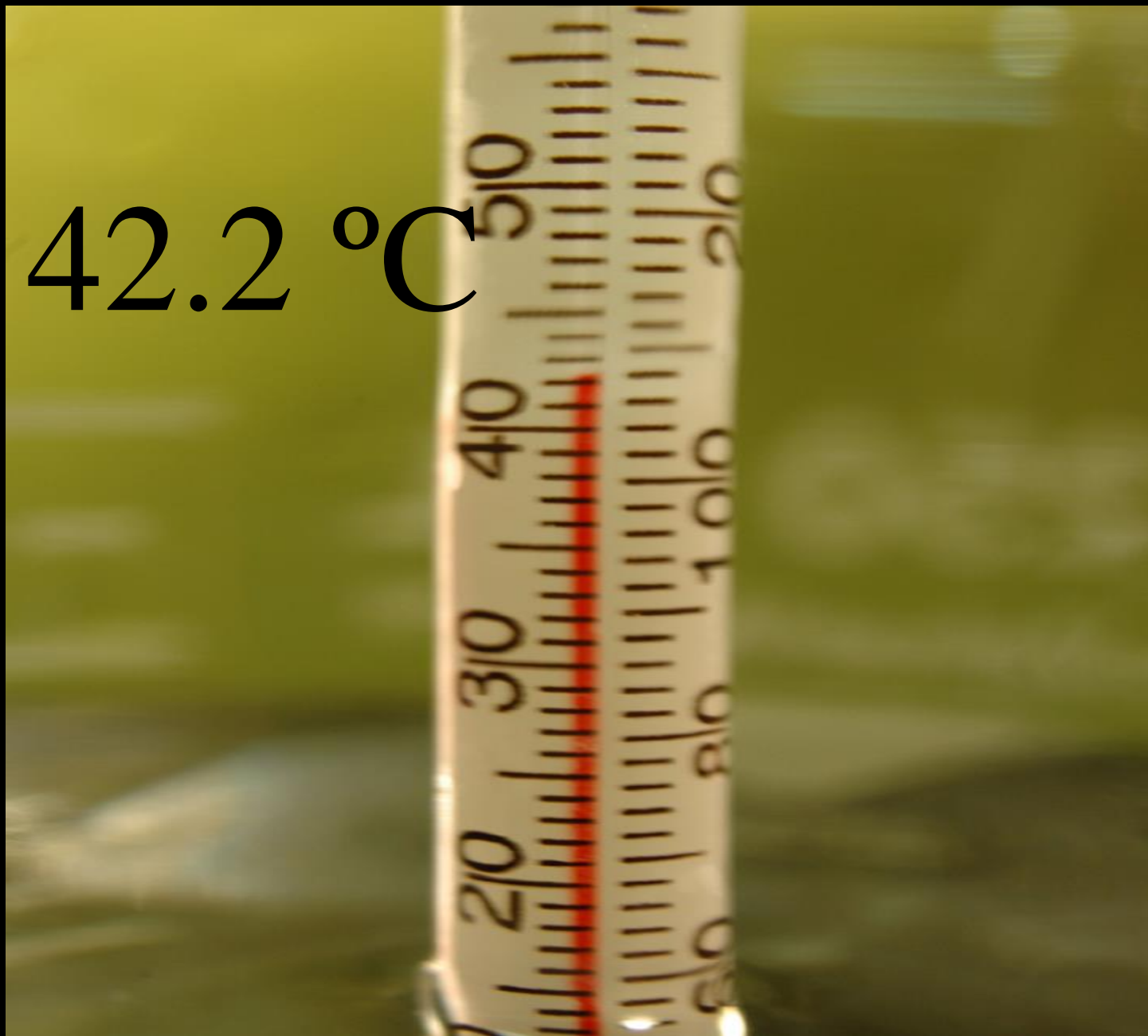
Temperature ($^{\circ}\text{C}$)

How Hot or Cold is
Something?

Measured with a thermometer

Water freezes at 0°C & boils at 100°C

42.2 °C



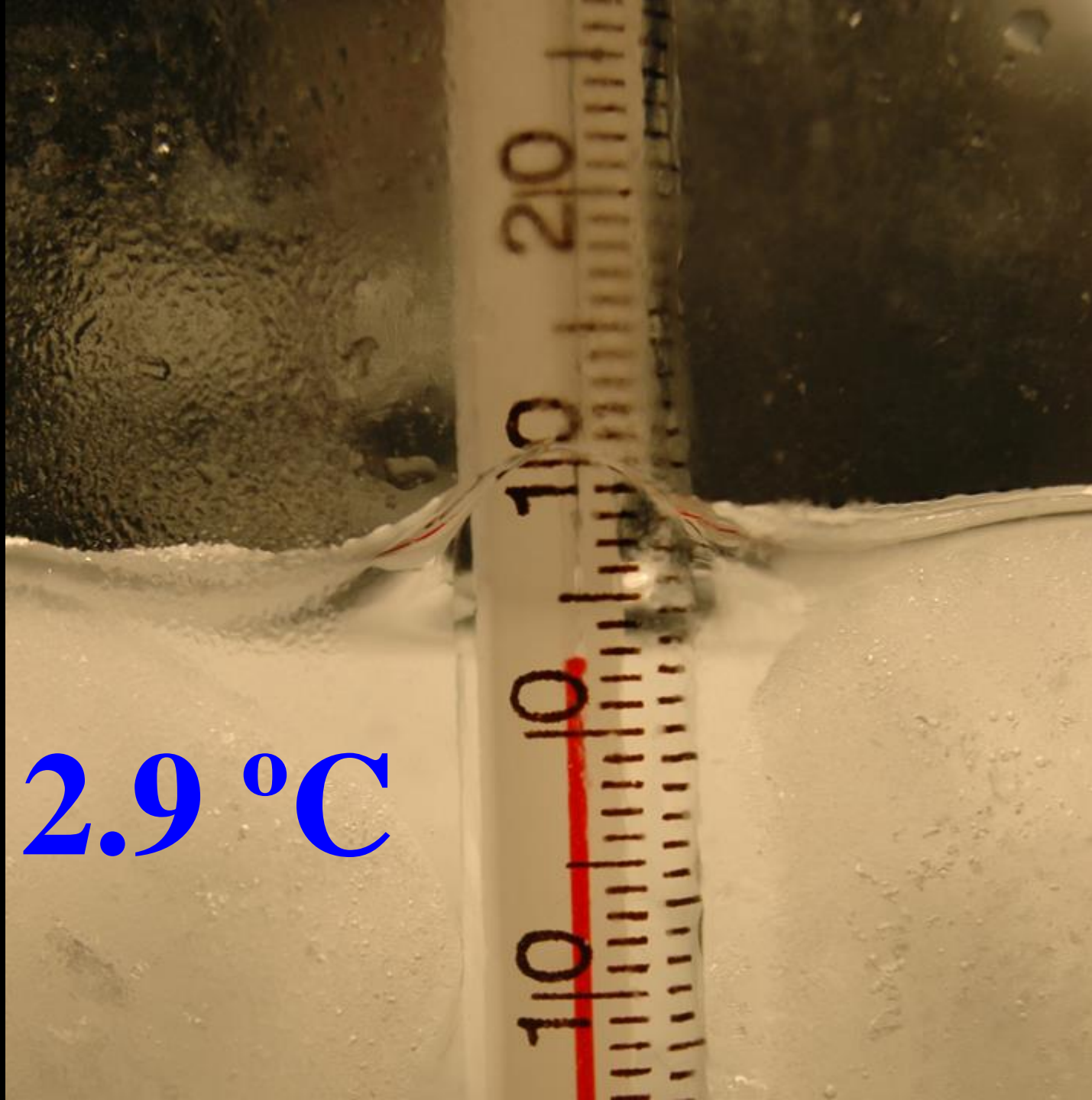


23.5 °C

22.3 °C



2.9 °C



-0.5 °C



Volume (L)

How much space does it
take up?

Liquids measured with a Graduated
Cylinder

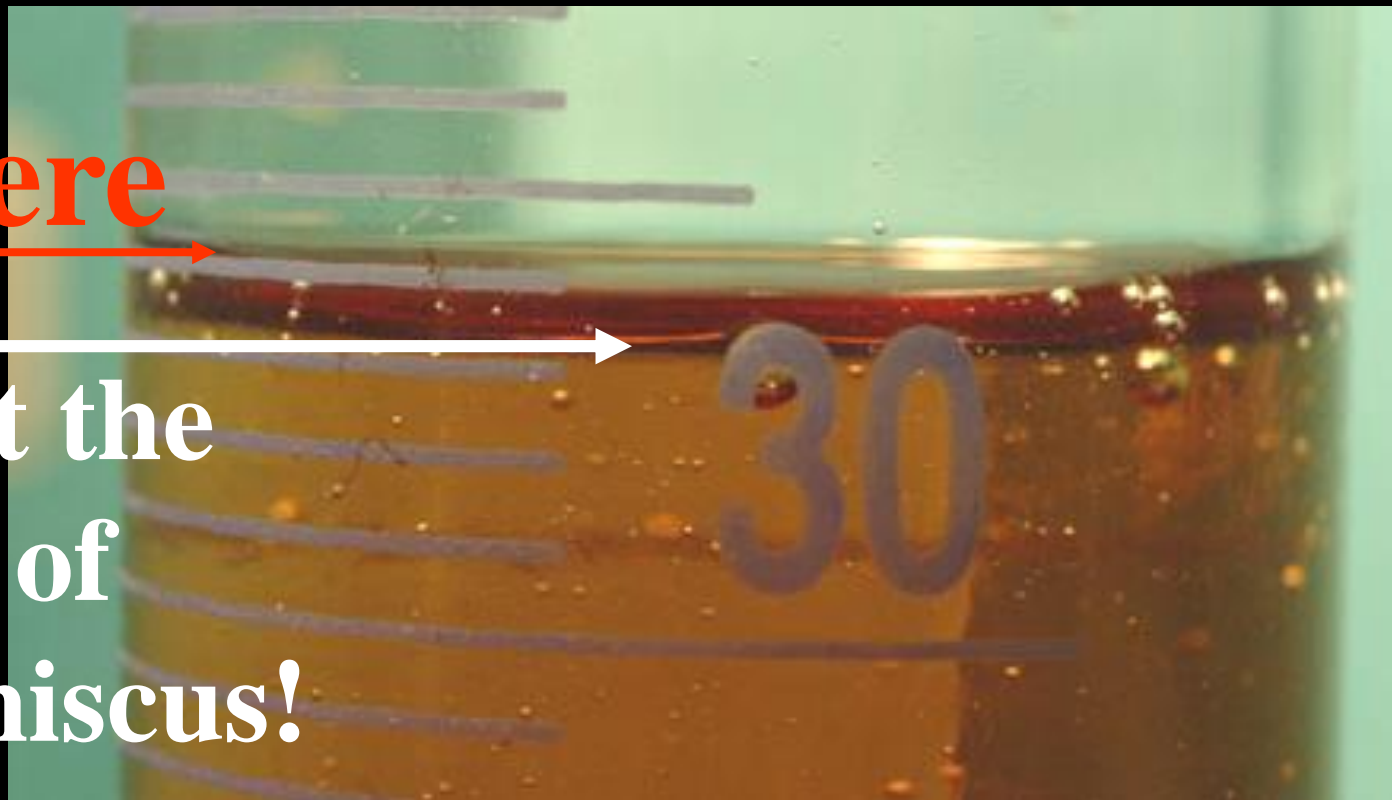
Milliliters & Liters

**When we measure volume we
read the bottom of the meniscus!**

Not Here

**Here, at the
bottom of
the meniscus!**

33 mL. Not 34!





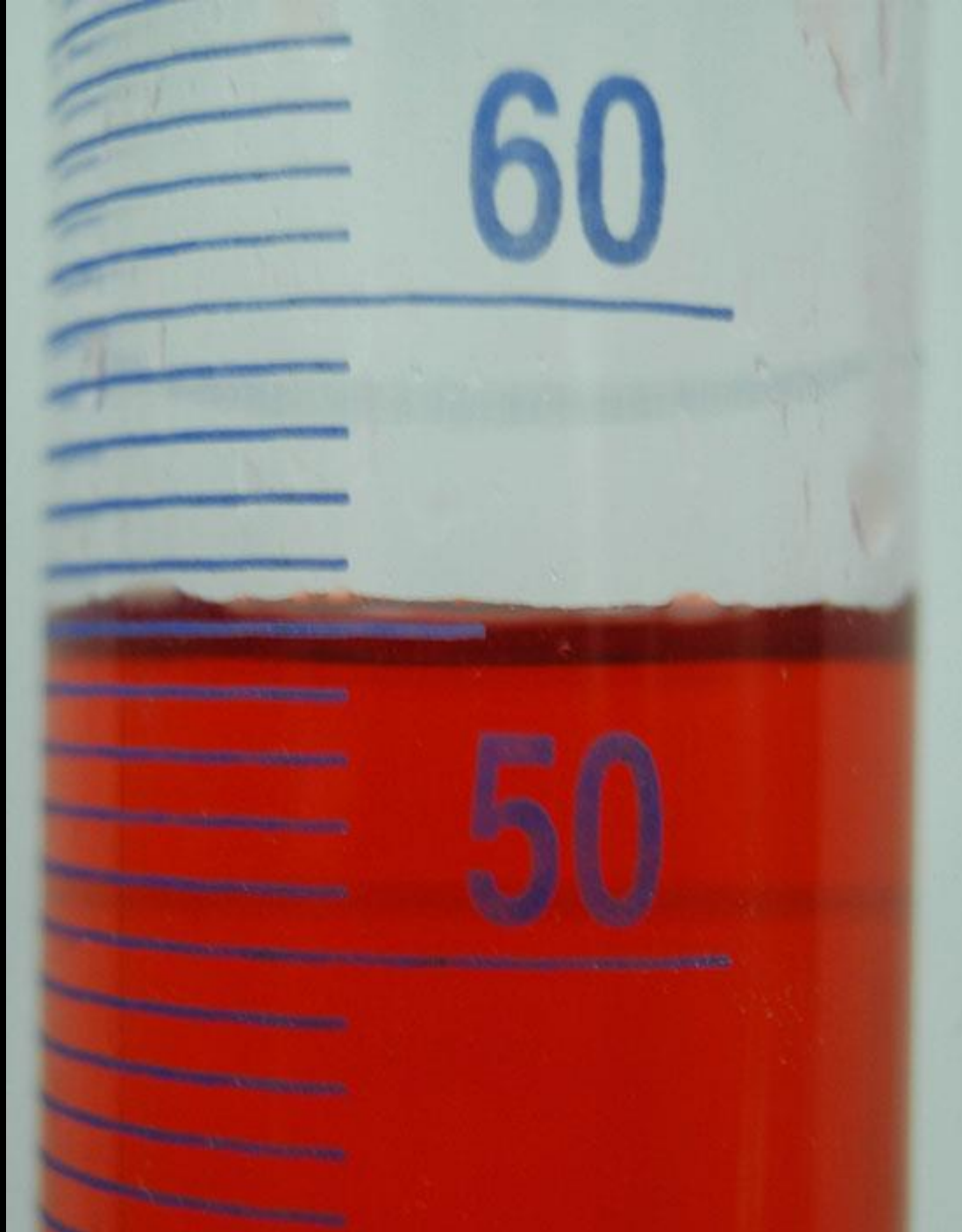
88 mL (Scale is 2)



36 mL



25 mL



**54.5
mL**

Time (s)

How long does it take?

Measured with a stopwatch, clock, or
calendar

Time is universal; hours, minutes, &
seconds

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Let's practice
some
measurement!