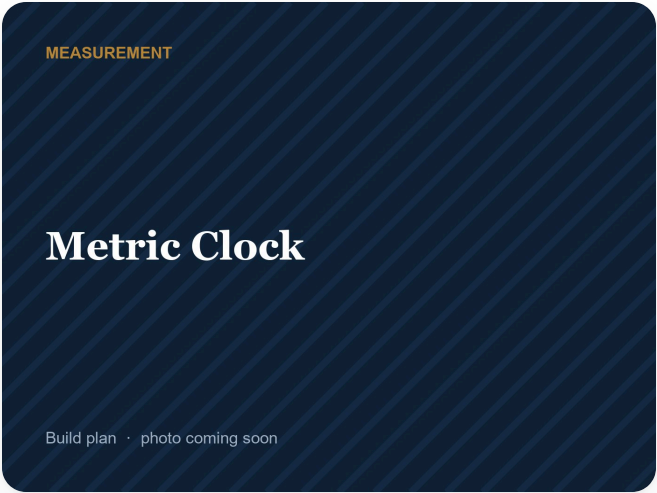


EQUIPMENT BUILD PLAN MEASUREMENT

Metric Clock

An inexpensive wall clock gets a new paper face with ten numbers and the words Think Metric. It is a conversation piece for lessons on the metric system and powers of ten, and it sets up a good puzzle about what a decimal second would really be.

Written from Bruce's original workshop handout. Bruce's final review of this plan is in progress.



DIFFICULTY Beginner	BUILD TIME 1 hour
COST About \$10	SAFETY Everyday care
GOOD FOR Teachers, Families	

What it shows

Hang a clock with only ten numbers on it and watch every student in the room start doing math.

Key ideas: metric system, powers of ten, unit conversion, time

CONSTRUCTION

Build it

Materials

- ☐ Inexpensive battery wall clock · 1
Choose one whose case comes apart with screws
- ☐ Heavy paper or card stock · 1 sheet
- ☐ Printed numbers 1 through 10 and the words Think Metric · 1 set

Tools

Small screwdriver

Computer and printer
Scissors or craft knife
Glue stick
Compass or round template

1

Open the clock

Remove the screws on the back and take off the case front and clear cover. Bruce's clock came apart with four screws.

2

Remove the hands

Gently pull the hands straight off the shaft, starting with the second hand. Note their order.

3

Make the new face

Trace the old face onto card stock and cut it out, including the center hole. Print the numbers 1 to 10 and glue them evenly around the circle, 36 degrees apart.

4

Add the title

Print the words Think Metric and glue them to the face.

5

Install the face

Lay the new face over the old one, line up the center hole, and press the hands back on in the same order, all pointing straight up when set to the top position.

6

Reassemble and hang

Replace the cover and screws, add a battery, and hang the clock where everyone will notice it.

THE PHYSICS

How it works

Our time system mixes bases: 60 seconds per minute, 60 minutes per hour, 24 hours per day, for 86,400 seconds in a day.

Using it

- How many ordinary seconds are in a day? (86,400.)

A decimal time system would divide the day by powers of ten: for example 10 hours per day, 100 minutes per hour and 100 seconds per minute, which gives 100,000 decimal seconds per day.

Because 100,000 decimal seconds must fit into the same day as 86,400 ordinary seconds, each decimal second would be shorter: about 0.864 of an ordinary second.

The clock's motor still runs at ordinary speed, so the new face is a thinking prop, not a working metric clock. Figuring out why is part of the fun.

- How many metric seconds should a metric day have, and would a metric second be longer or shorter than an ordinary second?
- Should a metric clock have AM and PM? How does your answer change the number of seconds?
- Does this clock actually keep metric time? What would you have to change inside it?
- Research the decimal time France tried in the 1790s and why it was dropped.

GO FURTHER

Variations

- Make a matching face for a 10-hour day with the hour hand going around once per day.

IF IT DOESN'T WORK

Troubleshooting

IF THIS HAPPENS

The hands rub on the new face.

TRY THIS

Use thinner paper, or press the hour hand on slightly less far so it clears the face.

IF THIS HAPPENS

The hands will not come off.

TRY THIS

Rock them gently while pulling straight out; do not twist, which can strip the shaft.