PRESSURE

BAROMETER

MAKE YOUR OWN BAROMETER LESSON

LEARN HOW THIS FLIGHT INSTRUMENT CAME TO BE AND HOW WERE STILL USING IT TO THIS DAY

STEMPILOT®

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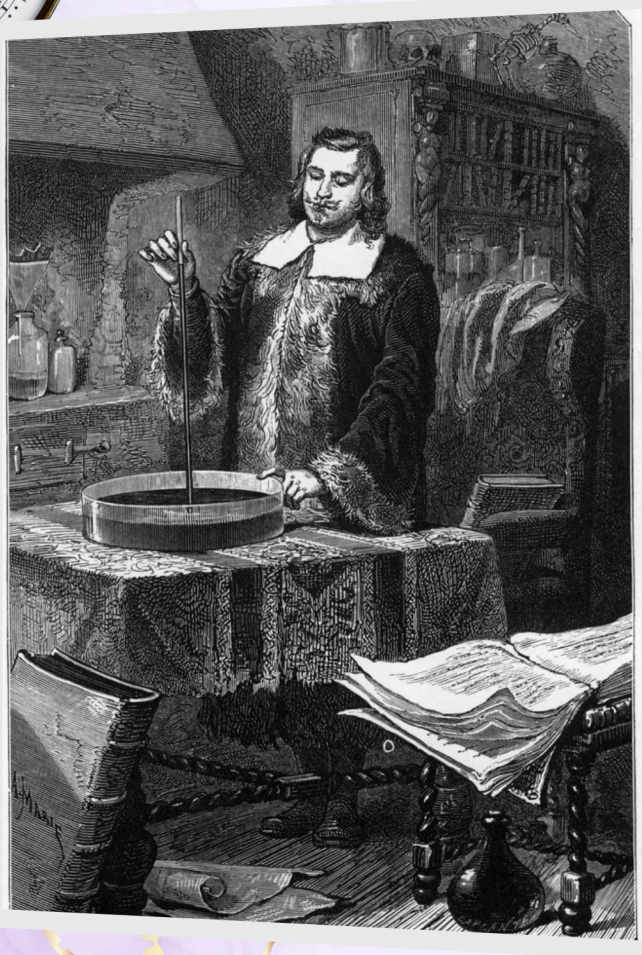
HEY THERE, YOUNG SCIENTISTS! DID YOU KNOW THAT WE CAN MEASURE AIR PRESSURE USING A MAGICAL TOOL CALLED A BAROMETER? LET'S DIVE INTO THE WORLD OF AIR PRESSURE AND DISCOVER HOW IT AFFECTS OUR WEATHER!

ONCE UPON A TIME, IN THE LAND OF BRILLIANT MINDS, LIVED A GENIUS NAMED EVANGELISTA TORRICELLI. INSPIRED BY THE GREAT GALILEO GALILEI, TORRICELLI SET OUT ON A QUEST TO SOLVE A PUZZLING MYSTERY. WHY, OH WHY, WOULDN'T WATER RISE MORE THAN 33 FEET THROUGH A SUCTION PUMP?



TORRICELLI'S ADVENTURE:

TORRICELLI SUSPECTED A SNEAKY CULPRIT CALLED AIR PRESSURE, ALSO KNOWN AS ATMOSPHERIC PRESSURE. WHAT'S THAT, YOU ASK? WELL, IMAGINE AIR GIVING THE EARTH A BIG HUG, PRESSING DOWN WITH ITS INVISIBLE FORCE. TORRICELLI HAD A CLEVER IDEA TO TEST HIS THEORY. HE CRAFTED A SPECIAL GLASS TUBE, 35 INCHES LONG, AND FILLED IT WITH SHINY MERCURY. WHY MERCURY, YOU WONDER? BECAUSE IT'S 14 TIMES HEAVIER THAN WATER, MAKING IT PERFECT FOR OUR EXPERIMENT! WITH HIS TRUSTY TUBE IN HAND, TORRICELLI CLIMBED A MOUNTAIN.

AS HE REACHED THE PEAK, SOMETHING MAGICAL HAPPENED! THE MERCURY IN THE TUBE DANCED AND TWIRLED, CREATING A VACUUM AT THE TOP. TORRICELLI'S EXPERIMENT PROVED THAT AIR INDEED HAD WEIGHT, EXPLAINING WHY THE WATER WOULDN'T RISE IN THE PUMP.

ENTER THE ANEROID BAROMETER:

FAST FORWARD TO 1844, WHERE A FRENCH SCIENTIST NAMED LUCIEN VIDI ADDED HIS OWN TWIST TO THE BAROMETER TALE. HE INVENTED THE ANEROID BAROMETER, A SLEEK CONTRAPTION WITH A SEALED METAL CHAMBER THAT DANCED WITH THE AIR PRESSURE'S RHYTHM.

THESE FANCY BAROMETERS REPLACED THE CLUNKY MERCURY ONES BECAUSE THEY WERE CHEAPER AND EASIER TO CARRY AROUND. SOME EVEN CAME WITH A MAGICAL TOOL CALLED A BAROGRAPH, WHICH SCRIBBLED DOWN CHANGES IN AIR PRESSURE LIKE A SECRET CODE.

THE DIGITAL ERA:

THANKS TO THE MAGIC OF TECHNOLOGY, WE NOW HAVE DIGITAL BAROMETERS! METEOROLOGISTS USE THEM TO PREDICT WEATHER PATTERNS AND KEEP US SAFE FROM SURPRISES. BUT WAIT, THERE'S MORE! YOU'LL FIND DIGITAL BAROMETERS HIDING IN YOUR SMARTPHONES, WHISPERING WEATHER SECRETS THROUGH GPS AND WEATHER APPS.

THE POWER OF AIR PRESSURE:

SO, HOW DO METEOROLOGISTS USE BAROMETERS TO PREDICT WEATHER? REMEMBER OUR FRIEND, AIR PRESSURE? WHEN IT'S FEELING LOW, IT USUALLY MEANS CLOUDY SKIES AND A CHANCE OF RAIN. BUT WHEN IT'S HIGH, GET READY FOR CLEAR SKIES AND SUNSHINE!

NOW THAT YOU'RE BURSTING WITH BAROMETER KNOWLEDGE, IT'S TIME FOR SOME HANDS-ON FUN! GET INTO GROUPS AND EMBARK ON A THRILLING EXPERIMENT TO CREATE YOUR VERY OWN BAROMETERS. LET'S SEE IF YOU CAN UNLOCK THE SECRETS OF AIR PRESSURE JUST LIKE TORRICELLI DID!

ACTIVITY SETUP:

- DIVIDE STUDENTS INTO GROUPS OF 3-4.
- EXPLAIN THAT THEY WILL BE CONDUCTING AN EXPERIMENT TO CREATE THEIR OWN BAROMETERS.
- EMPHASIZE THE IMPORTANCE OF FOLLOWING THE INSTRUCTIONS CAREFULLY AND RECORDING DATA ACCURATELY.

MATERIALS:

- CLEAR SANITIZED JARS (E.G., PICKLE JARS OR MASON JARS)
- SCISSORS
- TAPE
- STRAWS
- RUBBER BANDS
- PARTY BALLOONS
- PENCILS
- PLAIN PAPER
- RULERS
- STEM PILOT'S BAROMETER ANALYSIS SHEET (1 COPY PER GROUP)
- BUILD YOUR OWN BAROMETER INSTRUCTION SHEET

ACTIVITY STEPS:

1. ENSURE ALL MATERIALS ARE PREPARED AND DISTRIBUTED TO EACH GROUP.
2. PROVIDE EACH GROUP WITH THE BUILD YOUR OWN BAROMETER INSTRUCTION SHEET AND BAROMETER ANALYSIS SHEET.
3. INSTRUCT STUDENTS TO MAKE PREDICTIONS ABOUT WHETHER AIR PRESSURE AFFECTS WEATHER BEFORE STARTING THE EXPERIMENT.
4. GUIDE STUDENTS THROUGH THE PROCESS OF ASSEMBLING THEIR BAROMETERS ACCORDING TO THE PROVIDED INSTRUCTIONS.
5. ONCE ASSEMBLED, HAVE EACH GROUP PLACE THEIR BAROMETER IN THE CLASSROOM, AWAY FROM DIRECT SUNLIGHT OR DRAFTS.
6. INSTRUCT STUDENTS TO MARK THE END OF THEIR STRAWS WITH A PENCIL OR MARKER, NOTING THE DATE AND TIME OF THE FIRST READING.
7. HAVE STUDENTS RECORD THE CURRENT WEATHER CONDITIONS ON THEIR BAROMETER ANALYSIS SHEET.
8. REPEAT STEPS 6-7 DAILY FOR 4-7 SCHOOL DAYS, ENCOURAGING STUDENTS TO OBSERVE ANY CHANGES IN THEIR BAROMETER READINGS.
9. AFTER THE EXPERIMENT PERIOD, FACILITATE A DISCUSSION WHERE STUDENTS ANALYZE THEIR DATA AND ANSWER QUESTIONS ON THE BAROMETER ANALYSIS SHEET AS A GROUP.

CONCLUSION:

- ENCOURAGE STUDENTS TO REFLECT ON THEIR FINDINGS AND DISCUSS WHETHER THEIR PREDICTIONS WERE ACCURATE.
- SUMMARIZE THE CONNECTION BETWEEN AIR PRESSURE AND WEATHER, HIGHLIGHTING THE ROLE OF BAROMETERS IN PREDICTING ATMOSPHERIC CHANGES.
- REINFORCE THE RELEVANCE OF SCIENTIFIC EXPERIMENTATION AND OBSERVATION IN UNDERSTANDING NATURAL PHENOMENA.

EXTENSION:

- CHALLENGE STUDENTS TO RESEARCH MODERN APPLICATIONS OF BAROMETERS, SUCH AS DIGITAL BAROMETERS USED IN WEATHER FORECASTING AND SMARTPHONE TECHNOLOGY.
- ENCOURAGE FURTHER EXPLORATION OF ATMOSPHERIC SCIENCE BY INVESTIGATING OTHER INSTRUMENTS USED TO STUDY WEATHER PATTERNS, SUCH AS THERMOMETERS AND ANEMOMETERS.