Prompt: The goal of this activity is to define Moore's law and describe the physical limitations in devices that have stopped it from continuing to be true.

Response:

1) **Define Moore's law**

Moore's Law is a computing term which originated around 1970; the simplified version of this law states that processor speeds, or overall processing power for computers will double every two years.

To break down the law even further, it specifically stated that the number of transistors on an affordable CPU would double every two years (which is essentially the same thing that was stated before) but 'more transistors' is more accurate.[1]

2) **Why it has now stopped being true. Physical limitations that have prevented Moore's law from continuing to be true.**

According to Moore's Law/Observation, transistor density doubles every 2 year. However, it leads to increased power consumption and thus increased temperature. Following are the limitations in a nutshell:

1) Power consumption is critical now a days due to battery usage in the devices. Since doubling transistors density significantly increases power consumption, the battery will run out of charge quickly, hence Moore's observation can't be continued.

2) Even if there is an access to power by plugging the device into the wall, the temperature will be really high and could melt the chip.

3) There is a need to cool off the chip to prevent it from melting, if you don't have the heatsink to dissipate the heat and the fan to blow away the heat, then it'll hurt the chip causing it to melt physically. That's what we call the power wall.

4) Heatsink and fan is used to cool off the chips and dissipate heat off of the processor generally. However, air cooling wouldn't be sufficient at the increasingly high temperature in doubling the transistors.

5) Even if cooling the heat off could be done via liquid cooling (instead of typical air cooling). A common person would not prefer to have cooling pipe(s) attached to their personal device, hence Moore's observation can't be continued.

6) A way to reduce power consumption is to scale up the voltage but it has its own limitations, since to avoid confusion in identifying high/low voltage, the range can be at max. for instance 1.1V as high and 0.5V as low. Voltage scaling also has potential power leakage.

References:
[1] **http://www.mooreslaw.org/**