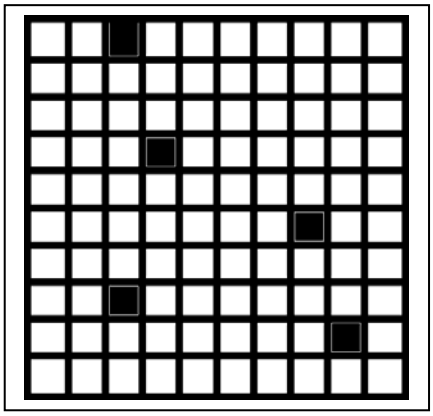

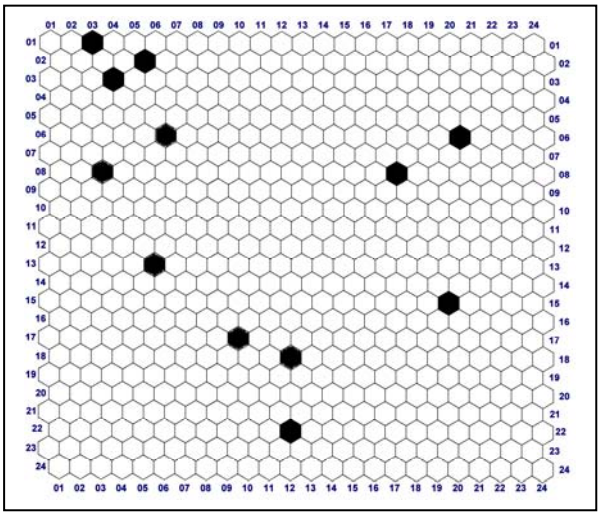

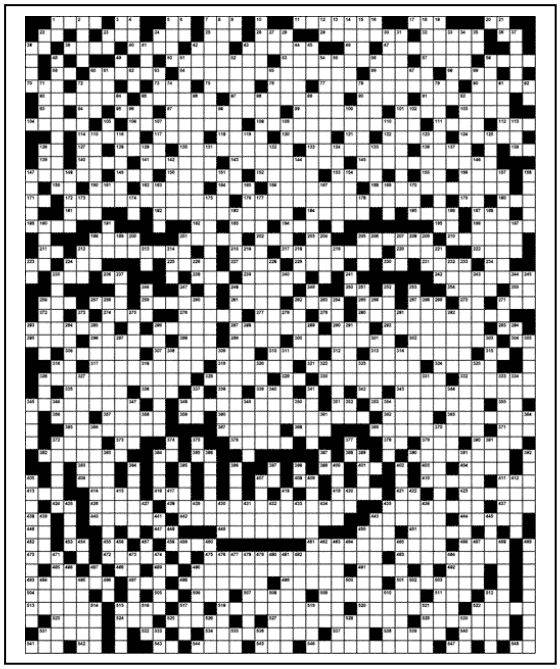

The Stratospheric Aerosol and Gas Experiment III (SAGE III), the sensor will be installed on the International Space Station (ISS) sometime in 2015.

Aerosols are small particles that are suspended in the air. Examples include fog and smog, but also includes dust, soot and ash particles. These particles can affect climate, and can also cause health problems such as emphysema, asthma or even lung cancer.

Instead of measuring the amount of aerosols or pollutants by percentage, scientists often use units such as parts-per-million. This exercise helps you work with these units.

Problem 1 - Suppose you are 15 years old. How many parts-per-hundred is this of one century?

Problem 2 – You have a bag of 200 blue marbles, 280 green marbles and 20 red marbles. How many parts-per-thousand are the red marbles compared to the whole?

Problem 3 – Which of the figures to the left shows a concentration of black spots equal to
A) 243000 parts-per-million?
B) 50000 parts-per-million?
C) 20833 parts per million?

Problem 1 - Suppose you are 15 years old. How many parts-per-hundred is this of one century?

Answer: 15 years is 15/100 = **15 pph** of 1 century.

Problem 2 – You have a bag of 200 blue marbles, 280 green marbles and 20 red marbles. How many parts-per-thousand are the red marbles compared to the whole?

Answer: The total number of marbles is 200+280+20 = 500. So the 20 red marbles is 20/500 = 4/100 or **4 pph** of the total number of marbles.

Problem 3 – Which of the figures to the left shows a concentration of black spots equal to A) 243000 parts-per-million? B) 50000 parts-per-million? C) 20833 parts per million?

Answer: First let's find out how many squares we have.

Top = 10x10 = 100 total and 5 black so 5/100 are black

Middle = 24 x 24 = 576 squares and there are 12 black so 12/576 are black

Bottom = 40 x 50 = 2000 squares and there are 486 black so 486/2000 are black

Lets use pph = parts-per-hundred
ppt = parts per thousand and
ppm = parts per million.

We can write the top as 5 pph = 50 ppt = 50,000 ppm
Middle as 12/576 = 0.0208333 = 2.0833 pph = 20.833 ppt = 20833 ppm
Bottom as 486/2000 = 0.243 = 24.3 pph = 243 ppt = 243000 ppm

So the answers are
A) Is the bottom figure
B) Is the top figure
C) Is the middle figure

Note: The concentration of carbon dioxide in our atmosphere has increased from 335 ppm to nearly 390 ppm since 1975!