FPS - Chapter 1 Unit 1 Review

Name_____ Period_____

Conceptual Understanding

1. List several important safety rules.

wear goggles, listen to directions, no eating, etc...

2. What is an observation? Give several examples.

information/data gathered through our senses

eg: color of something, smelling the flowering of a tree etc...

3. List the steps of the scientific method. Explain each.

1) Observe/Question
2) Hypothesis
3) Experiment
4) Analyze Data
5) Conclusion
6) Communicate

4. What makes a good hypothesis? Give an example of one from the Pinky Lab.

If... then, specific

eg: If we use nonstandard measurement, then our data will likely be inaccurate.

5. Define independent variable, dependent variable, control group, and controlled variables.

variable we deliberately change

changes due to independent

group w/no changes used for comparison

all other variables kept constant

6. Why is standardized measurement important?

For universal consistency; so scientists can communicate

7. What is the difference between precision and accuracy?

exactness + consistency of measurement

closeness to "true" or correct value

8. List the types of graphs and describe what data types best fit each.

Bar - groups

Line - changes over time

Pie - percentages

9. What is density?

how tightly packed particles are; mass to volume ratio

10. What is the placebo effect? Give an example.

Effect of a placebo ("sugar pill") which results in real symptoms/relief.

Eg: No real surgery, but pain relief

Problem solving

Convert the following metric values. SHOW YOUR WORK.

11. 500 cm = 5 m
12. 10 km = 10,000 m
13. 800 cm = 8 m
14. 3000 m = 3 km
15. 9 cm = 90 mm
16. 6 cm = 60 mm
17. 8 km = 8000 m
18. 4000 m = 4 km
19. 7000 m = 7 km
20. 1000 cm = 10 m
21. 80 mm = 8 cm
22. 5000 m = 5 km
23. 1 m = 100 cm
24. 10 cm = 100 mm
25. 2 cm = 20 mm
26. 2000 m = 2 km
27. 300 cm = 3 m
28. 200 cm = 2 m
29. 900 cm = 9 m
30. 30 mm = 3 cm

Write the number(s) given in each problem using scientific notation.

31. The human eye blinks an average of 4,200,000 times a year. 4.2×10^6
32. A computer processes a certain command in 15 nanoseconds. (A nanosecond is one billionth of a second.) In decimal form, this number is 0. 000 000 015 seconds. 1.5×10^{-8}
33. There are 97,000 km in blood vessels in the human body. 9.7×10^4
34. The highest temperature produced in a laboratory was 920,000,000 F (511,000,000 C) at the Tokamak Fusion Test Reactor in Princeton, NJ, USA.

9.2×10^8 F 5.11×10^8 C

35. The mass of a proton is 0.000 000 000 000 000 000 000 001 673 grams.

1.673×10^{-24}

36. The mass of the sun is approximately 1,989,000,000,000,000,000,000,000,000,000,000 grams.

1.989×10^{33}

37. The cosmos contains approximately 50,000,000,000 galaxies. 5.0×10^{10}

38. A plant cell is approximately 0.00001276 meters wide. 1.276×10^{-5}

Write the number(s) given scientific notation in standard form.

39. The age of earth is approximately 4.5×10^9 years. yr 4,500,000,000

40. The mass of a tiny block is is 1.66×10^{-8} kg.

0.000000166

Using the formula for density, solve the following problems.

41. A flask that weighs 345.8 g is filled with 225 mL of carbon tetrachloride. The mass of the flask and carbon tetrachloride is found to be 703.55 g. From this information, calculate the density of carbon tetrachloride.

$703.55\text{g} - 345.8\text{g} = 357.75\text{g}$

$D = \frac{m}{V} = \frac{357.75\text{g}}{225\text{mL}} = 1.599\text{g/mL}$

42. Calculate the density of sulfuric acid if 35.4 mL of the acid weighs 65.14 g.

$D = \frac{m}{V} = \frac{65.14\text{g}}{35.4\text{mL}} = 1.84\text{g/mL}$

43. Find the mass of 250.0 mL of benzene. The density of benzene is 0.8786 g/mL.

$m = D \times V = (0.8786\text{g/mL}) \times (250.0\text{mL}) = 219.65\text{g}$

44. A block of lead has dimensions of 4.50 cm by 5.20 cm by 6.00 cm. The block weighs 1591 g. From this information, calculate the density of lead.

$V = lwh = (4.5)(5.2)(6) = 140.4\text{cm}^3$

$D = \frac{m}{V} = \frac{1591\text{g}}{140.4\text{cm}^3} = 11.33\text{g/cm}^3$

45. 28.5 g of iron shot is added to a graduated cylinder containing 45.5 mL of water. The water level rises to the 49.1 mL mark, From this information, calculate the density of iron.

$49.1\text{mL} - 45.5\text{mL} = 3.6\text{mL}$

$D = \frac{m}{V} = \frac{28.5\text{g}}{3.6\text{mL}} = 7.92\text{g/mL}$

46. What volume of silver metal will weigh exactly 2500.0 g. The density of silver is 10.5 g/cm^3.

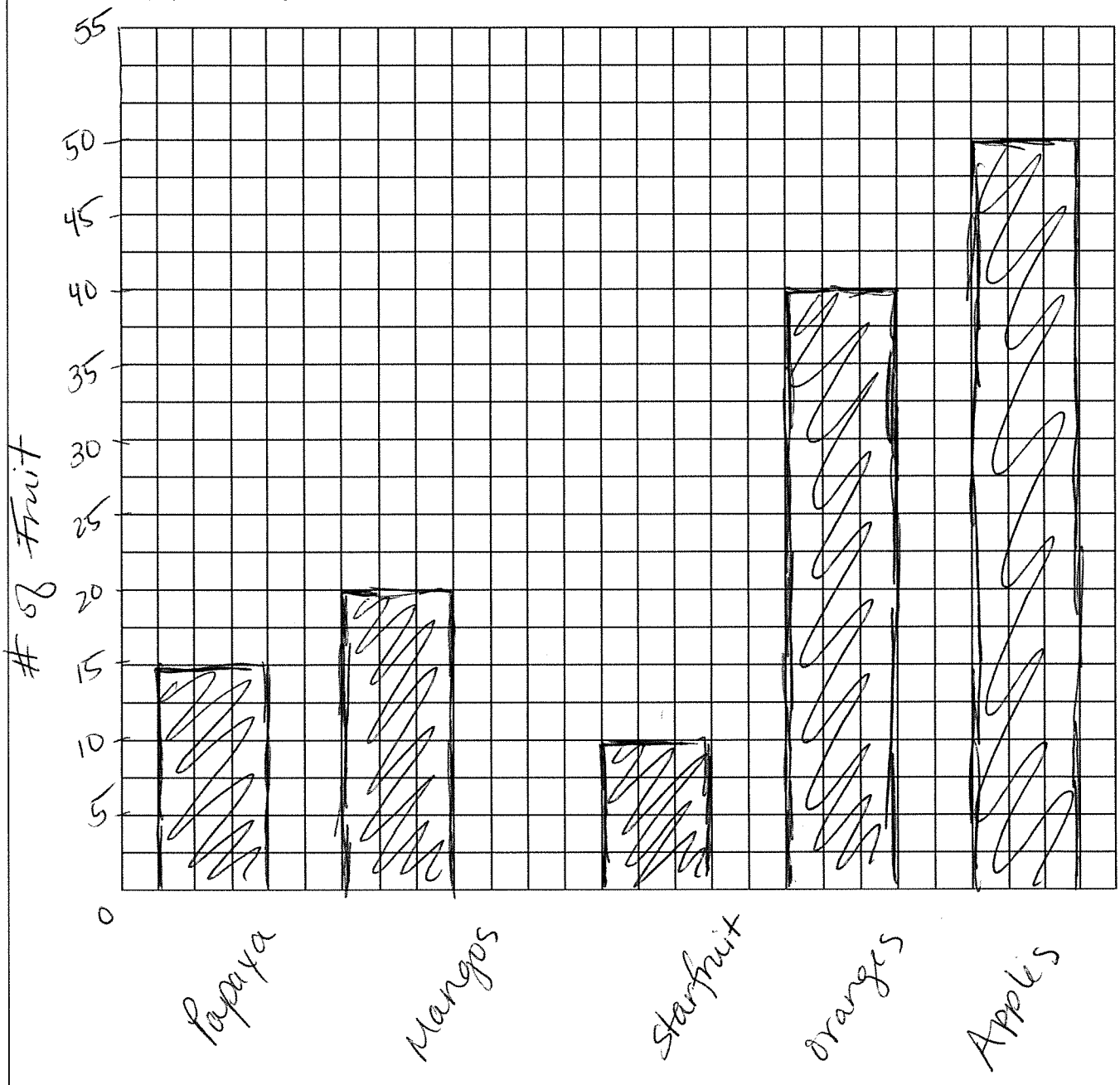
$V = \frac{m}{D} = \frac{2500.0\text{g}}{10.5\text{g/cm}^3} = 238.1\text{cm}^3$

Graphing

47. My Uncle Lester owns a fruit stand and wants to keep track of how many of each kind of fruit that he sells on average per day.

Fruit Sales

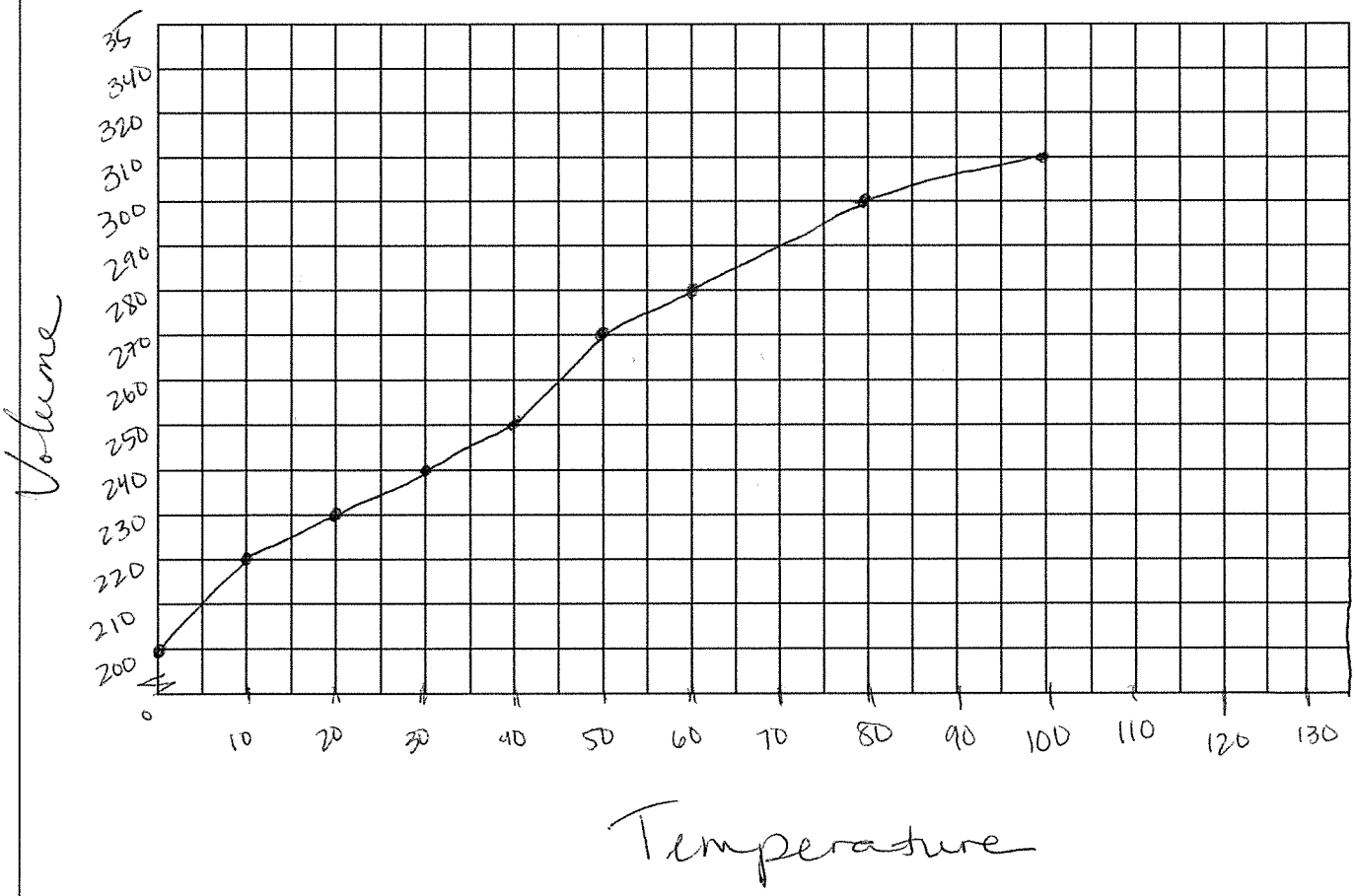
Papaya 15, Mangos 20, Star Fruit 10, Oranges 40, Apples 50



48. The data table below shows how the volume of a gas changes as the temperature of the gas changes.

Temperature (Celcius)	Volume (Millimeters)
100	310
80	300
60	280
50	270
40	250
30	240
20	230
10	220
0	200

Changes of a Gas



Units

49. *Systeme Internationale (SI Units)*

Quantity	*Name*	*Symbol*
Length	Meter	m
Mass	Kilogram	kg
Time	Second	s
Electric current	Ampere	A
Temperature	Kelvin	K
Amount of Matter	Mole	mol
Luminous intensity	Candela	cd

50. *Derived Units*

Quantity	*Name*	*Symbol*
Area (l x w)	Square meter	m^2
Volume (l x w x h)	cubic meter	m^3
Speed	meter per second	m/s
Acceleration	meter per second squared	m/s^2
Density	gram per milliliter	g/mL
	gram per cubic centimeter	g/cm^3
	Kilogram per cubic meter	kg/m^3
Volume of a liquid	milliliter	mL