

What is Physics?

Physics studies _____ that can be _____ with our five senses.

Model - _____

Theory - _____

Law - Uses _____ language to describe _____ patterns that have been verified _____ times

Scientific Method - used to solve many types of problems, not just science

Usually begins with _____ and question about the phenomenon to be studied

Next preliminary research is done and _____ is developed

Then experiments are performed to _____ the hypothesis

Finally the tests are analyzed and a _____ is drawn

Prefix	Symbol	Value	Prefix	Symbol	Value
<i>exa</i>	<i>E</i>	10^{18}	<i>deci</i>	<i>d</i>	10^{-1}
<i>peta</i>	<i>P</i>	10^{15}	<i>centi</i>	<i>c</i>	10^{-2}
<i>tera</i>	<i>T</i>	10^{12}	<i>milli</i>	<i>m</i>	10^{-3}
<i>giga</i>	<i>G</i>	10^9	<i>micro</i>	μ	10^{-6}
<i>mega</i>	<i>M</i>	10^6	<i>nano</i>	<i>n</i>	10^{-9}
<i>kilo</i>	<i>k</i>	10^3	<i>pico</i>	<i>p</i>	10^{-12}
<i>hecto</i>	<i>h</i>	10^2	<i>femto</i>	<i>f</i>	10^{-15}
<i>deca</i>	<i>da</i>	10^1	<i>atto</i>	<i>a</i>	10^{-18}

Units

Science uses _____ System (SI System)

Base Units

Length - _____ (m)

Time - _____ (s)

Mass - _____ (kg)

Others are _____ units

Unit Conversions

Multiply by _____ factors so that unwanted units _____ out

Convert 20 Gm to m

Convert 5 cg to kg

Convert 25 km/h to m/s

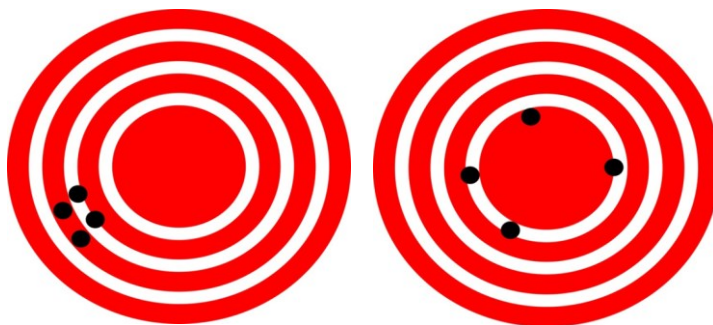
Accuracy and Precision

Accuracy is how _____ a measurement is to the _____ value for that measurement.

Precision of a measurement system is refers to how _____ the agreement is between _____ measurements.

Accuracy and precision mean there is some _____.

A device can repeatedly get the same _____ (precise), but always be _____ (not accurate).



Practice Work

- Classify each as a **model**, **theory**, or **law**.
 - _____ Bohr model of atom
 - _____ Gravity
 - _____ Drawing a picture to represent a physics problem
 - _____ The Earth is round
 - _____ The Big Bang
 - _____ Creation
- The altitude of the International Space Station is 409 km. What is this in meters? (RW) **409000 m**
- The elevation of Berrien Springs is 209 m. What is this in cm? (RW) **20900 cm**
- Convert 1 hour to seconds. (RW) **3600 s**
- The speed limit on some highways is 100 km/h. How fast is that in m/s? (RW) **27.8 m/s**
- The Earth orbits the sun at 29.78 km/s. What is this in km/h? (RW) **107200 km/h**
- The Earth orbits the sun at 29.78 km/s. What is this in mph (assume 1 mile = 1.609 km)? (RW) **66630 mph**
- The surface area of the Earth is 510,072,000 km². What is this in m²? (RW) **5.10072 × 10¹⁴ m²**
- Water covers approximately 361,132,000 km² of the Earth's surface. What is this in ft² (assume 1 m = 3.2808 ft)? (RW) **3.8871 × 10¹⁵ ft²**
- The average density of Earth is 5.514 g/cm³. What is this in kg/m³? (RW) **5514 kg/m³**
- What is meant when a physical law is said to be universal? (HSP 1.7)
 - The law can explain everything in the universe.
 - The law is applicable to all physical phenomena.
 - The law applies everywhere in the universe.
 - The law is the most basic one and all laws are derived from it.
- Describe how modeling is useful in studying the structure of the atom. (HSP 1.11)
 - Modeling replaces the real system by something similar but easier to examine.
 - Modeling replaces the real system by something more interesting to examine.
 - Modeling replaces the real system by something with more realistic properties.
 - Modeling includes more details than are present in the real system.
- Which of the following does not contribute to the uncertainty? (HSP 1.13)
 - the limitations of the measuring device
 - the skill of the person making the measurement
 - the regularities in the object being measured
 - other factors that affect the outcome (depending on the situation)
- A friend says that he doesn't trust scientific explanations because they are just theories, which are basically educated guesses. What could you say to convince him that scientific theories are different from the everyday use of the word theory? (HSP 1.26)
 - A theory is a scientific explanation that has been repeatedly tested and supported by many experiments.
 - A theory is a hypothesis that has been tested and supported by some experiments.
 - A theory is a set of educated guesses, but at least one of the guesses remain true in each experiment.
 - A theory is a set of scientific explanations that has at least one experiment in support of it.
- While watching some ants outside of your house, you notice that the worker ants gather in a specific area on your lawn. Which of the following is a testable hypothesis that attempts to explain why the ants gather in that specific area on the lawn. (HSP 1.46)
 - The worker thought it was a nice location.
 - because ants may have to find a spot for the queen to lay eggs
 - because there may be some food particles lying there
 - because the worker ants are supposed to group together at a place.
- Design an experiment that will test the following hypothesis: driving on a gravel road causes greater damage to a car than driving on a dirt road. (HSP 1.59)
 - To test the hypothesis, compare the damage to the car by driving it on a smooth road and a gravel road.
 - To test the hypothesis, compare the damage to the car by driving it on a smooth road and a dirt road.
 - To test the hypothesis, compare the damage to the car by driving it on a gravel road and the dirt road.
 - This is not a testable hypothesis.
- Explain the advantages and disadvantages of using a model to predict a life-or-death situation, such as whether or not an asteroid will strike Earth. (HSP 1.61)
 - The advantage of using a model is that it provides predictions quickly, but the disadvantage of using a model is that it could make erroneous predictions.
 - The advantage of using a model is that it provides accurate predictions, but the disadvantage of using a model is that it takes a long time to make predictions.
 - The advantage of using a model is that it provides predictions quickly without any error. There are no disadvantages of using a scientific model.
 - The disadvantage of using models is that it takes longer time to make predictions and the predictions are inaccurate. There are no advantages to using a scientific model.
- A friend tells you that a scientific law cannot be changed. State whether or not your friend is correct and then briefly explain your answer. (HSP 1.62)
 - Correct, because laws are theories that have been proved true.
 - Correct, because theories are laws that have been proved true.
 - Incorrect, because a law is changed if new evidence contradicts it.
 - Incorrect, because a law is changed when a theory contradicts it.