Khalifa City A School

Cycle 2

دائـرة التـعـلـيـم والـمـعـرفـة
DEPARTMENT OF EDUCATION AND KNOWLEDGE

Science Grade (5)

Term (1)

2018 /2019

Chapter (1)

Building a Better Scientist

Science:	**Is a way of learning about the natural world.**
Life science:	**The study of living things. Ex: study plants and animal**
Earth science:	**The study of earth and space. Ex: study rocks, soils, ocean, clouds and climate system**
Physical science:	**the study of matter (chemistry) and energy (Physics)**
Observation :	**is using one or more of your senses to identity or learn about something**
Data:	**different types of information that can be collected to answer a scientific question**
Scientific method:	**a series of steps that scientist use when conducting a scientific investigation**
Hypothesis:	**is a prediction that can be tested in investigation**
Technology:	**the practical use of science**
Precision :	**a description of how close repeated measurements are to each other**
Inference:	**is conclusion formed from available information or evidence**
Independent variables:	**the variable that is changed in controlled experiment**
Dependent variables:	**the variable that is being measured during an investigation**
Scientific theory:	**is an a attempt to explain a pattern observed repeatedly in the nature world**
Scientific law:	**a rule that describe a pattern in nature. Ex: gravity force**
A scientific investigation	**Is a way of answering a scientific question.**
Controlled experiment	**Is a scientific investigation that involves one factor and observing its effects on another factor while keeping all other factors constant.**

A field study	**Is an investigation in which scientists make observation and collect information outside of the laboratory**
Model	**Is a representation of an object or an event that is used as a tool for understanding the natural world.**
Conclusion	**Is a statement about whether or not the hypothesis is valid based on the data collected**
Quantitative date:	**Data that can be measured. Ex: length, width, height, volume, mass and weight**
Qualitative data:	**Are data that cannot be measured. Ex: colors, texture, smells and tastes**
Description:	**is a summary of observations.**
Explanation:	**is an interpretation of observation**
Precision:	**is how close repeated measurements are to each other**
Consistency:	**is the ability to repeat a task with little variation**
Graphs	**are used tot organize and summarize data in a visual way Ex:bar graphs, circle graph and maps**
Table:	**display information in rows and columns**
Mean:	**is the sum of the numbers in a data divided by the number of entries in the data set**
Median:	**is the middle number in a set of data when the data are arranged in numerical order.**
Range:	**Is the difference between the highest and lowest value.**
Measurement:	**is a precise expression of a physical property as length and mass in a specific unit such as centimeters or grams.**
Mass:	**is the amount of matter in an object.**

The Important questions for lesson 1, 2

1	What do scientists do?
#	Scientists ask many questions about the world around them.
2	How do scientists communicate?
#	Scientists often publish reports in journals, books and on the internet (attend a scientific conference)
3	How is science applied?
#	Science applied by technology which is the practical use of science and how humans adapt nature to meet their needs.
4	What are the branches of science?
#	1 – The life Science 2 - The Earth Science 3 – The physical science
5	What is a scientific investigation?
#	It's a way of answering scientific questions.
6	How do scientists analyze data?
#	1 – Organize the data as a chart such as a table, a graph, a diagram, a map or a group of pictures. 2 – Look for pictures in the chart that show connections between important variables in the hypothesis being tested.
7	How do scientists draw conclusions?
#	1 – Decide if the data clearly support or doesn't support the hypothesis. 2 – If the results are not clear, rethink how the hypothesis was tested and make a new plan. 3 – Record the results to share with others.
8	Why is it important to check your data?
#	To make sure if it supports the hypothesis or not.

The important concepts for L-2 (The scientific method)

1 – Scientific method (الطريقة العلمية)

Is a series of steps that scientists use when conducting an investigation.

2 – Hypothesis (الفرضية)

Is a possible answer or prediction (التنبؤ) that can be tested.

3 – Data (البيانات)

Are information that gather during an investigation.

Data can be recorded in the form of descriptions (وصف), tables (جداول), charts (مخططات), graphs (رسومات بيانية) or drawings (رسومات)

Life cycle of star: - (دورة حياة نجم)

Stellar nursery	(مرحلة النشأة)
Protostar	(نجم بدائي)
Sun like star	(شبيه بالشمس)
Red giant	(عملاق أحمر)
White dwarf	(قزم أبيض)

Scientific Method

الطريقة العلمية

Make observations

لاحظ

Ask a question

اطرح سؤالا

Form a Hypothesis

ضع فرضية

Test your Hypothesis

اختبر فرضيتك

Results support Hypothesis

النتائج تدعم الفرضية

Results do not support Hypothesis

النتائج لاتدعم الفرضية

Draw Conclusions / Ask Questions

استخلص النتائج \اطرح الاسئلة

(Science)

A summary for lesson 3

(Tools of the scientist)

1) Qualitative Data:-

Are descriptive data that cannot be measured.

Examples of qualitative data are:-

Colors, textures, smells and tastes.

2) Quantitative Data:-

Are data that can be measured

Examples of quantitative data are:-

Length, width, height, mass and weight.

3) Description and explanation:-

A) A description is a summary of observation.

A description can be spoken or written
It includes different types of observation about an object (smell, colour or sounds)

B) Explanation:-

Is an interpretation of observation.
It explains how or why something occurred.

Precision and consistency :-

Precision is how close (متقارب)repeated measurements are to each other.

Consistency is the ability to repeat a task with little variation.

the mean: is the sum of the numbers in the data set divided by the number of the entries in the data set.

$$\text{Mean} = \frac{\text{The sum of the number in the data set}}{\text{The number of the entries in the data}}$$

For Example :- The mean for **(3, 4, 5, 6, 7, 8)** is $\frac{3+4+5+6+7+8}{6}$

The median :- The middle number is a set of data when a data is arranged in a numerical order.

For example :- 3, 4, 5, 6, 7, 8
The median in this set of data is

$$\frac{5+6}{2} = \frac{11}{2} = 5.5$$

The range :- in a set of data is the difference between the highest and lowest values

For Example :- The range for (3, 4, 5, 6, 7, 8) is **8 - 3 = 5**

Highest Value — Lowest Value

The important question in lesson 3

1 – What are the types of data?

A) Qualitative data
B) Quantitative data

Note :- How do scientists communicate data?

- Tables, graphs and statics make it easier for scientist to understand and share it with others.
- Different types of graphs are used to display different types of data.

How we can stay safe in the lab?

1 – Follow your teacher's instructions.

2 – Wear the correct protective clothing and equipment for the investigation.

3 – Always wash your hands before and after the investigation.

A summary for lesson 4 Chapter 1

1) How are physical properties observed and described?

a) By using tools such as hand lenses and microscopes.

b) Detailed descriptions also allow scientists to communicate their findings, and give others a picture of an object.

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2) How are physical properties measured?

- Most people throughout the world use the International System of Units (SI) to measure objects physical properties such as Centimeters, Milliliters and Grams.

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3) How are mass and weight measured?

- An object's mass is measured with a metric balance or also called a Pan Balance.
- To measure an object's weight use spring scales.

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4) How is volume measured?

a) Volume for solids :- Volume = Length x Width x Height

b) Volume for liquids: - We can measure volume for liquids by graduated Cylinder or a Beaker.

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5) How is temperature measured?

- Temperature is measured by a Thermometer

Types Of Thermometer

1) **A liquid – in – glass thermometer: -** a clear glass tubes contains a liquid, the liquid expands when it gets warmer, then you read the temperature.
2) **A dial thermometer: -** it contains a coiled strip made of two metals; the strip expands when it gets warmer.
3) **A liquid crystal thermometer: -** is a plastic strip filled with a substance that change color at a particular temperature.
4) **An electronic or digital thermometer: -** has an electronic sensor that detects the temperature of an object.

Some Important Concepts:-

A hand lens: - is a simple microscope or a microscope with only one lens.

A compound microscope: - it has several lenses; scientists use it to magnify things that are very small such as cells.

A measurement: - is a precise expression of a physical property such as length and mass.

A graduated cylinder: - is a tall, narrow and clear container.

Table of Measurements	
International System of Units (SI)	
Temperature	**Water freezes at 0°C (degrees Celsius and boils at 100°C**
Length and Distance	**1,000 meters (m) = 1 kilometer (km)** **100 centimeters (cm) = 1 meter (m)** **10 millimeters (mm) = 1centimeter (cm)**
Volume	**1,000 millimeters (mL) = 1litter (L)** **1 cubic centimeter (cm^3) = 1 milliliter (Ml)**
Mass	**1,000 grams (g) = 1 kilogram (kg)**
Weight	**1 kilogram (kg) weight 9.81 newtons(N).**

How do you convert units?

When you convert From largest to smallest (multiply)

1- Convert 3 meters to Centimeter:

Even 1 meter = 100 centimeter,

So 3 m x 100 cm = 300 CM

When you convert From smallest to largest (divide)

2- Convert 2,000 grams to kilograms:

Even 1 kilogram = 1,000 grams,

So 2,000 grams ÷ 1,000 grams = 2 kilograms

Multiple Choice

1 -Scientific theories are

A - guesses why something happens.

B - supported by observations and results from many investigations.

C - scientists' opinions.

2 - The variable that is changed in a controlled experiment is called the

A - independent variable.

B - dependent variable.

C - control variable.

3 - Which are examples of qualitative data?

A - color and mass.

B - color and smell.

C - smell and volume.

4 - Which statistic is the middle number in a data set?

A - mean.

B - median.

C - range.

5 - Why would scientists want to calculate the range of a set of data?

A - to identify the middle number in the data set.

B - to understand the amount of variation in the data set.

C - to make sure the procedures were followed correctly.

6 - Which tool would a scientist use to find the volume of a small amount of water?

A - graduated cylinder.

B - balance.

C - computer.

7 - Which is an important safety rule to follow while conducting a scientific investigation?

A - Ask questions only after you have finished completing the investigation.

B - Wear safety goggles and protective clothing when working with chemicals.

C - Avoid washing your hands after an investigation.

Fill in the blank.

1 - The variable that is measured during an investigation is called the **dependent variable.**

2 - A series of steps that scientists use when conducting a scientific investigation is called the **scientific method.**

3 - Information gathered during a scientific investigation is called data.

4 - Scientists use **consistency** to be sure that tasks and procedures can be repeated with minimal variation.

5 - An object's mass is measured with a **metric balance.**

6 - The **mean** of a set of numbers is the sum of the numbers divided by the number of entries in the data set.

7 - The use of science to meet human wants and needs is called **technology.**

8 - The **independent variable** in a controlled experiment is the variable that is changed.

9 - A **hypothesis** in an investigation is a prediction that can be tested.

10 - A **spring scale** is used to measure weight.

11 - A tall, narrow, clear container used for measuring the volume of a liquid is a **graduated cylinder.**

12 - The application of science is **technology.**