Fourth Grade
Science Academic Packet

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Week 1
March 30-April 3, 2020

Orange County Public Schools

Fourth Grade Recommended Pacing

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Tuesday	**Big Idea 1: The Practice of Science** **Big Idea 2: The Characteristics of Scientific Knowledge** **Big Idea 3: The Roles of Theories, Laws, Hypotheses, Models** **Study Island: Topic 2b. Collecting, Recording, & Communicating Data** **Topic 2c. Interpreting Data**	4-5
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Big Ideas 1, 2, & 3 Study Guide: Nature of Science

_____ is the study of the natural world.

A scientist asks _____ about the natural world. Scientists conduct _____ to answer their questions.

An experiment is a fair test to investigate a question. An experiment can show that one thing causes another thing to happen. All of the factors that a scientist can change or control in an experiment are _____.

A test variable (independent variable) is the thing being tested. What is being changed on purpose.

The outcome variable (dependent variable) is what is being measured or observed because of the testing variable that was changed.

The constant variables are the factors that are kept the same for both the control group and test group.

Types of Scientific Investigations:

Type of Investigation	Description
Model	a representation of an idea, an object, a process, or a system that is used to describe and explain something that cannot be experienced directly.
Simulation	an imitation of the functioning of a system or process
Systematic Observations	documenting descriptive details of events in nature –amounts, sizes, colors, smell, behavior, texture - for example - eclipse observations
Field Studies	studying plants and animals in their natural habitat
Controlled Experiment	an investigation in which scientists control variables and set up a test to answer a question. A controlled experiment must always have a control group (used as a comparison group) and a test group.

All types of scientific investigations include making _____ and collecting _____.

Scientists make observations about the world around them. An observation is information collected using the senses. An observation is something you _____, _____, _____, _____, or _____. Scientists ask questions about their observations. Scientists use measurement tools to make observations.

_____ is information gathered when scientists make systematic observations or set up an experiment to collect and record _____. The data recorded is then analyzed by the scientists in order to base _____ on the evidence collected. The collection of evidence is a critical part of a scientific investigation. Evidence is used when scientists explain how things work. A scientific investigation is only valid if it is based on observations and evidence.

Scientists always complete at least _____ trials in a controlled experiment. Performing repeated trials helps to ensure that the results of an experiment are reliable or valid.

Scientists also replicate the work of other scientists to verify the results. When a scientific investigation is replicated by another scientist using the same procedure and tools, the results should be _____ for all of the scientists. Scientists compare observations made by different groups and seek reasons to explain the differences across groups.

_____ can be displayed in different ways, such as in maps and graphs. Scientists communicate in many ways, such as working together to collect data, comparing data, and reporting their results and conclusions.

An _____ is a statement that explains an observation. Scientists infer how things work by thinking about their _____.

Make an observation and an inference based on the observation for the photo below in the table.

Photo	Observation	Inference
		

It is important to note that scientific investigations do not follow a rigidly defined set of steps. These investigations follow steps necessary to find an answer to the question being investigated. The table below shows some steps that are often included in the scientific method when carrying out a controlled experiment.

Step	Description
Problem/Purpose	The question being investigated is identified.
Research	Information about the topic is obtained from reputable sources: books, internet (reliable sites), experts, encyclopedias, etc.
Prediction (Hypothesis)	A prediction, based on research, is made about what you think the evidence is going to show. All 4th grade hypotheses should include the words If…. then…. because….
Experiment	Materials are identified and a procedure is developed to test your prediction. Make sure that you are very specific about the details - amounts, types, colors, etc .so that another scientist could follow your steps. Once you have a good procedure, you should perform 3 trials of your experiment and keep data in a data table for each trial.
Analyze Results	Examine the data and look for patterns, trends, consistencies, etc
Conclusion	Compare the results with your prediction. Was your prediction supported by the evidence? Or did the evidence disprove your prediction?

Sometimes a scientific question can only be answered by using a _____. A _____ represents something real that is too big, too small, or has too many parts to investigate directly.

_____ can either be two-dimensional, three-dimensional, or a computer model.

Words in science can have different or more specific meanings than their use in everyday language; for example, energy, cell, heat/cold, and evidence.

Big Idea 8 Study Guide: Properties of Matter

States of Matter and Its Physical Properties

Matter is anything that has _____ and_____.

The three _____ of matter include _____, _____, and _____.

Solids have a definite _____ and _____.

Liquids have a definite_____, but no definite _____.

Gases have no definite _____ or _____.

Matter can be described by its _____.

What are some physical properties of matter that you are able to observe?

Mass = _____ Mass is measured with what science tool? _____
Volume = _____ What are three tools can you use to measure volume? 1._____ 2._____ 3._____

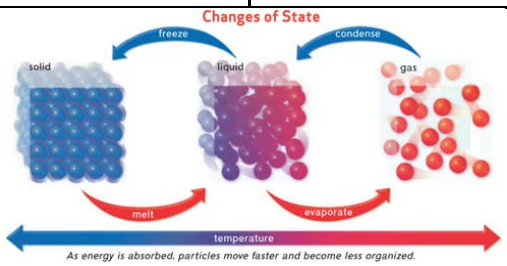
Do a quick draw comparing two objects with the same mass and same volume. Include a balance in your drawing.

Do a quick draw comparing two objects with the same volume, but different mass. Include a balance in your drawing.

Do a quick draw comparing two objects with the same mass, but different volume. Include a balance in your drawing.

A _____ is when matter changes from one state to another.

Heat is increased (added)	Heat is decreased (removed)
_____ is when a solid changes to a liquid. _____ is when a liquid changes into a gas.	_____ is when a gas changes into liquid. _____ is when a liquid changes into a solid.



What are common uses of water in its liquid state?

What are common uses of water in other states (solid or gas)?

<u>Law of Conservation of Mass</u>

The Law of Conservation states that _____ does not change when the shape of the matter changes.

For example, a whole cracker has the same mass as a cracker that is broken into pieces.

If a stick of clay has a mass of 50 grams. Say you change that stick of clay into four different shapes. When you find the mass of all four shapes together, what is the mass of those four different shapes combined? _____ grams

<u>Magnetism</u>

When two magnets with the same poles (north and north or south and south) are placed next to each other, they will _____.

When two magnets with opposite poles (north and south) are placed next to each other, they will _____. Magnets attract metals like _____ and _____.

Draw a diagram to show what happens when the north pole of a magnet is placed next to the north pole of another magnet.

Draw a diagram to show what happens when the north pole of a magnet is placed next to the south pole of another magnet.

Draw a diagram to show what happens when the south pole of a magnet is placed next to the south pole of another magnet.

Big Idea 9 Study Guide: Changes in Matter

A _____ is a change of a matter in size, shape, or state that does not change the original matter into a new type of matter. No new substance is formed.

What are some ways we can create a physical change?

Water undergoes a physical change when it _____, _____, _____, or _____.

Boiling water is an example of a _____ change.

A _____ is a process by which substances are changed into different substances with different properties.

A _____ substance is formed as a result of a chemical change.

There are many changes that materials undergo that result in other materials with different characteristics, such as:

- _____
- _____
- _____
- _____
- _____

There are four signs that indicate a chemical change occurred. Those four signs are:

- _____
- _____
- _____
- _____

When a material undergoes a change, it can occur quickly, or take place over a long period of time. One example of a quick change, is fireworks. One example of a slow change, is a bike rusting.

Fill in the table below with examples of changes create no new substance and examples of changes that created a new substance.

No New Substance Created	A New Substance Was Created
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

Changes that create new substances are _____, while changes that do not create a new substance are _____.