

# Fifth Grade Science Academic Packet



Week 1  
March 30-April 3, 2020

# Fifth Grade Recommended Pacing

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<b>Monday</b>	<b>Big Idea 1: The Practice of Science</b> <b>Big Idea 2: The Characteristics of Scientific Knowledge</b>  <b>Study Island: Topic 1. Pretest</b> <b>Topic 2a. Scientific Investigations</b> <b>Topic 2b. Experimental Design</b>	3-4
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<b>Wednesday</b>	<b>Big Idea 6:</b> <b>Study Island: Topic 3c. Rocks &amp; Minerals</b> <b>Topic 3d. Earth's Resources</b> <b>Topic 3e. Weathering and Erosion</b>	7-10
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## Big Ideas 1 & 2 Study Guide: Nature of Science

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 _____, is made about what you think the evidence is going to show. All 5th grade predictions 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 your experiment including at least _____ trials and keep data in a data table.
Analyze Results	Examine the _____ and look for patterns, trends, consistencies, etc.
Conclusion	Compare the results with your _____. Was your prediction supported by the evidence? Or did the evidence disprove your prediction?

### Types of Scientific Investigations:

Type of Investigation	Description
_____	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.
_____	an imitation of the functioning of a system or process
_____	documenting descriptive details of events in nature –amounts, sizes, colors, smell, behavior, texture - for example - eclipse observations
_____	studying plants and animals in their natural habitat
_____	an investigation in which scientists control variables and sets 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.
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ALL types of Scientific Investigation include making \_\_\_\_\_ and collecting \_\_\_\_\_.

**Observations:**

Scientists make observations about the world around them. An \_\_\_\_\_ is information about the natural world that is gathered through one of the five \_\_\_\_\_. An observation is something you see, hear, taste, touch, or smell. Sometimes scientists use measurement tools when making observations. Scientists ask questions about their observations.

Scientists also make inferences. An inference is different than an observation because it is not directly seen, heard, tasted, touched, or smelled. An inference is an explanation based on evidence. Scientists make inferences based on their observations.

**Evidence**

**Evidence** is information gathered when scientists make systematic \_\_\_\_\_ and/or set up an experiment to collect and record data. The \_\_\_\_\_ recorded is then analyzed by the scientists in order to make conclusions based on the evidence collected. The collection of \_\_\_\_\_ is a critical part of a scientific investigation. Although the scientific method does not always follow a rigidly defined set of steps, a scientific investigation is only valid if it is based on \_\_\_\_\_ and \_\_\_\_\_.

Make an observation and an inference based on the observation for each of the photos in the table.

Photo	Observation	Inference
		
		

**Controlled Experiments**

A **controlled experiment** is different than all other types of scientific investigations because in an experiment, \_\_\_\_\_ are being controlled by the scientist in order to answer a question. A controlled experiment always includes at least two groups - a test group and a \_\_\_\_\_ group used for comparison. The control group is identical to the test group except for the one variable changed on purpose (the thing being tested) so that evidence of any difference can be collected. A variable is a factor, condition, or event that can be changed or

controlled in order to study or test a prediction (hypothesis). There are three classes of variables used in experiments: the test (independent) variable, the outcome (dependent) variable, and the constant variables.

Variable Type	Also Known As	Defined As:
_____	Independent Variable	The one thing that is changed between the test group and control group on purpose. The thing being tested. For example the test variable in the bubble lab was the amount of dish soap.
_____	Dependent Variable	The way that we are measuring the difference between the control and test groups - for example the outcome variable in the bubble lab was the diameter (size) of the bubble produced by each formula.
_____	Constants	All of the things that are kept the same in an experiment so that you can trust that any difference between the test group and the control group is because of the test variable (or thing that is being tested). For example in the bubble lab the amount of water, type of dish soap, type of straw, amount of liquid squirted on the table, etc would all be kept the same.

Scientists always complete at least \_\_\_\_\_ trials in a controlled experiment. Performing repeated trials helps to ensure that the results of an experiment are \_\_\_\_\_. This means that the results are consistent (or similar) in all of the trials performed. A valid experiment controls variables, includes at least \_\_\_\_\_ trials and obtains \_\_\_\_\_ results in the three trials.

To help fill in these charts students are asked to reflect on two different inquiries from the CRM PowerPoints: Those inquiries are:

- Bubble Lab from Big Ideas 1 & 2 CRM PowerPoint
- Alka-Seltzer Rocket from Big Ideas 8 & 9 CRM PowerPoint

**Give Examples of Predictions, Observations and Inferences from each lab listed:**

Lab	Predictions (If....then....because)	Observations (Things I See, Hear, Taste, Touch, or Smell)	Inferences
Bubble Lab			

<b>Alka Seltzer Rocket Lab</b>			
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**Give Examples of Constant (Controlled) Variables for each lab:**

<b>Bubble Ball Lab</b>	<b>Alka-Seltzer Rocket Lab</b>

**Give Examples of Testing Variables for each lab:**

<b>Bubble Ball Lab</b>	<b>Alka-Seltzer Rocket Lab</b>

**Give Examples of Outcome Variable for each lab:**

<b>Bubble Ball Lab</b>	<b>Alka-Seltzer Rocket Lab</b>

**Control Group**

Why is it important to have a control group in an experiment?

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Why is it important for a scientific investigation to be replicable by other scientists?

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Why is it important for scientists to share findings with other scientists?

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## Big Idea 6 Study Guide: Earth Structures

### Minerals

Minerals are non-living, solids that can be found in nature. Each type of mineral has a definite chemical composition. For example every piece of quartz is made of the same type of matter as another piece of quartz. Minerals can be identified by their consistent and distinct physical properties. The table below examines some of the properties we can use to identify or describe a mineral.

Property	Description
_____	Like all objects in our world, when light shines on a mineral some colors bounce off the mineral and other colors are absorbed by the mineral. Our eyes see the color that is bounced off or reflected. Many minerals share the same color so you will have to observe more than just this property in order to identify a mineral.
_____	Describes how easily it can be scratched. A mineral is considered harder than another mineral if it can scratch that mineral.
_____	Describes how a mineral appears when it reflects light (how shiny it is). Words like metallic, earthy, glassy, dull, pearly and waxy can be used to describe this property.
_____	Describes how a mineral breaks apart along smooth surfaces. Mica is a mineral with excellent cleavage.
_____	Describes the color of the powder the mineral leaves behind when it is rubbed on a streak plate (porcelain tile).

### Songs To Help with Minerals and Rocks

Mineral Properties Song (To the tune of Frère Jacques)	Rock Song
Hardness - Scratch Hardness - Scratch Luster - Shine Luster - Shine Cleavage - Break Cleavage - Break Streak - Powder Streak - Powder	Metamorphic - Heat and Pressure Sedimentary - Erosion and Weather Igneous - Red hot magma - Cooled

## Rocks

All rocks are made of \_\_\_\_\_. Each rock contains one or more minerals. Rocks are classified by the way that they are \_\_\_\_\_. The table below describes the three types of rocks. ***Some examples of each type of rock can be found in the Examples column. These specific examples DO NOT need to be memorized.***

Type of Rock	How it is Formed	Characteristics Possible	Found	Examples (Do Not Memorize)
_____	Formed when melted rock, known as magma (lava), cools. It can cool on Earth's surface or below.	<ul style="list-style-type: none"> <li>• glassy</li> <li>• gas bubbles</li> <li>• crystals form when it cools slowly under Earth's surface</li> </ul>	Near volcanoes	pumice obsidian, basalt
_____	Formed deep in the earth when rock is put under extreme heat and pressure.	<ul style="list-style-type: none"> <li>• ribbon-like layers because of uneven pressure</li> <li>• crystals</li> </ul>	Deep in the Earth	slate, schists, marble, gneiss
_____	Formed on Earth's surface when rock is weathered, layered, and cemented together naturally by water.	<ul style="list-style-type: none"> <li>• fossils (remains of dead plants &amp; animals)</li> <li>• visible layers</li> <li>• visible pieces of different sizes &amp; types of rock and sediment</li> </ul>	On the surface of Earth - Near water or where there once was water	conglomerate shale, sandstone, limestone

## Weathering and Erosion - Change the surface of Earth slowly

Process	Definition	Agents That Can Cause Each Process
_____	The breaking down of rock by various agents on earth. Words you may see for weathering are breaking, cracking, crushing, splitting, smoothing, etc.	water, wind, ice (glaciers), temperature change, plants
_____	The moving of sediment (rock) to new places by various agents on earth. Words you may see for erosion are moving, carrying, blowing, falling, flowing, etc.	water, wind, ice (glaciers), gravity

Decide whether the following examples in the table below are either weathering or erosion:

 <p>Ice expanding in cracks of a rock.</p>	 <p>Wind blowing sand to form a dune.</p>	 <p>Glaciers carrying pieces of rocks.</p>	 <p>Plants roots growing in a rock.</p>
<p>_____</p>	<p>_____</p>	<p>_____</p>	<p>_____</p>

Use the [Weathering and Erosion Sort](#) to record some real world examples of Weathering and Erosion in the chart below.

Weathering	Erosion

Although most weathering and erosion takes place over a \_\_\_\_\_ period of time, there are some changes that occur rapidly. Some examples of those rapid changes are: earthquakes, volcanoes, landslides, avalanches, floods, tsunamis.

### **Renewable and Nonrenewable Resources**

A resource is something found in nature that people use when needed.

The wise use of resources is called conservation. Recycling is a great way to help conserve our resources.

Many \_\_\_\_\_ resources are used faster than they are naturally replaced. That is why it is important to look at ways to conserve.

Fill in the correct type of resource to match the correct definition and examples:

	Definition	Examples	Examples in Florida
_____	A resource that can be remade fairly easily.	wind, solar, water /hydropower, tides, fruit, vegetables, wood, biofuel /ethanol, cotton	water, wind, solar energy, orange trees
_____	A resource that can't be easily remade.	fossil fuels (coal, oil & natural gas), phosphate deposits, limestone, silicon	phosphate, oil, limestone, silicon

## Big Ideas 8 and 9 Study Guide: Properties and Changes in Matter

**Matter** is anything that has \_\_\_\_\_ and \_\_\_\_\_.

The three \_\_\_\_\_ (or forms) 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 \_\_\_\_\_ properties.

Fill in the chart. Put yes in the box if it is possible for the state to have the property listed. Put no in the box if it is not possible for the state to have the property.

Property	Solid	Liquid	Gas
Can be different colors			
Have a definite shape			
Have a definite volume			
Can have a bumpy texture			
Have hardness (tested by scratching)			
Can Break			
Takes the Shape of its Container			
Have different odors			
Has mass			
Can Change Temperature			

What are some physical properties of matter that you are able to measure and/or observe?


Property	Defined As	Measured By
Mass		
Volume		1. 2. 3.
Temperature		

Draw a picture showing a balance scale with two boxes of equal mass and equal volume.

Draw a picture showing a balance scale with two boxes of equal mass, but different volume

Draw a picture showing a balance scale with two objects of equal volume, but different mass.

## Mixtures

**Mixtures of solids** can be separated by properties like

\_\_\_\_\_.

A mixture of sand and pebbles could be separated by \_\_\_\_\_ using a \_\_\_\_\_.

Trail mix could be separated by the \_\_\_\_\_ of the different food items in the mix.

A bag of M&M candy could be separated by the \_\_\_\_\_ of the M&Ms.

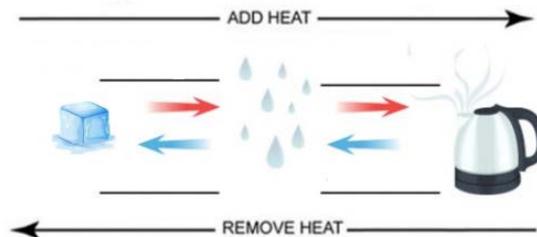
A mixture of pebbles and iron nails can be separated by \_\_\_\_\_ using a \_\_\_\_\_.

## Physical Changes

A **physical change** is a change of a substance from one form to another without a change in its chemical properties. During a physical change a substance changes state, size, or shape, but what the substance is made of does NOT change.

- **Dissolving** a substance like salt in water is a physical change. The salt and the water mix evenly when it is dissolved, but the salt can be separated from the water by \_\_\_\_\_ the water. The water and salt each keep their original \_\_\_\_\_.
  - Heating, stirring/shaking, and exposing more surface area (making the pieces \_\_\_\_\_) cause the physical change of dissolving to happen faster.
  - How do you know something has dissolved in a liquid?  
\_\_\_\_\_
  - List some examples of things that dissolve in water:  
\_\_\_\_\_
  - List some examples of things that do NOT dissolve in water: \_\_\_\_\_

- **State Changes**, substances change from one state (solid, liquid, or gas) to another, are always physical changes. For example, when water freezes, it changes from a liquid to a \_\_\_\_\_. This state change also causes water to expand, or spread out. The volume and shape of the \_\_\_\_\_ were changed, but the substance is still water (no chemically new substance has been created).
  - State changes are caused by a change in \_\_\_\_\_. Fill in the blanks on the diagram with the science word that describes the change.



- When water changes from a solid to a liquid it \_\_\_\_\_.
- When water changes from a liquid to a gas it \_\_\_\_\_.
- When water changes from a gas to a liquid it \_\_\_\_\_.
- When water changes from a liquid to a solid it \_\_\_\_\_.

Boiling water is another physical change that causes water to change from a \_\_\_\_\_ to a gas (the bubbles) where the heat is being applied (at the bottom of the pot).

As the temperature of a gas increases, so does its \_\_\_\_\_.

### Chemical Changes

A **chemical change** is a process by which substances are \_\_\_\_\_ into different substances with different chemical properties. A new material with new characteristics is formed.

- For example: Rotting (Decaying) - when food, wood, or another substance (like a dead plant or animal) rots, it becomes softer, changes color and is gradually destroyed. The rotten smell and mushy substances are some of the new materials with new properties that are formed.

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

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

When you \_\_\_\_\_ the temperature of chemical changes, the rate of the reaction increases. This means that when the substances reacting are hotter in temperature, the reaction will happen faster.

**Place the following words into the t-chart under the type of change the term indicates.**

burning	dissolving	rotting	rusting	freezing
crushing	condensing	boiling	cooking	melting
evaporating	decaying	cutting	shattering	digesting

Physical Change	Chemical Change