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**Grade 3**

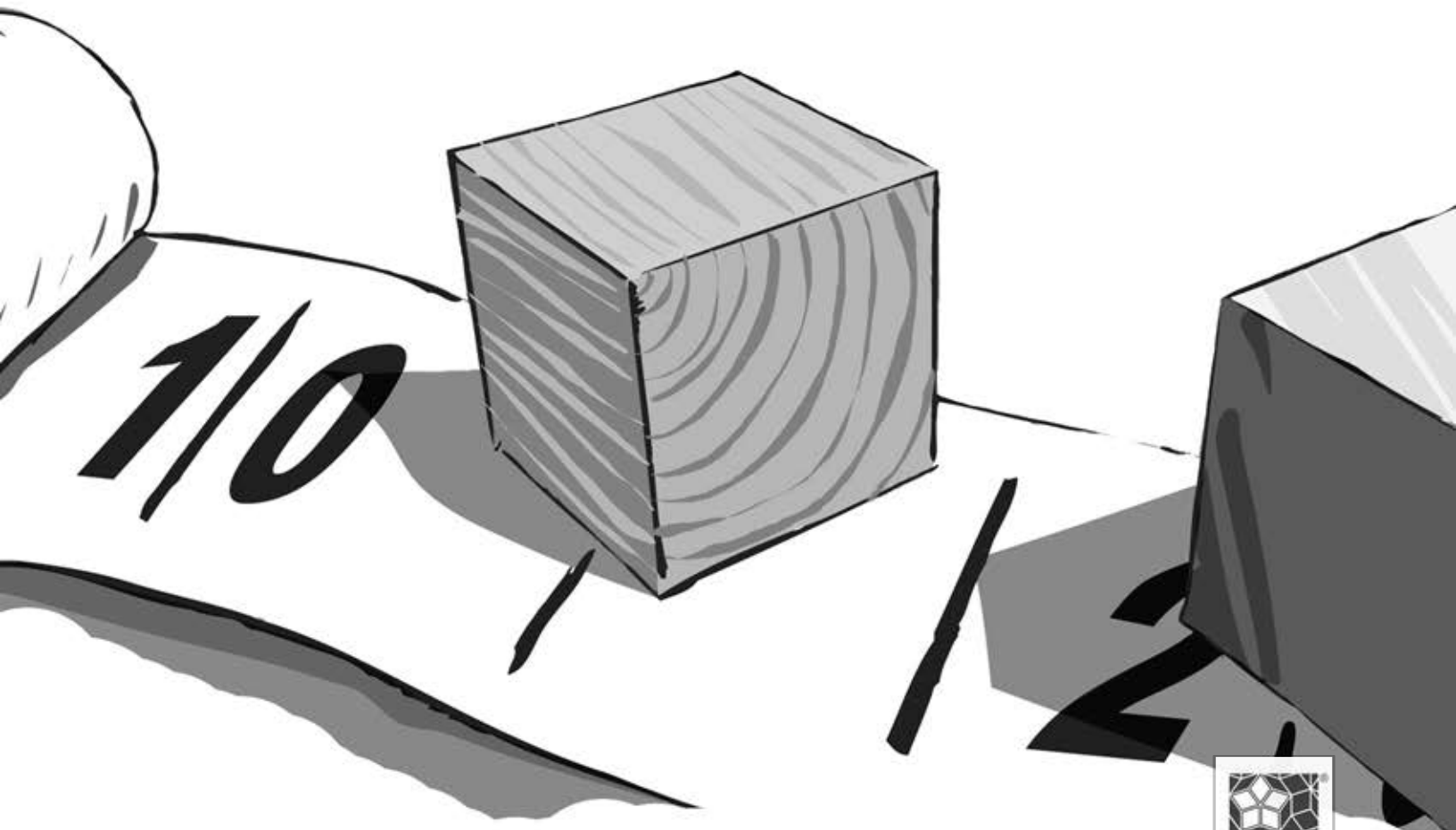
The Inquiry Project

*Seeing the world through a scientist's eyes*

# Science Notebook

**Investigating Things in My World**

Observing and Measuring Materials and Objects





Dear Student Scientist,

Scientists use notebooks, and you will too.

This is a place to keep track of your work and your questions. Here's where you'll record your measurements. Or you might make a drawing to show what you observed and add notes to it. You can explain your ideas here too.

Your notebook is for you, to help you remember what you were thinking, what you did, and what you found out. And, it is for others who want to know what another scientist (you) was thinking.

**When it's time for science, open your notebook and fill it with your ideas, questions, drawings, and findings!**

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Date \_\_\_\_\_

## *What are things in my world made of?*

**We sorted a set of objects by their materials.**

We made \_\_\_\_\_ groups.

Here are our groups and what we put in each group.

Group name:          	Group name:          
Group name:          	Group name:          
Group name:          	Group name:          

Date \_\_\_\_\_

*What kind of material makes an object work well?*

**Objects and Materials**

Object	What it is made of	Another material it could be made of	A material it can't be made of
window pane			
spoon			
my object			

*What kind of material makes an object work well?*

**Reflection:**

1. What's a good object to make with paper? Why do you think so?

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2. What's a bad object to make with paper? Why do you think so?

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Date \_\_\_\_\_

*How are materials the same and different?*

**My description of materials in 2 cubes:**

Kind of Cube (oak, pvc, copper, etc)	Words to describe the material the cube is made of

Here are two ways the materials in these cubes are alike:

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Here are two ways the materials in these cubes are different:

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Date \_\_\_\_\_

***How can we sort cubes that are all the same size?***

**We sorted the cubes in different ways.**

Here are 3 of the ways:


Date \_\_\_\_\_

*How can we sort cubes that are all the same size?*

**Reflection:**

Here's what I'm thinking now.

Here's what I noticed about materials when I grouped the objects by weight:

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Here's what I learned about materials when I grouped objects by kind of material (metal, plastic, wood):

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Date: \_\_\_\_\_

Name: \_\_\_\_\_

**My observations of objects and materials:**

Material	Why this is a good material to use

Here’s a different material that could be used to make a pencil.

\_\_\_\_\_

Here’s why I think so: \_\_\_\_\_

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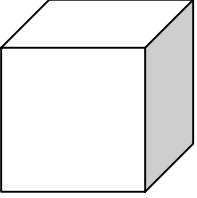
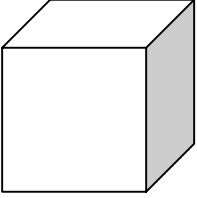
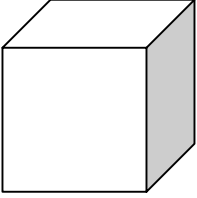
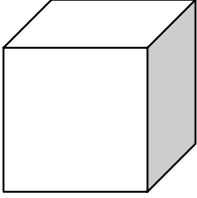
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Date \_\_\_\_\_

*How good are our senses at comparing the weights of the cubes?*

Using my hands, I think the cubes go in this order by weight

Least Weight	←-----→	Most Weight	
			

Our group thinks the 8 cubes go in this order by weight

Least Weight	←-----→	Most Weight					
							

I was surprised that:

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*What does a pan balance tell us about the weight order of the cubes?*

**We used a pan balance to compare the weights of the cubes.**

Here's what my group found out.

Weight order using pan balance:

Least Weight ----- Most Weight							

Here's how the weight order using our hands and the weight order using a pan balance compare:

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Our class decided the order of the cubes by weight is:

Least Weight ----- Most Weight							



*What does a pan balance tell us about the weight order of the cubes?*

**Reflection:**

We used our hands and a pan balance to compare the order of cubes by weight.

Here's what I'm thinking now.

1. Our senses are good at predicting the order of objects by weight when:

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2. Our senses are not good enough when:

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**Investigating Weight 2:** *What does a pan balance tell us about the weight order of the cubes?*

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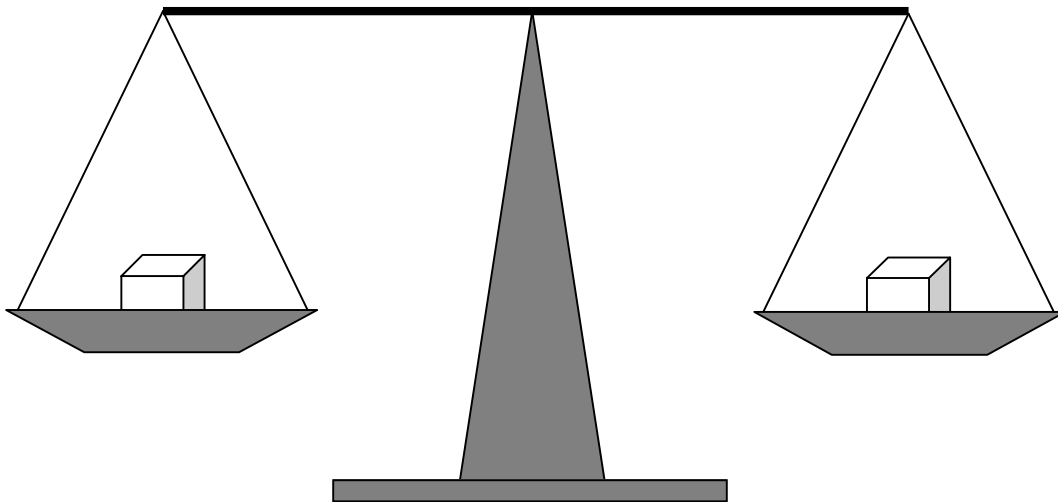
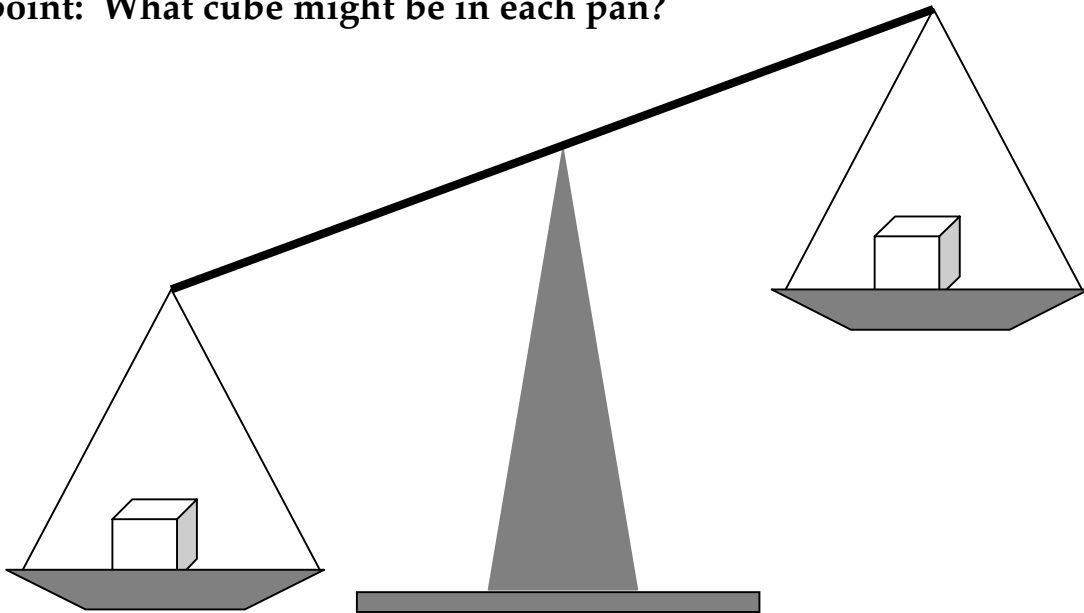
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Date \_\_\_\_\_

*What does a pan balance tell us about the weight order of the cubes?*

**Checkpoint:** What cube might be in each pan?



**Investigating Weight 2:** *What does a pan balance tell us about the weight order of the cubes?*

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***How can we measure the weights of our cubes?***

We used plastic bears, washers, and paper clips to weigh three cubes.

Our Data:

Weights		
Aluminum cube	PVC cube	Acrylic cube

I think the next time I weigh cubes I will use:

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Because:

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Date \_\_\_\_\_

*How much heavier is one cube than another?*

Our class agreed to use \_\_\_\_\_ to weigh things.

Our Data:

pine	oak	nylon	acrylic	pvc	aluminum	steel	copper

My object weighs \_\_\_\_\_

When I looked at our data I saw that:

1. Two cubes close in weight are:

\_\_\_\_\_ and \_\_\_\_\_.

2. Two cubes that have very different weights are:

\_\_\_\_\_ and \_\_\_\_\_.

3. My object weighs more than:

\_\_\_\_\_ and less than \_\_\_\_\_.

4. \_\_\_\_\_ weighs about 2 times as much as

\_\_\_\_\_.

**Investigating Weight 4:** *How much heavier is one cube than another?*

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Date \_\_\_\_\_

## *How can grams help us compare weights?*

### **Data:**

The object I weighed is \_\_\_\_\_.

It weighed \_\_\_\_\_.

Here's what I'm thinking now.

When I think about using grams to weigh things, I am surprised that:

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I wonder:

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*How much do the cubes weigh in grams?*

My Group's Data (weight in grams):

pine	oak	nylon	acrylic	pvc	aluminum	steel	copper

Our Class Data (weight in grams):

pine	oak	nylon	acrylic	pvc	aluminum	steel	copper

I think some good reasons to use grams to weigh things are:

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Date \_\_\_\_\_

*Do very tiny things have weight?*

Here is a sketch or picture of my desktop weight line and the pieces of clay.

If I gather up all the pieces of clay (including any stuck to my knife, fingers, desk, or plate) I predict the weight will be:

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I think so because:

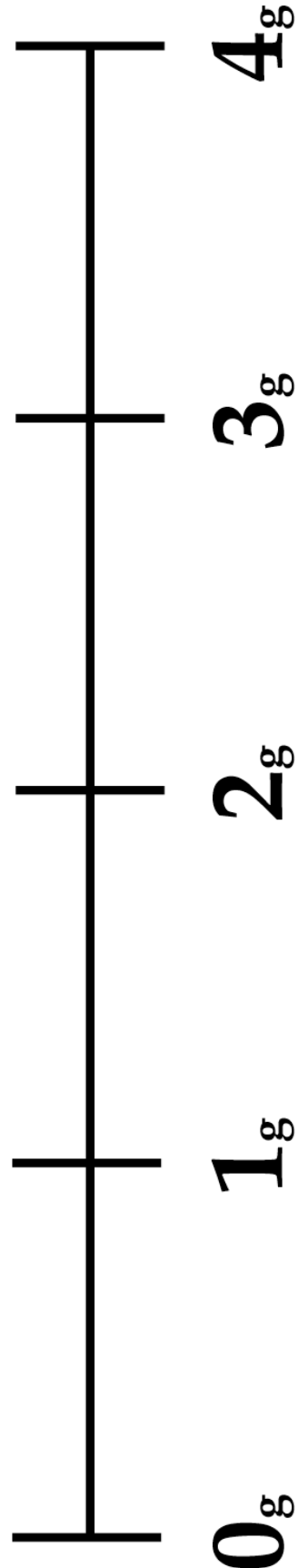
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## Desktop Weight Line





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## *The 10-10-10-10 Challenge*

### **Team members**

- |    |    |
|----|----|
| 1. | 2. |
| 3. | 4. |

### **What can you create using all of these materials?**

- 10 grams of wood
- 10 grams of plastic modeling clay
- 10 grams of aluminum
- 10 grams of Styrofoam

### **Procedure**

1. Decide what your group plans to make.
2. Weigh out 10 grams of each material.
3. Create the sculpture or object.
4. Predict the final weight.
5. After you build your creation, check the final weight.

Our group plans to make:

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I predict when it's finished, it will weigh \_\_\_\_\_

My reason is:

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## *The 10-10-10-10 Challenge*

Here's a drawing or picture of our 10-10-10-10 creation.

It weighed \_\_\_\_\_

Here's what I'm thinking about weighing things now:

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## *What does it mean to take up space?*

Three pieces of fruit and the space they take up.

Less Space  $\longleftrightarrow$  More Space

Do you think a tiny ant takes up space?

I think:

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Because:

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*How do centimeter cubes help us measure space?***Estimating:**

We estimated the amount of space some blocks take up.

<b>Least volume</b>	<b>Next</b>	<b>Next</b>	<b>Most volume</b>

**Measuring:**

Here's what we did to measure the volume of the blocks:

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Data:

<b>Block</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Volume in Cubic Centimeters				

Here's the order of the blocks by volume.

<b>Least volume</b>  <b>Most volume</b>

Here are some objects that have about the same volume as a cubic centimeter:

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**Investigating Volume 2:** *How do centimeter cubes help us measure space?*

Date \_\_\_\_\_

*If we change the shape of an object, will the volume change?*

We made 8 clay centimeter cubes. Then we made new shapes out of the clay.

**Data:**

Object	Number of centimeter cubes (cc)
8 clay centimeter cubes	
Sketch of new shape	
Sketch of new shape	

**Investigating Volume 3:** *If we change the shape of an object, will the volume change?*

Date \_\_\_\_\_

*Does changing the shape of an object change its volume?*

**Reflection:**

Here's what I'm thinking now.

When I change the shape of an object, I predict the volume will:

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What would you say to somebody who asks, "What is volume?"

I would say:

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Date \_\_\_\_\_

*How can we describe our personal objects?*

**Data I collected to describe my object**

**My object is** \_\_\_\_\_

**Materials**

My object is made of these materials \_\_\_\_\_

\_\_\_\_\_

Number of different materials \_\_\_\_\_

**Weight**

My object weighs \_\_\_\_\_ grams

**Volume**

The volume of my object is approximately

\_\_\_ less than 1 cubic centimeter

\_\_\_ 1-10 cubic centimeters

\_\_\_ 10-100 cubic centimeters

\_\_\_ more than 100 cubic centimeters



***How can we describe our personal objects?***

I used data from our class charts to answer these questions.

**Data table # 1: What kinds of materials are our objects made of?**

Most of our objects are made of \_\_\_\_\_ materials.

The number of materials ranges from \_\_\_\_\_ (smallest #)  
to \_\_\_\_\_ (highest #).

**Data table # 2: What materials are our objects made of?**

How many different materials are our objects made of?

\_\_\_\_\_

The material that is used most often is \_\_\_\_\_.

A material that isn't used in any of our objects is \_\_\_\_\_.

**Data table # 3: How much do our objects weigh?**

The weight of our objects range from \_\_\_\_\_ (lightest)

to \_\_\_\_\_ (heaviest).

The most common weight is about \_\_\_\_\_ grams.

**Data table # 4: What is the volume of our objects?**

The most frequent volume is \_\_\_\_\_.

The least frequent volume is \_\_\_\_\_.

**Investigating Volume 4:** *How can we describe our personal objects?*

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