

THE EARTH CLUB

A MATH PROJECT

In this project students will work with the various aspects of participating in a school Earth Club! Math skills include:

- **Graphing and Data Interpretation**
- **Multi-Digit Operations**
- **Fractions**
- **Elapsed Time**
- **Problem-Solving**
- **Money**

and more!



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ABOUT THIS RESOURCE

Are you looking for a way to reinforce math concepts in an engaging way that helps your students make connections? "The Earth Club" is a **real-life math project** where students will complete eleven different math-related tasks.

These activities can be used as a package, or in isolation. They work great as a math center, small-group lesson, early finisher activity, or partner activity. This particular project is great for the month surrounding Earth Day.

Take a look at what you'll find inside this math project:

TASK #1: EARTH DAY FACTS

Now that you're part of the Earth Club, it's important to learn some interesting facts about our Earth!

Skills: problem-solving, fractions, multiplication, division, subtraction, comparing & ordering

TASK#2: TREE PLANTING

Your Earth Club's first task is to help the town plant new trees! Let's take a look at where they will be planted.

Skills: bar graphs, data interpretation, elapsed time

TASK
#1

EARTH FACTS

Now that you're part of the Earth Club, it's important to learn some interesting facts about our Earth!

The Sahara Desert is the largest desert on Earth. It covers about one-third of the continent of Africa. What fraction of Africa is not covered by the Sahara Desert? Write your answer in picture form and in word form. Then represent it in picture form.

Mount Everest is the highest mountain on Earth, measuring 29,031 meters. Suppose that a climber climbed Mount Everest. About how many meters would he/she climb each day? Write your answer in picture form.

The first Earth Day was celebrated in 1970. How many years ago was it? Write your answer in picture form.

The average person produces 2 kilograms of garbage each week. How much garbage will one person produce in four weeks? Write your answer in picture form.

PLANET	DIAMETER (in kilometers)
Neptune	49,244 km
Saturn	16,460 km
Uranus	50,724 km
Mars	6,779 km
Earth	12,742 km
Mercury	4,879 km
Venus	12,104 km
Jupiter	139,820 km

Order the planets from smallest to largest diameter.

How much longer is the diameter of Earth than the diameter of Venus?

How much shorter is the diameter of Mars than the diameter of Saturn?

What is the difference between the shortest and longest diameters?

TASK
#2

TREE PLANTING

Your Earth Club's first task is to help the town plant new trees! Let's take a look at where they will be planted.

The town has hired your Earth Club to do all of the new tree planting around town. You'll be planting trees in the following areas:

- Main Street - 30 trees
- Fifth Avenue Park - 65 trees
- Community Playground - 18 trees
- Bike Trail - 75 trees
- Town Campground - 100 trees

Record the trees on the bar graph.

NUMBER OF TREES TO BE PLANTED				
100				
90				
80				
70				
60				
50				
40				
30				
20				
10				
0				
	MAIN STREET	FIFTH AVE PARK	COMMUNITY PLAYGROUND	BIKE TRAIL
				TOWN CAMPGROUND

Solve the problem:

The tree seedlings come in crates of 50. How many crates will you need to plant all of the trees?

You'll need to make a plan for tree planting. Let's see how long it will take at each location.

Location	Time Required
Main Street	1 hour
Fifth Avenue Park	1 hour 15 minutes
Community Playground	30 minutes
Bike Trail	2 hours 30 minutes
Town Campground	3 hours

THINK FAST! If a tree in your front yard was planted 80 years ago, in what year was it planted?

Use the chart above to solve the problems:

You begin planting at the Community Playground at 9:08 am. At what time do you finish? Use the number line to show your work. Then draw the hands on the clocks to show the start and end times.

START

END

Suppose that you begin planting at the Town Campground at noon. Once you finish, it takes 20 minutes to get your supplies over to Fifth Avenue Park, where you will plant next. At what time do you finish at Fifth Avenue Park?

Altogether, how long does it take to plant all of the trees?

TASK #6: TRANSPORTATION CHALLENGE

Your club has started a transportation challenge for the entire school! You're trying to encourage more people to walk or bike to school instead of driving.

Skills: bar graphs, interpreting data, number lines, fractions, decimals

TASK #6 TRANSPORTATION CHALLENGE

Your club has started a transportation challenge for the entire school! You're trying to encourage more people to walk or bike to school instead of driving.

You will survey the students in your school three different times a week. The graph below shows how many students walked, biked, or drove to school on Monday and Wednesday.

Day	Walking	Biking	Driving
Monday	75	100	150
Wednesday	125	100	100

Use the graph to answer the questions.

- How many people walked to school on Monday?
- How many people drove to school on Monday?
- How many more people walked than drove on Wednesday?
- What happened to the amount of people who walked to school on Wednesday?

Solve the problems.

Michael is one of the students who has been walking to school instead of getting a ride with his mom. It takes 3 minutes to drive to school, but 16 minutes to walk. If he needs to be at school at 8:45 am, at what time should he leave his house when he walks to school? Use the number line.

Nikola rides his bike to school during the challenge. He has 10 blocks to ride from his house to the school. It takes him 45 seconds to bike one block. How long (in minutes and seconds) does it take for him to bike to school?

Over the past 10 school days, Carlyn has driven with her uncle twice, walked 4 times, and biked the rest! For each type of transportation that Carlyn has used, write a fraction, write a decimal, and draw a representation.

	FRACTION	DECIMAL	REPRESENTATION
DRIVE			
WALK			
BIKE			

TASK #7: PLASTIC BAG COLLECTION

This month you're collecting as many plastic grocery bags as you can. They will be reused at your school.

Skills: expanded form, word form, problem-solving

TASK #7 PLASTIC BAG COLLECTION

This month you're collecting as many plastic grocery bags as you can. They will be reused at your school.

This table shows the amount of plastic bags collected at the school each week. Write each number in word form and expanded form.

Week #	# of Bags Collected	Word Form	Expanded Form
1	24		
2	309		
3	187		
4	450		

Answer the questions:

Your goal was to collect 1000 bags during the month. How many bags did you collect in week 4?

What is the difference between your goal and the number of bags collected in week 4?

TASK #8: SCHOOL COMPOST

Your next task is to start a school compost! You'll be encouraging all of the students and teachers to compost whatever they can from their lunch waste!

Skills: problem-solving

TASK #8 SCHOOL COMPOST

Your next task is to start a school compost! You'll be encouraging all of the students and teachers to compost whatever they can from their lunch waste!

Composting is another way to reduce waste. Suppose that you collect 10 kilograms of fruit and vegetable waste per day from the school to add to your compost. This will reduce the amount of waste that is thrown away! How many kilograms would you collect in one school week (5 days)?

How about in one month (20 school days)?

The 5th grade class has 20 students. Three-fourths of them added something to the compost today. How many students from 5th grade added something to the compost today?

It will take about 4 months for the materials in your compost to decompose. About how many days is this?

Suppose that your Earth Club spends about one hour per week working on the compost. About how many hours will you spend over the 4 months?

TASK #9: REUSABLE MATERIALS

Your school has an after-school Art Club. The club is asking for re-usable materials for an upcoming project!

Skills: line plots, comparing data

TASK #9 REUSABLE MATERIALS
Your school has an after-school Art Club. The club is asking for re-usable materials for an upcoming project!

The Art Club is collecting the following items: cereal boxes, plastic milk jugs, glass jars, and newspapers. The line plot below shows how many of each were collected in February and March.

ITEMS COLLECTED IN FEBRUARY
(each x represents 8 items)

					X
				X	X
			X	X	X
		X	X	X	X
	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X

ITEMS COLLECTED IN MARCH
(each x represents 8 items)

										X
								X	X	X
							X	X	X	X
						X	X	X	X	X
					X	X	X	X	X	X
				X	X	X	X	X	X	X
			X	X	X	X	X	X	X	X
		X	X	X	X	X	X	X	X	X
	X	X	X	X	X	X	X	X	X	X

Use the line plots to answer the questions.

- How many cereal boxes were collected in February? _____ How about March? _____
- How many more milk jugs were collected in March than in February? _____
- Altogether, how many newspapers were collected in February and March? _____
- How many glass jars were collected in March? _____
- The Art Club needs 75 glass jars in all. Do they have enough? _____

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TASK #10: COMMUNITY GARDEN

Great news! Your Earth Club has been asked to plant this year's community garden! This is a huge project for your entire community!

Skills: money, addition, multiplication, subtraction, fractions, problem-solving, picture graphs

TASK #10 COMMUNITY GARDEN
Great news! Your Earth Club has been asked to plant this year's community garden! This is a huge project for your entire community!

The first task is to buy the seeds. Figure out the total cost for all of the seeds.

Type of Seed	# of Packages	Cost Per Package	Total Cost
Carrot	20	\$2.25	
Pea	15	\$1.50	
Tomato	20	\$1.75	
Pepper	20	\$2.00	
Radish	12	\$2.10	
Lettuce	20	\$2.25	
TOTAL COST OF ALL SEEDS			

Next you will need to prepare and plant the garden.

It takes your group 120 minutes (2 hours) in all to prepare and plant. One-fourth of the time is spent tilling the garden. One-third of the time is spent planning the layout of the garden. The rest of the time is spent planting and watering the seeds. What fraction of the time is spent planting and watering the seeds? Use the fraction diagram to help you.

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As you are planting the garden, you run into some problems that need to be solved.

You bought 20 packages of carrot seeds. There are 25 seeds in each package. How many seeds are there altogether?

You are planting the pea seeds 4 centimeters apart. How many seeds will you need that is 10 meters long? (Hint: Remember that there are 100 centimeters in 1 meter.)

FIRST: How long is the row in centimeters?

SECOND: How many pea seeds will fit in the row?

In the first row of tomatoes, you plant 80 seeds. In the second row, you plant the same amount. In the third row you plant one-half the amount that you planted in the first row. How many tomato seeds do you plant altogether in those three rows?

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Today was a big day in the garden. This picture graph shows what was picked from the garden today.

Plant	How many were picked today? (Each picture represents 6 vegetables)
Carrots	
Peas	
Tomatoes	
Peppers	
Radishes	
Lettuce	

Use the graph to answer the questions.

- How many peppers were picked today? _____
- How many tomatoes were picked today? _____
- How many carrots were picked today? _____
- How many more peas than radishes were picked today? _____
- Altogether, how many peppers, tomatoes, and peas were picked today? _____
- How many vegetables were picked today in all? _____


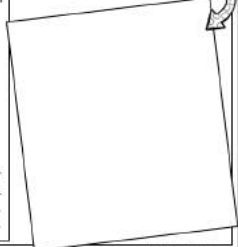
Explain how you figured this out: _____

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TASK #11: WATER BOTTLE FACTS

Plastic water bottles are not only expensive, but they also create a lot of waste! Let's learn some facts about water bottles.

Skills: problem-solving

TASK #11	WATER BOTTLE FACTS Plastic water bottles are not only expensive, but they also create a lot of waste! Let's learn some facts about water bottles.
<p>It takes about 450 years for a plastic water bottle to decompose! If you throw a water bottle away today, what year will it be when it finally is decomposed? Use a number line.</p> 	
<p>Only one-fifth of water bottles are actually recycled! Suppose that 1000 water bottles are sold at the store today. How many of them will end up in a landfill rather than being recycled?</p>	
<p>Suppose that a bottle of water costs \$2.00 and a family buys 600 bottles per year. How much money does this family spend on bottled water in one year?</p> <p>How much money does this family spend if they buy 1000 bottles per year?</p> <p>In your opinion, is the cost of bottled water worth it? _____</p>	<p>Design a poster to encourage students to reduce or recycle their water bottles.</p> 
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PLUS TWO BONUS WRITING ACTIVITIES
to use at the beginning and end of the project

EARTH CLUB Suppose that you are going to start an Earth Club at your school. List some ideas for what you could do to make an impact on the environment.	
IDEAS	
NAMES What could you name your Earth Club? List some ideas.	
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MAKE A PLAN One person can make a big difference! On this page, write down all the ways you can think of to help the environment. Let's make it happen!	
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ANSWER KEYS ARE INCLUDED TO MAKE SELF-CHECKING SIMPLE.

WAYS TO USE MATH PROJECTS IN YOUR CLASSROOM:

Math projects are an ideal way to consolidate learning. I recommend using them as an engaging activity AFTER skills have been learned rather than during learning. You will likely find that engagement is very high and that your students ask to do more of these!

There are many ways to use math projects in your classroom. Some of the most popular are:

- a small-group or pairs activity
- a guided math activity to allow you to see where your students are struggling
- a fun, rewarding way to engage your early finishers
- a low-prep, easy-to-implement activity for a substitute teacher

Enjoy!

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