



Investigate the Possibilities

Elementary Astronomy

THE UNIVERSE

From Comets to Constellations

Student Journal

Tom DeRosa
Carolyn Reeves

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Student Journal

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Unless otherwise noted, Scripture quotations are from the New International Version of the Bible.

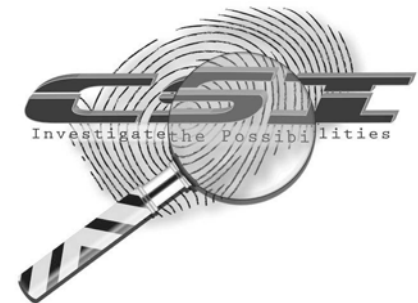
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Note to the Student

Record your ideas, questions, observations, and answers in the student book. Begin with "Think about This." After you read "Think about This," try to recall and note any experiences you have had related to the topic, or make notes of what you would like to learn.

Record all observations and data obtained from each activity.

You should do at least one "Dig Deeper" project each week, recording the projects you choose to do, along with the completion date in a notebook or journal. Your teacher will tell you how many projects you are required to do. The reason for the large number of projects is to give you choices. This allows you to dig deeper into those areas you are most interested in pursuing. Most of these projects will need to be turned in separately from the Student Journal.

Record the answers to "What Did You Learn."

The Stumper's Corner is your time to ask the questions. Write two short-answer questions related to each lesson that are hard enough to stump someone. Write your questions along with the correct answer or write two questions that you don't know and would like to know more about.

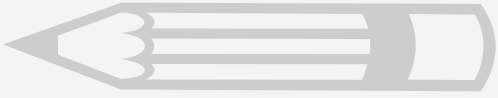
Some of these experiments should be done with the help of adult supervision. They have been specifically designed for educational purposes, with materials that are readily available.

ACTIVITY

1

Investigation #1 What Is the Universe?

Date:



Dig Deeper



Dig Deeper completed in notebook.

The Activity: Procedure and Observations



Follow the directions to make a model of the distances of the planets from the sun.

1. Each penny represents a distance of 1 AU (astronomical unit). Use the chart in your text to find the approximate distance of each planet from the sun. Write the names of the planets and tell how many miles or km each planet is from the sun.

Planet	Distance to the sun
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. Predict how many pennies it would take to represent the distance to the nearest star from our solar system. _____



Stumper's Corner

1. _____
2. _____



1. Why do scientists sometimes use models to explain things in nature?

2. What is one problem with using the penny model to help explain the solar system?

3. What kinds of things are found in our solar system?

4. Name the four rocky planets in order.

5. Name the four outer gas planets in order.

6. Explain what is meant by an AU unit.

7. Where are the solar system's asteroid belt and the TNO region?

8. What is a light-year? Why are AUs not used to measure some distances between objects in the universe?

9. Briefly explain each of the following: solar system, galaxy, cluster of galaxies, and universe.

10. "Milky Way" and "Local Group" are the names of two things found in space that contain the earth. What is each?

11. What is the nearest star to our sun? Is it in our solar system? Is it in our galaxy?

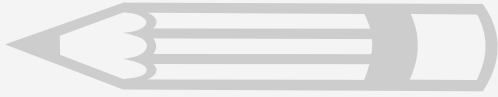
12. Briefly describe one method scientists use to estimate the distance between objects in space

Investigation #2 Spreading Out the Heavens



Dig Deeper

Date:



Dig Deeper completed in notebook.

The Activity: Procedure and Observations



Part A.

Partially blow up a large balloon and put colored dots all over the outside. Space the dots somewhat evenly apart from each other. Continue to blow into the balloon so that it gets larger. Notice that the dots get farther and farther apart as the balloon gets bigger. Now gradually let the air out of the balloon and notice that the balloon gets smaller and the dots get closer together. Blow up the balloon again and observe. Write about what you observe.

Part B. Record times

1. How many marshmallows did B catch in 10 seconds when no one was moving?" _____
2. How many marshmallows did B catch in 10 seconds when A was walking slowly toward B? _____
3. How many marshmallows did B catch in 10 seconds when A was walking slowly away from B? _____

Repeat this activity two more times. In which situation was it easier to catch the marshmallows? _____



Stumper's Corner

1. _____

2. _____



1. What scientist discovered that there were other galaxies in the universe in addition to the galaxy our earth is in? _____

2. What evidence did Edwin Hubble discover that caused him to conclude that galaxies are moving and getting farther away from the earth? _____

3. Before the time of Hubble, did scientists believe all the stars in the universe were in the same galaxy? _____

4. Which color in the visible spectrum has the longest wavelength? _____

5. Is the bluish/violet end of the visible spectrum made up of shorter waves or longer waves? _____

6. What major shift in thinking about the solar system came from scientists like Copernicus, Galileo, and Kepler? _____

7. The “big-bang” theory is based on what two pieces of evidence? Does this prove that the big bang actually happened? _____

8. Briefly tell about the “nebula theory.” Does it attempt to explain the origin of all the stars, planets, moons, comets, rocks, and dust in the universe? _____

9. What instrument was available for Galileo, Kepler, and Hubble to use that Copernicus did not have? _____
10. Give the shape of two different kinds of galaxies. _____

11. All galaxies appear to be moving. Why are we unable to look at them and tell that they are moving? _____

