Grades 5-8

FOCUS ON

MIDDLE SCHOOL

ASTRONOMY

Laboratory Workbook

Rebecca W. Keller, PhD

REAL SCIENCE 4 Kids

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Keeping a Laboratory Notebook

A laboratory notebook is essential for the experimental scientist. In this type of notebook, the results of all the experiments are kept together along with comments and any additional information that is gathered. For this curriculum, you should use this workbook as your laboratory notebook and record your experimental observations and conclusions directly on its pages, just as a real scientist would.

The experimental section for each chapter is pre-written. The exact format of a notebook may vary among scientists, but all experiments written in a laboratory notebook have certain essential parts. For each experiment, a descriptive but short *Title* is written at the top of the page along with the *Date* the experiment is performed. Below the title, an *Objective* and a *Hypothesis* are written. The objective is a short statement that tells something about why you are doing the experiment, and the hypothesis is the predicted outcome. Next, a *Materials List* is written. The materials should be gathered before the experiment is started.

Following the Materials List, the *Experiment* is written. The sequence of steps for the experiment is written beforehand, and any changes should be noted during the experiment. All of the details of the experiment are written in this section. All information that might be of some importance is included. For example, if you are to measure 1 cup of water for an experiment, but you actually measured 1 1/4 cup, this should be recorded. It is hard sometimes to predict the way in which even small variations in an experiment will affect the outcome, and it is easier to track a problem if all of the information is recorded.

The next section is the *Results* section. Here you will record your experimental observations. It is extremely important that you be honest about what is observed. For example, if the experimental instructions say that a solution will turn yellow, but your solution turned blue, you must record blue. You may have done the experiment incorrectly, or you might have discovered a new and interesting result, but either way, it is very important that your observations be honestly recorded.

Finally, the *Conclusions* should be written. Here you will explain what the observations may mean. You should try to write only *valid* conclusions. It is important to learn to think about what the data actually show and what cannot be concluded from the experiment.

Contents

Experiment 1: Constellations

Date: _____

Objective

_____

_____

Hypothesis

_____

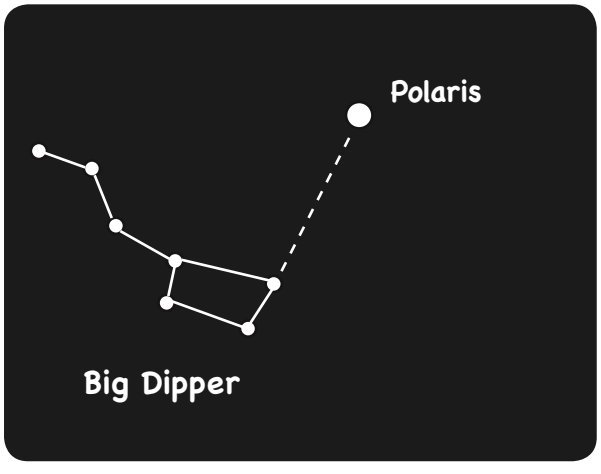
_____

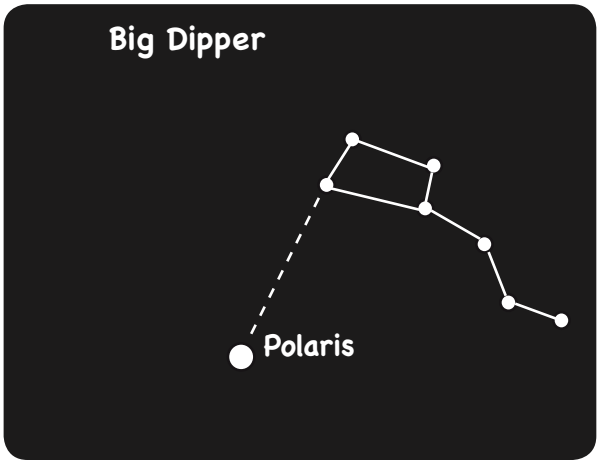
Materials

pencil
flashlight

Results

❶ In the evening on a clear night go outside and, without using a compass, locate "north." To do this you will need to find the Big Dipper. The Big Dipper is a set of stars that form the shape of a "dipping spoon." (The Big Dipper is not an official constellation but is called an asterism—a small group of stars.) The two stars on the end of the dipping spoon point to the star Polaris.

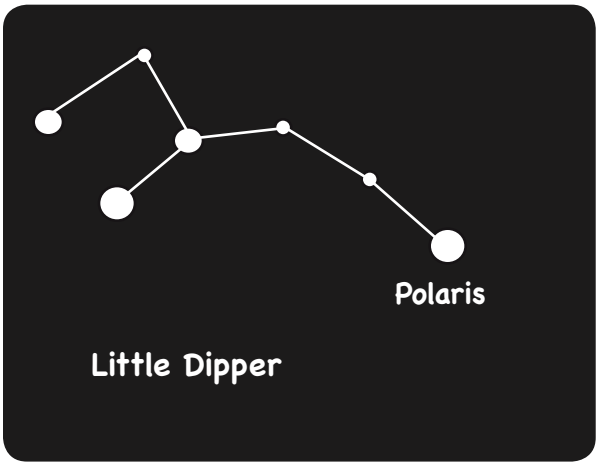




Polaris is the "North Star," and when you turn towards Polaris, you are pointing "north." It doesn't matter in which direction the Big Dipper is pointing, the two end stars always point to the North Star. The North Star is the only star in the sky that doesn't move (much). All of the constellations appear to move around the North Star. Once you find the North Star you can find nearby constellations.

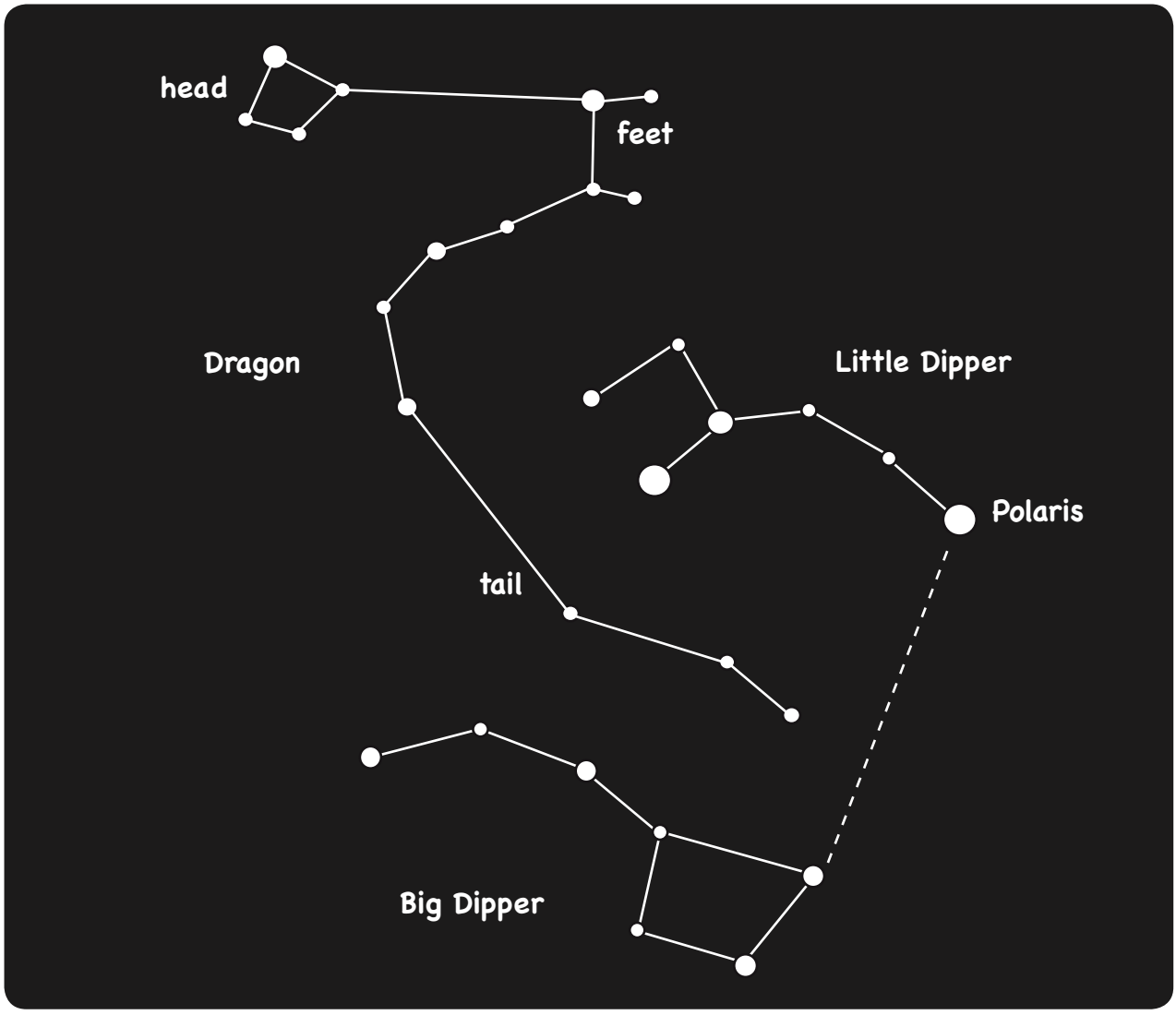
❷ Now that you have found the North Star, try to find the constellation called the "Little Dipper."

Polaris forms the end of the handle of the Little Dipper.



Draw the Little Dipper constellation as you observe it.

❸ Try to locate the "Dragon." The Dragon constellation is between the Big Dipper and Little Dipper.



❹ On the following page, draw the Dragon constellation as you see it.

❺ Count the stars in the Dragon constellation in the image above. Compare this number with the number of stars you've recorded for the Dragon.

Draw the Dragon constellation as you observe it.

❻ Record your physical location, city, state, or country, whether you are in the Northern or Southern Hemisphere, and the month.

Location _____

_____

Hemisphere _____

Month _____

Conclusions

Summarize how easy or difficult it was to find the North Star, the Big Dipper asterism, and the two constellations—the Little Dipper and the Dragon. What role, if any, does your physical location and the month you made these observations have on your results?

Review

Answer the following:

- The word astronomy comes from the Greek word _____ which means _____ and the Greek word _____ which means _____.
- The word astronomy means _____.
- The word geocentric comes from the Greek word _____ which means _____ and the Greek word _____ which means _____.
- The word geocentric means _____.
- The word heliocentric comes from the Greek word _____ which means _____ and the Greek word _____ which means _____.
- The word heliocentric means _____.
- A constellation is _____ _____.
- The North Star is also called _____.