Khaled bin Sultan
Living Oceans
Foundation

CLASSIFICATION

This lesson is part of the *Classification* unit, which explains how to organize the millions of organisms on Earth. Below is a summary of what is included in the entire unit.

STANDARDS

- **CCSS**: RST.9-10.1, 2, 3, 4, 5, 7, 8, 9, 10; RST.11-12.1, 2, 3, 4, 7, 8, 9, 10; W.9-10.2, 4, 7, 8, 9; W.11-12.2, 4, 7, 8, 9; SL.9-10.4, 6; SL.11-12.4, 6
- **NGSS**: HS-LS4-1
- **OLP**: 4.B.1, 4.B.2, 5.C.22

ONLINE CONTENTS

- Classification Quiz
- *What Clade R U?* Interactive (at bottom of *How To Build A Cladogram* section) Use the interactive program to learn and explore more about the anatomy of a stony coral polyp.
- *What Are Corals?* Video Classification helps scientists tell species apart. This educational video explains modern biological classification categories from the most general (domain) to the most specific (species).

UNIT CONTENTS

A. Background Information

- How Do We Classify Organisms?
- Linnaean Naming System
- Coral Classification
- Modern Classification
- Understanding Cladograms
- How to Build a Cladogram

UNIT 2:
CLASSIFICATION

CORAL REEF
ECOLOGY CURRICULUM

B. Lessons

Watch It! Naming Nature
- A worksheet to accompany the *Naming Nature* video

Classify This!
- A worksheet to classify an organism and identify its characteristics

Rules, Rules, Rules
- A worksheet about scientific names

"Taxing" Corals
- An activity to classify corals based on their characteristics

In Light of New Evidence
- A writing assignment on an organism that has been reclassified

The Key to ID
- An activity using a dichotomous key for sea stars

And Then There Was One
- An activity to create a dichotomous key for corals

Cladograms 1
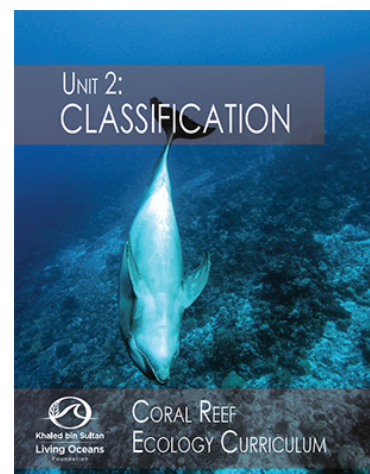- A lesson on creating and interpreting a cladogram

Cladograms 2
- A lesson on creating and interpreting a cladogram (with traits already included)

Read It! Troubling Taxonomy
- A worksheet to accompany the *Troubling Taxonomy* field blog

Read It! Blue, You Say?
- A worksheet to accompany the *Blue, You Say?* field blog

LESSON 4B   AND THEN THERE WAS ONE

INSTRUCTIONS: You will now construct your own dichotomous key.

1. Create a dichotomous key for the corals in the photographs provided by your teacher. Follow the instructions below titled *How to create a dichotomous key?*
2. Swap your dichotomous key with two other students. Use their dichotomous key to identify each of the corals. Space is provided for your answers called *Student 1 and 2 Dichotomous Key*. Make sure to include the name of each student (on the line provided) whose keys that you are using.
3. Answer the questions on your worksheet.

TIPS WHEN CREATING A DICHOTOMOUS KEY:

• Do not use characteristics that change with the seasons or are influenced by environmental factors.
• When using measurements make sure to use descriptive terms such as *3 inches* or *4 yards* and not terms that are vague such as *large* or *small* and *tall* or *short*.
• Make sure that at least one organism has the characteristic before choosing to use it in the key. Do not start off with a negative statement such as *does not have* or *is not*.
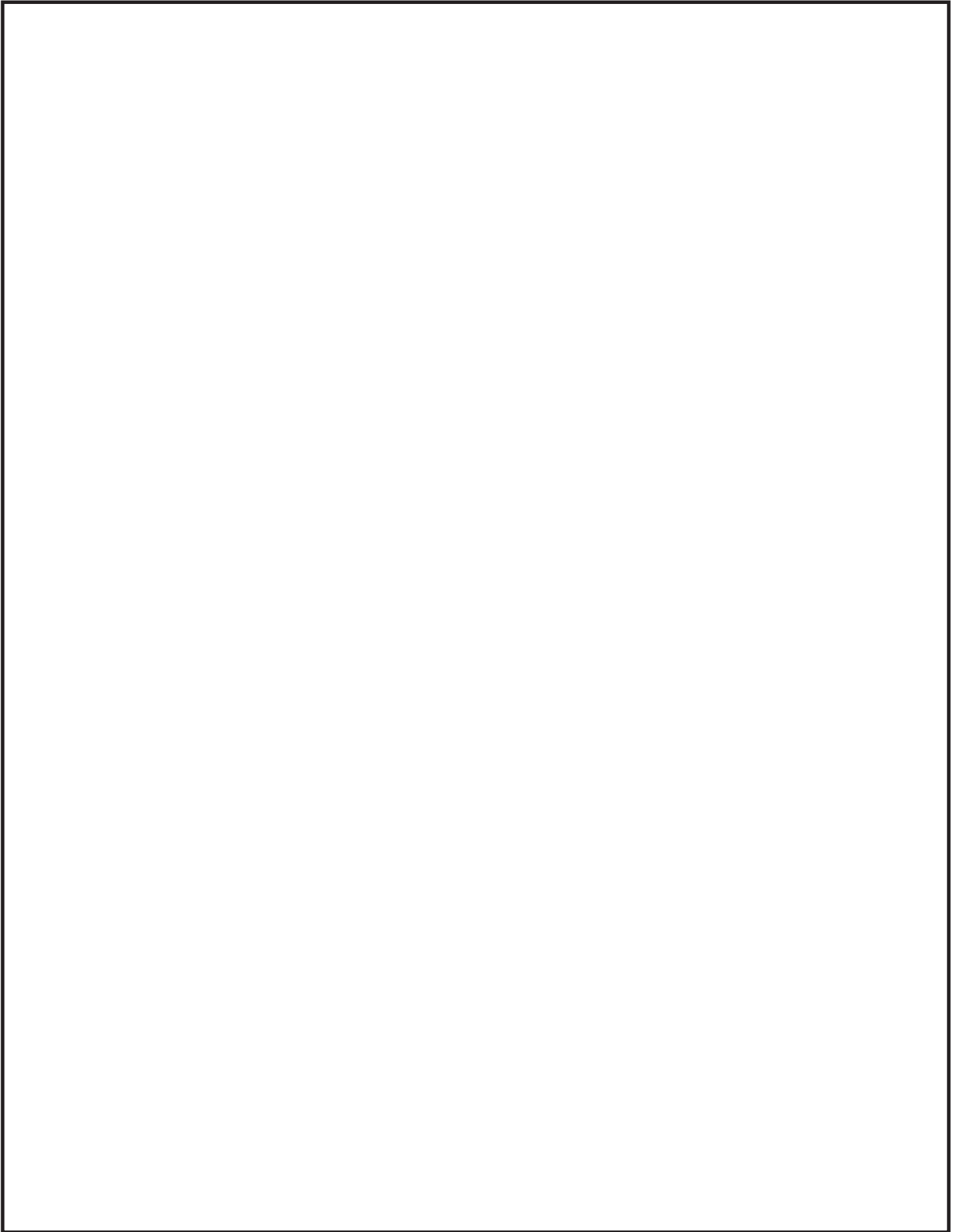
HOW TO CREATE A DICHOTOMOUS KEY:

1. Observe the photos of corals. Think about how you can group each coral together. Only use observable traits. Brainstorm your ideas in the box provided called *Brainstorm Characteristics*.
2. Create a *yes or no flow chart* as demonstrated by your teacher in class. A box is provided for your answers called *Yes or No Flow Chart*.
   a. In order to create the *yes or no flow chart,* Choose two characteristics that are very broad. Divide the corals into each category. Let's refer to this as *division 1*. NOTE: You want to be able to divide the corals into almost two even groups. Make sure to look at all of the characteristics before creating the *yes or no flow chart*.
   b. Choose a new category to divide corals from division 1. Divide the corals into each category. This process will continue until you are left with the name that identifies the organism. If you do not have the scientific name use the title (e.g. FP 03, FP 10, etc.).
3. Use the *yes or no flow chart* to create your dichotomous key. You may want to use a piece of scrap paper. Then transfer your answers to the worksheet. Place your final key in the area titled *Dichotomous Key*.
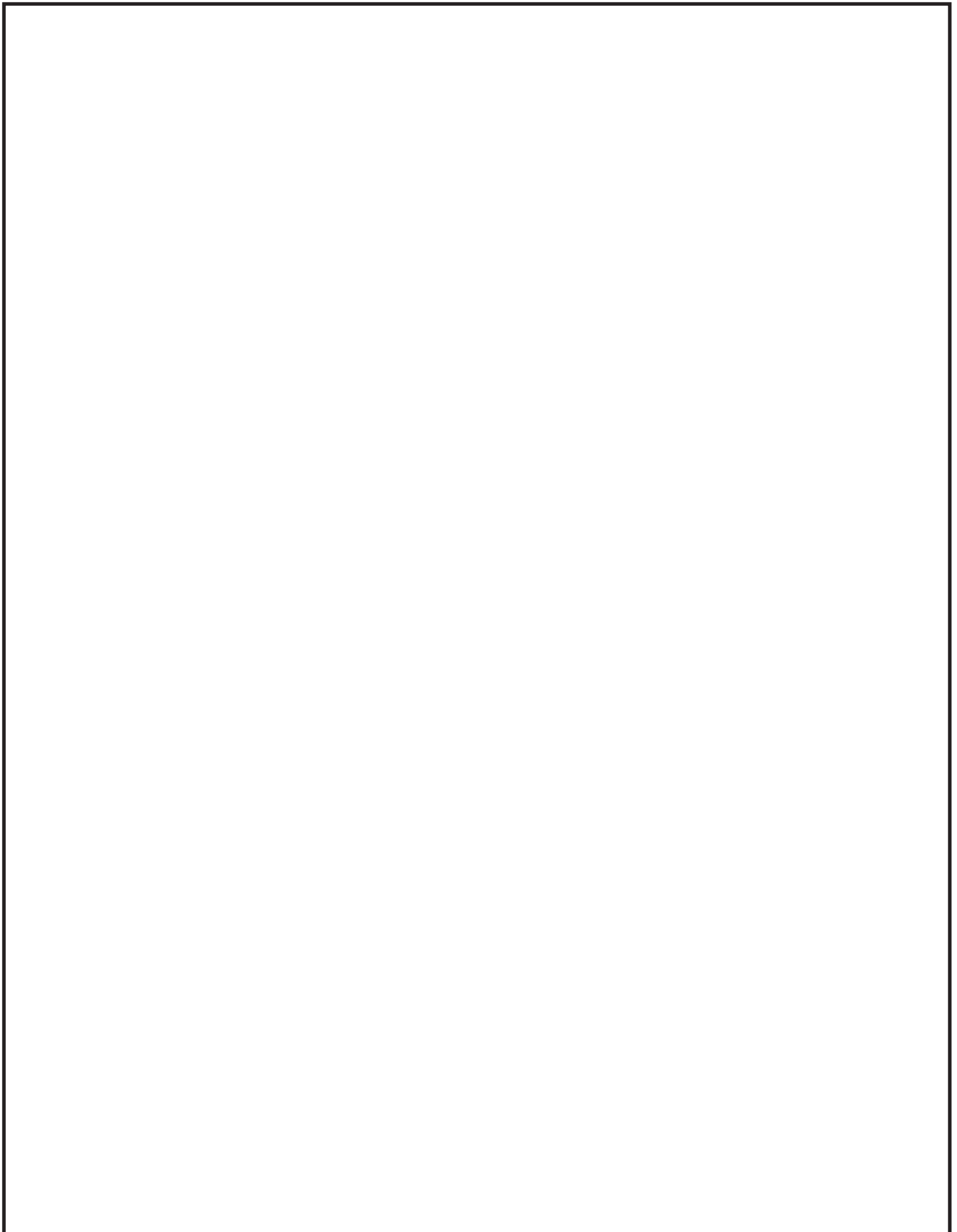   NOTE: To determine how many steps are needed in the dichotomous key, count the number of organisms that you identify. Then subtract 1. In this activity, we are identifying 10 corals. Ten minus one is nine. You will create a sequence of 9 steps. Again, there will be two choices for each step (a and b).
4. When creating the dichotomous key, make sure to write out all of the steps to the first question (1a) until you reach the identification of your first coral.
5. Then go back to the first place where the division stopped after step 1a. In many cases, this will probably be step 2b.
6. Continue to create step 1a before starting to key out step 1b.
7. Once you have created the key for 1a, repeat the same steps for 1b corals.

BRAINSTORM CHARACTERISTICS:

YES OR NO FLOW CHART:

DICHOTOMOUS KEY:

1a		
1b		
2a		
2b		
3a		
3b		
4a		
4b		
5a		
5b		
6a		
6b		
7a		
7b		
8a		
8b		
9a		
9b		

STUDENT 1 DICHOTOMOUS KEY
STUDENT'S NAME: _____

Photo #	Coral ID or Species Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

STUDENT 2 DICHOTOMOUS KEY
STUDENT'S NAME: _____

Photo #	Coral ID or Species Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

INSTRUCTIONS: Answer the following questions.

1. Did other students come up with the same dichotomous keys? Provide an example of any step that was the same.

2. Did other students come up with different dichotomous keys? Provide an example of any step that was different.

3. After completing this activity, do you think that there are multiple ways to construct dichotomous keys? Is your key better than other students' keys that differed?

4. Why is it important for field scientists to correctly classify organisms?

5. Dichotomous keys are based on physical characteristics of an organism. Do you think that classification systems that use genetics to classify organisms are more accurate than using a dichotomous key? Explain your answer.