

# OIMB GK12 CURRICULUM

4th Grade

60 minutes

## ALGAE DICHOTOMOUS KEY

### **Oregon Science Content Standards:**

4.1 Structure and Function: Living and non-living things can be classified by their characteristics and properties.

### **Ocean Literacy Principles:**

5. The ocean supports a great diversity of life and ecosystems

**Goals:** In this lesson, students learn to classify and identify algae using a dichotomous key and their own observations.

### **Concepts:**

- Scientists group or classify organisms into groups based on similar characteristics.
- A dichotomous key is a tool that scientists use to identify animals or plants.
- Algae are not plants since they lack true roots, stems, and leaves, but they do need light and water to grow, like plants.

### **Materials:**

- 10 specimens of live kelp and algae (including bull kelp), collected at the rocky shore or washed up on the beach. (It is possible to substitute pictures if live algae are not available.)
- 10 Station markers - labeled one through ten
- Handouts – enough for each student
  - Dichotomous Key – can be modified depending on which algae are collected
  - Record Sheet – print on both sides to give enough room for 10 stations

### **Lesson Plan:**

1. Introduce algae: Start by showing pictures of various types of algae and ask the students to describe what they see. Include phytoplankton and kelp. Explain that they are all different forms of algae. They are not plants since they lack true roots, stems, and leaves, but they do need light and water to grow, like plants.
2. Kelp anatomy: Students will need to know kelp anatomy for this lesson. This can be taught as a previous lesson or as part of the introduction to this lesson. Using a live piece of bull kelp, point out:
  - The holdfast, which anchors the kelp down to the rocks. It does not draw in water or nutrients like roots.

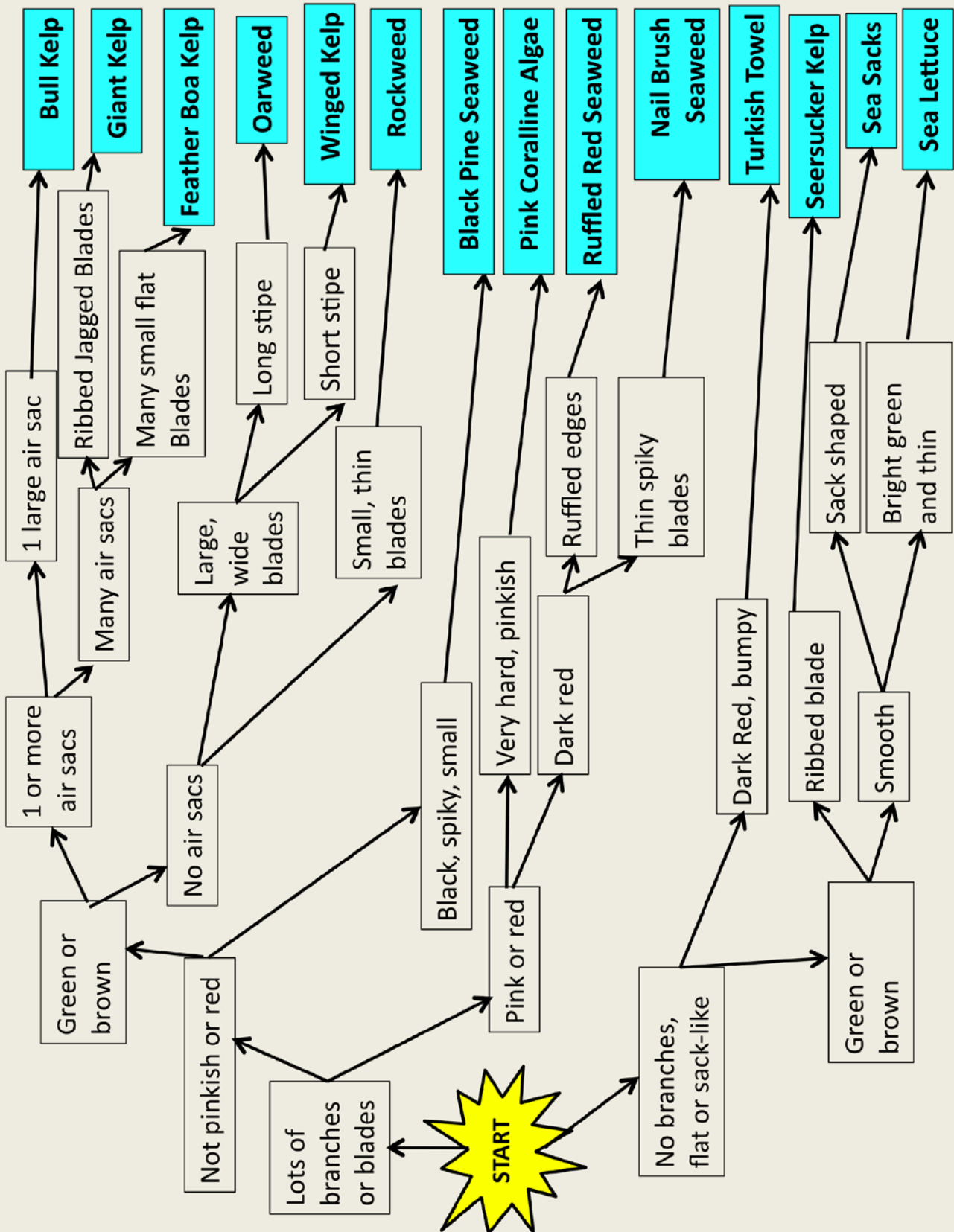
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- The blades, which are leaf-like structures that help the kelp gain energy from sunlight.
  - The stipe, which is stem-like and provides support.
  - The gas-filled float, which holds the kelp blades near the surface.
3. Introduce classification: Discuss that algae can be classified or grouped in different ways.
- Explain that classifying means to place things into categories.
  - One way to classify algae is by size. Point out that some algae are unicellular (only one cell!), some live in colonies of a few cells, and some are multicellular and quite large (kelp). Show pictures of algae divided into these groups.
  - Another way to classify algae is by color. Point out red algae, green algae, and brown algae. (Kelp are a type of brown algae). Show photos in which algae are divided into these groups.
4. Kelp dichotomous key: Explain that a dichotomous key is a tool that scientists use to identify animals or plants (or other things). It is like a ‘chase your own adventure book’ since at each branching point, you have to choose which direction to go.
- Pass out the algae dichotomous key and explain that in order to use the key, the students will need to make careful observations about the size, shape, and color of the algae. They may need to feel if it is smooth or bumpy or count the number of gas-filled floats.
  - Tell the students that to use a dichotomous key, you must always start at the ‘start star’. As you travel along, you have to make a decision based on what you observe. There are always two possible paths, and you must choose one. As you go along, you are getting closer and closer to the ‘answer’ or the identity.
  - Go through an example of identifying a piece of unknown alga using the dichotomous key while writing the path on board. Have students follow along and take notes with you. Ask them each question and have them vote for which direction to choose. It works well to have students put their thumb up to indicate following the path upward and thumbs down to indicate going down.
  - Have ten stations set up around the room, each with a different type of alga and a station number. Pass out the second worksheet. Divide the students up into ten groups and have each group go to a station. Students will be responsible for writing down the station number on the worksheet, the steps they took to get to the answer, and the name of the alga at each station.
  - At the end of class, go through the answers, having students share the path they chose to get the correct answer.

**Assessment:** The students’ record sheets and sharing of paths.

**GK12 Fellows:** Laurel Hiebert, Tim Davidson, Josh Lord and Erin Morgan

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Station #: \_\_\_\_\_

Name of algae: \_\_\_\_\_

Station #: \_\_\_\_\_

Name of algae: \_\_\_\_\_

Station #: \_\_\_\_\_

Name of algae: \_\_\_\_\_

Station #: \_\_\_\_\_

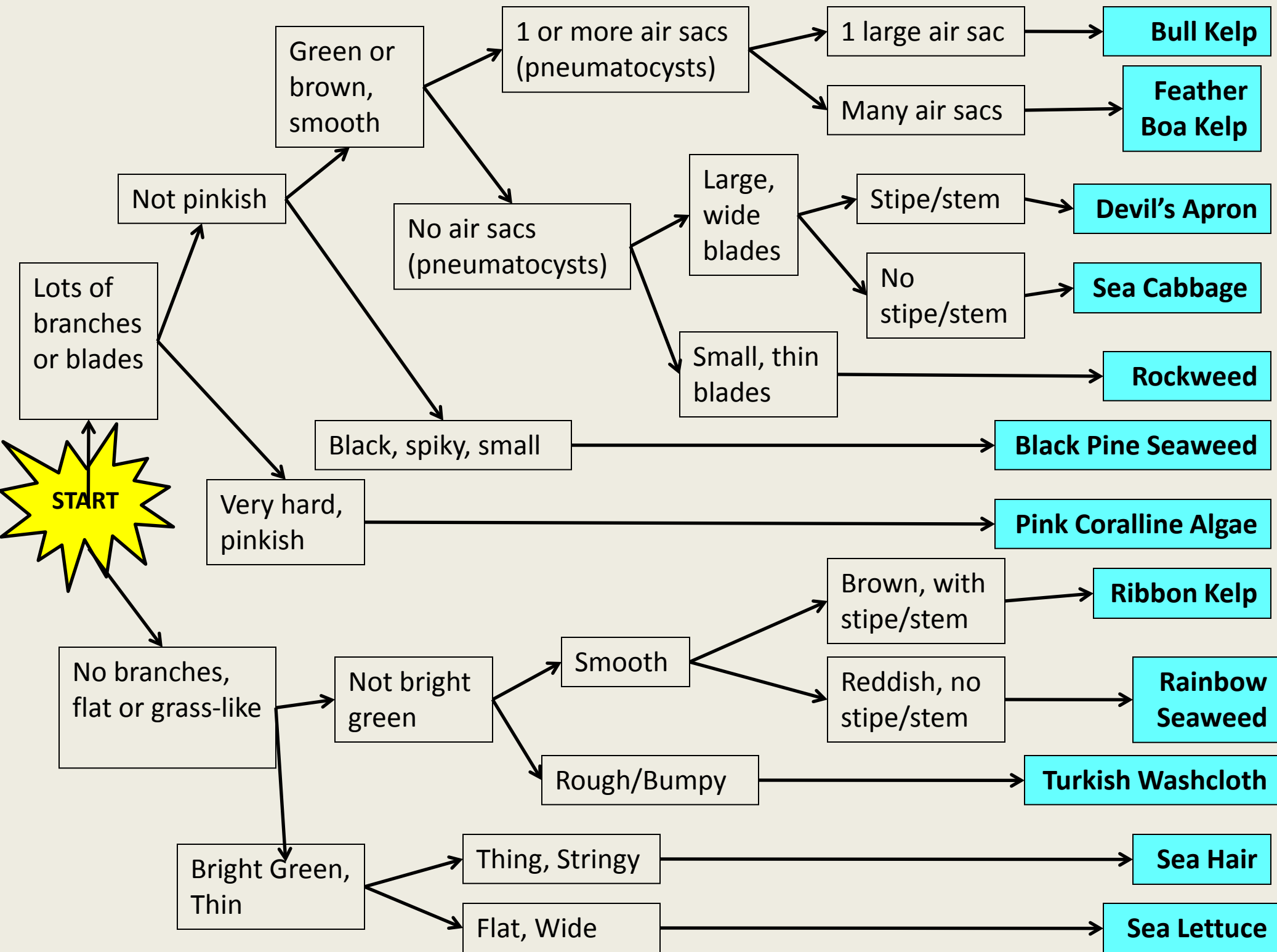
Name of algae: \_\_\_\_\_

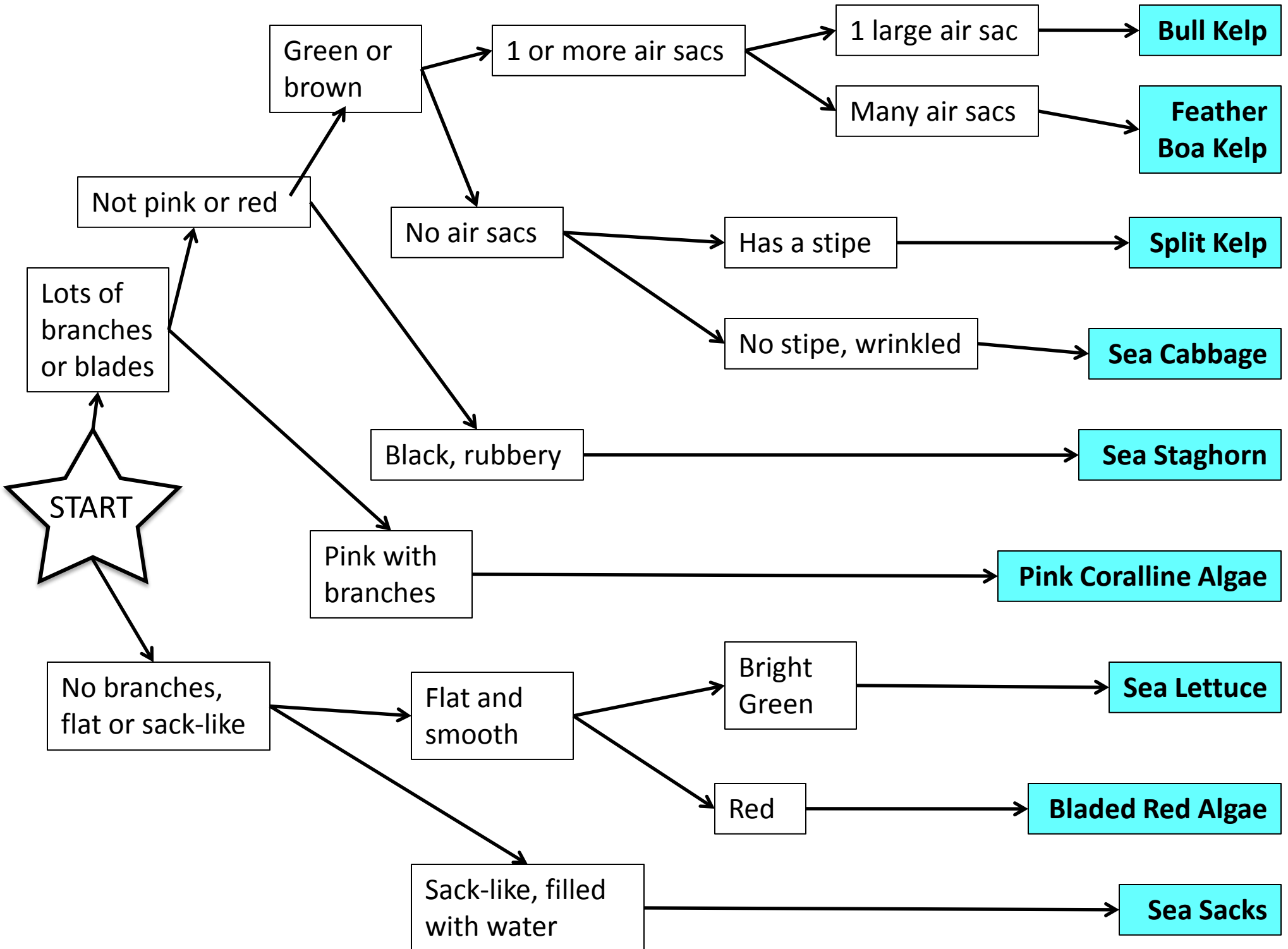
Station #: \_\_\_\_\_

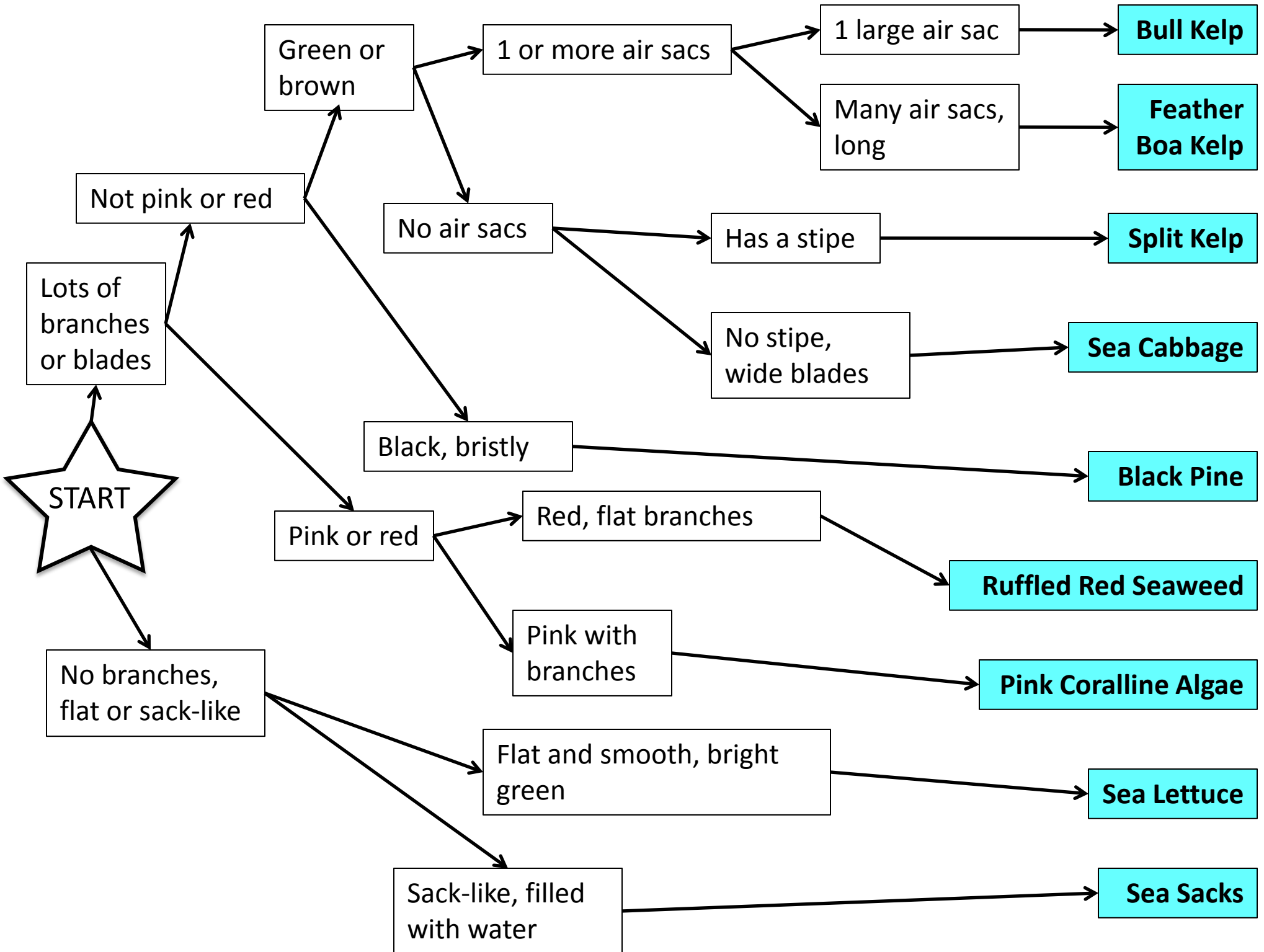
Name of algae: \_\_\_\_\_

Station #: \_\_\_\_\_

Name of algae: \_\_\_\_\_









**The Case:** Stanley Sea-Urchin has hired you, the kelp detective, to discover who has been stealing kelp from his garden.

**The Suspects:**

 <p><b>Rocky Rockfish</b></p>	 <p><b>Susie Sea Otter</b></p>	 <p><b>Kenny Kelp Crab</b></p>
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Be a kelp detective! Use the clues on the back to identify the seaweeds & discover the culprit!

WHO DID IT? \_\_\_\_\_

1 8 9 5 12

WHY? For a \_\_\_\_\_

7 2 4 11 8 3 10

Name of Seaweed

Clue

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_



