

LESSON 4 Be a Whale Researcher

Lesson at a Glance

Students distinguish observations from inferences. In studying the behaviors of humpback whales in the Hawaiian breeding and nursery grounds, as well as the Alaskan feeding grounds, students will be able to use inquiry to interpret these humpback behaviors. Students will then match fluke photographs like whale researchers to practice their observation skills, and make their own whale fluke designs.

Lesson Duration

One 45-minute period

Essential Question(s)

How do scientists identify and study individual humpback whales?

Key Concepts

Photo-Identification is a research method scientists use to document humpback whale observations that can be utilized to study individual whales and population size and distribution. Whale researchers take photographs of flukes and dorsal fins to identify individual humpback whales.

Instructional Objectives

- I can make a detailed observation.
- I can use those observations as data to identify whales.
- I can explain how scientists identify humpback whales through observations.

Related HCPS III Benchmark(s):

Science SC. 3.1.2 Safely collect and analyze data to answer a question.



Assessment Tools

Benchmark Rubric:

| | | | |
|--|--|--|--|
| Topic | | Scientific Inquiry | |
| Benchmark SC.3.1.2 | | Safely collect and analyze data to answer a question | |
| Rubric | | | |
| Advanced | Proficient | Partially Proficient | Novice |
| Summarize and share analysis of data collected safely to answer a question | Safely collect and analyze data to answer a question | With assistance, safely collect and analyze data | With assistance, safely collect data and attempt to analyze data |

Assessment/Evidence Pieces

Lesson

- Formative assessment: Chart for photo-identification activity

Materials Needed

| Teacher | Class | Group | Student |
|--------------------------------|---------------------------------|--------|---|
| • Method to present PowerPoint | • <i>WhaleFluke</i> photographs | • None | • Worksheet: <i>Fashion a Fluke</i> • Black markers or crayons |

Instructional Resources

PowerPoint Presentation: *Whale Tails*

Student worksheet: *Fashion a Fluke*

Teacher Reading: *Whale Fluke Photograph Cards*

Student Vocabulary Words

flukes: the two lobes of a whale's tail.

inference: an explanation or interpretation of an observation.

median notch: an indentation in the center of the outer edge of a whale fluke.

observation: something noticed using one or more of the senses.

Lesson Plan

Lesson Preparation

- Read the Science Background provided in the Unit's Overview.
- Make a copy of *Whale Fluke Photograph Cards*. Laminate and cut into individual photographs. Make a key, and label the back of matching flukes to help you check for correct matches (e.g., Fluke 1 = Fluke Z, Fluke 2 = Fluke Y, etc.).
- Make copies of Student Worksheet *Fashion a Fluke*, one per student.
- Make arrangements to project the PowerPoint presentation *Whale Tails*.

I. *Observations and Questioning Revisited*

- A. Re-introduce the terms, *observation* and *question*. Review that an observation is the act of examining something carefully using one or more of your five senses. Remind students that observations are based only on what they see, hear, smell, feel, or taste and that different observations require the use of specific senses. Clarify that once you start to explain why something is, you are no longer observing.
- B. Again ask students to make observations about a picture - something unfamiliar to them. (Suggestion: find an image of a Guitar Shark) List their observations, then elicit and list questions they have related to the observations. Be sure to encourage students to develop “why” questions as well.
- C. Review the importance of making detailed observations. Make sure the students understand that detailed observations are important to learn about the world around us.
- D. Tell the students that scientists constantly make observations of humpback whale behaviors. Some of the most spectacular humpback behaviors are observed during the winter months when the whales migrate to their breeding and nursery grounds in Hawai‘i. And now, they will be acting like scientists.

II. *Observing Flukes: Presentation and Activity*

- A. Introduce Photo-Identification, a research method scientists use to identify and learn about whales. Tell the students that they will be observing real pictures of humpback whale flukes taken by researchers. Explain that when a humpback whale displays its flukes during a fluke up dive behavior, researchers can take pictures of the underside of the flukes. Researchers can use the pictures of flukes to identify individual whales because each whale has unique flukes (similar to how people can be identified by their unique faces and fingerprints).
- B. Present the *Whale Tails* PowerPoint presentation, and engage the students in describing the humpback whale fluke characteristics as they observe each image. Help the students describe the color pattern, shape of the outer edge, depth of median notch, and other markings (such as scars) for each fluke image.
- C. After the presentation, engage the students in an activity where they will be using their observation skills to match pictures of real humpback whale flukes taken by whale researchers in Hawai‘i.
- D. Provide each student with *one* of the *Whale Fluke Photograph Cards*. (If there are an odd number of students, you will need to participate in the activity so that each student has a match.)
- E. Tell the students their goal is to find the student who has a picture of the same fluke. Warn the students that the picture that has the matching fluke may be slightly *different*, but shows the same exact fluke. Tell them to make careful observations of the flukes to ensure they have found the correct match.
- F. Tell the students to check with you once they think they have identified their match. The students who have made a correct match will return to their seats. If they have made an incorrect match, have them keep looking.
- G. After students have found their match, ask them to describe the characteristics that helped them determine the match (e.g., the matching flukes have the same color pattern, same depth in median notch, same shape of outer edge, same scars, etc.).

- H. Discuss the importance of the Photo-Identification research method. Make sure the students understand that scientists can learn information about individual humpback whales, population size and distribution (where they can be found), and migratory behaviors by comparing and matching (recapturing) flukes.
- I. Provide each student with a copy of *Fashion a Fluke* worksheet and markers. Have the students design their own unique fluke, cut the fluke out, and name the whale based on the design of their fluke. Encourage the students to be creative.

III. Practice photo-identification research methods

- A. Tape the flukes the students designed and cut out to the end of a chopstick.
- B. Hang a bed sheet or tarp as a barrier to hide the students that will be displaying their flukes.
- C. Have 5–6 students hide behind the barrier. (Only the flukes should be visible when displayed, not the students.)
- D. Have one student briefly display his or her flukes by holding it above the barrier while the students in the audience observe (capture) the image of the fluke by either drawing quickly or using distinct descriptive words. They can pretend to snap a photograph of the fluke, or provide a student (researcher) with a digital camera to capture the fluke image.
- E. Next, have all of the students in the *pod of whales* behind the barrier display their flukes at the same time. The student who previously displayed his or her fluke should quietly change positions with another student behind the barrier before the group display, so as to make it more difficult to identify his or her fluke. Sometimes the original whale fluke should not come up.
- F. Have the students in the audience identify (recapture) which fluke was the original one displayed. Students should chart this information including if the whale was present in the pod and its location if the whale was present.
- G. Explain the *capture-recapture* research method. Students should understand that whale researchers can identify whales in different locations (e.g., Alaska, Hawai‘i, and along migration routes) to learn more information about them.



LESSON 4

Fashion a Fluke

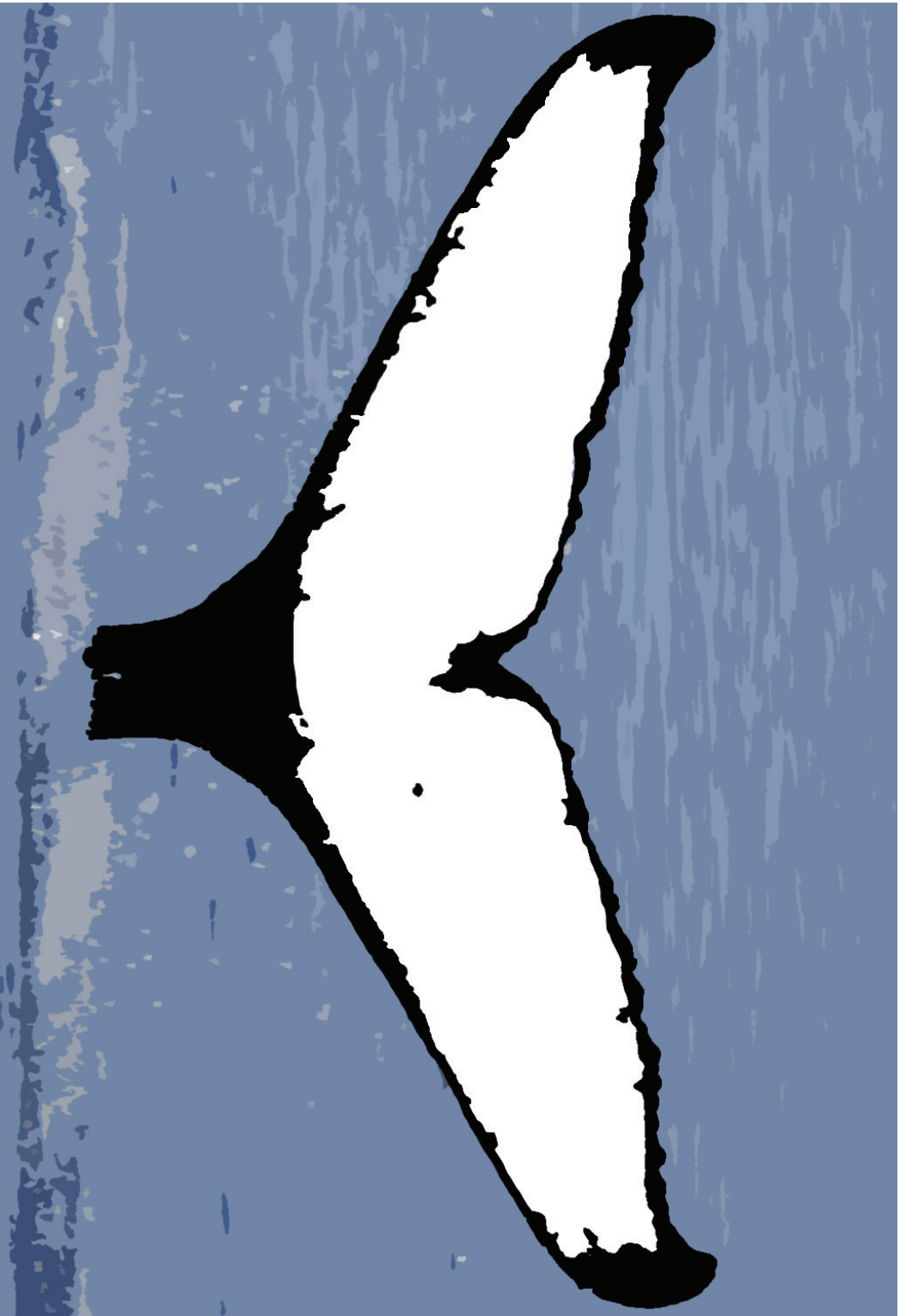
Name: _____ Date: _____

Directions: Design your own unique fluke. **BE CREATIVE!** Name the whale based on the design of the fluke you made. After you are finished, cut out the fluke. *(Turn this paper sideways to draw the fluke.)*

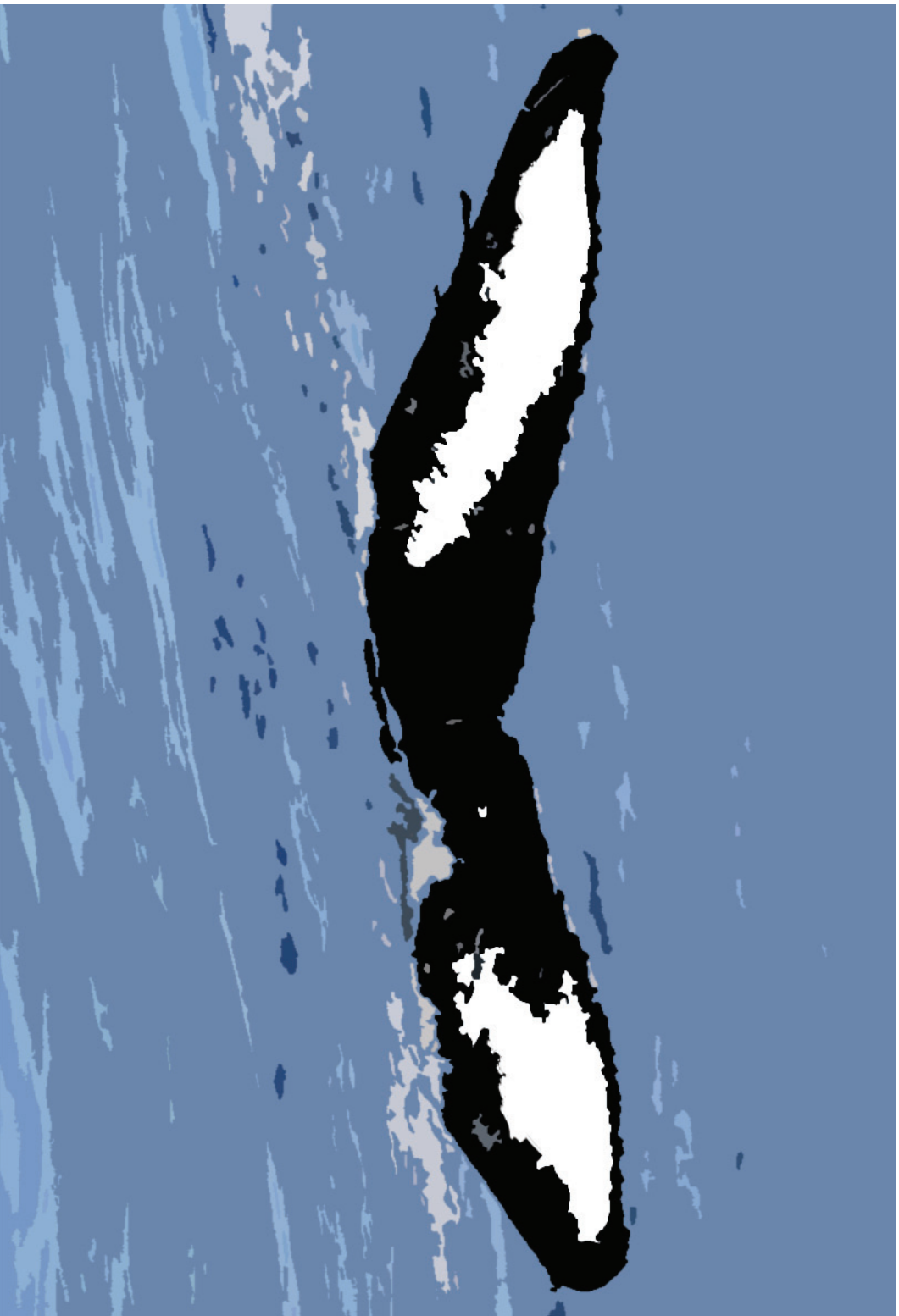
LESSON 4 Whale Fluke Photograph Cards



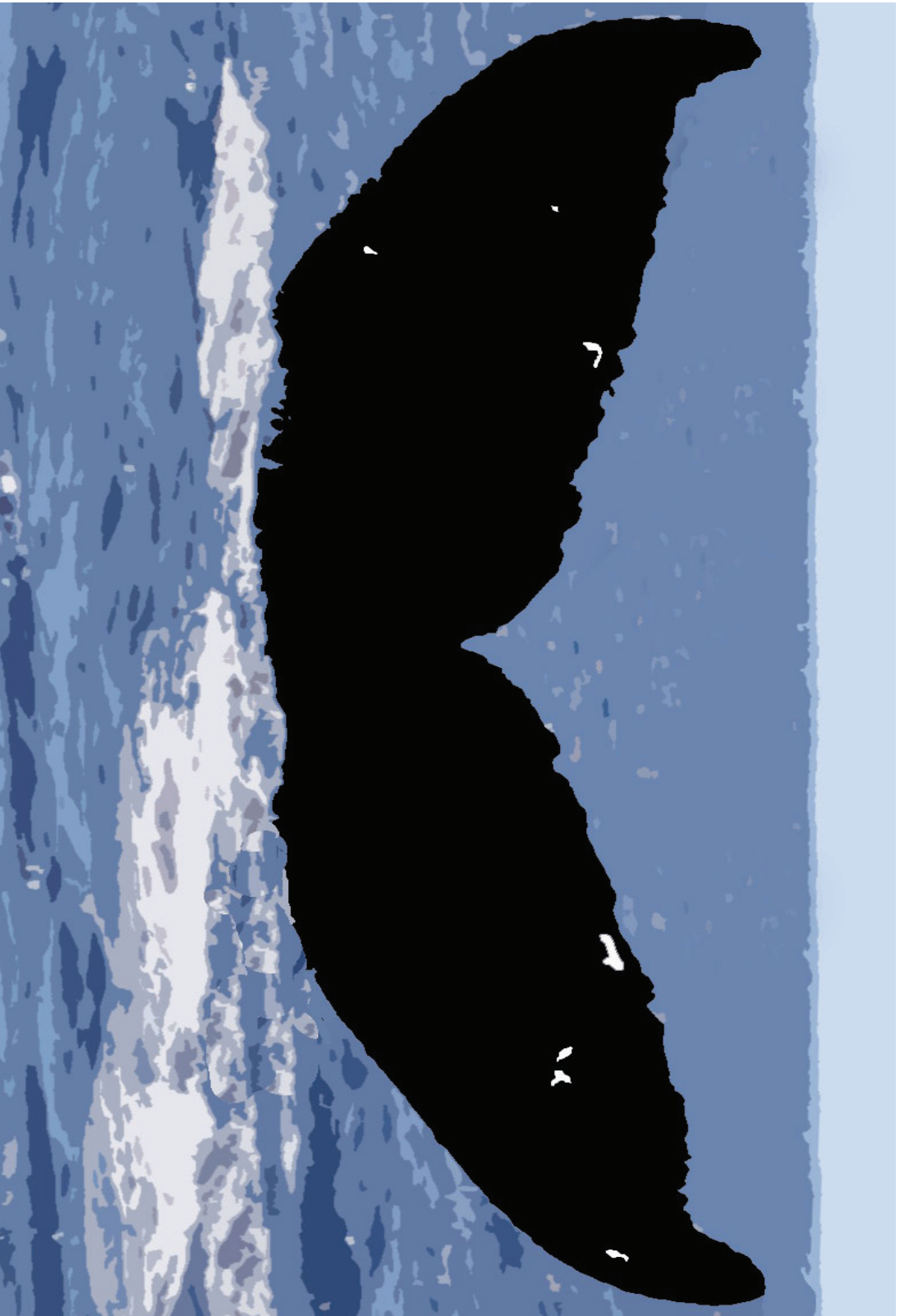
LESSON 4 Whale Fluke Photograph Cards



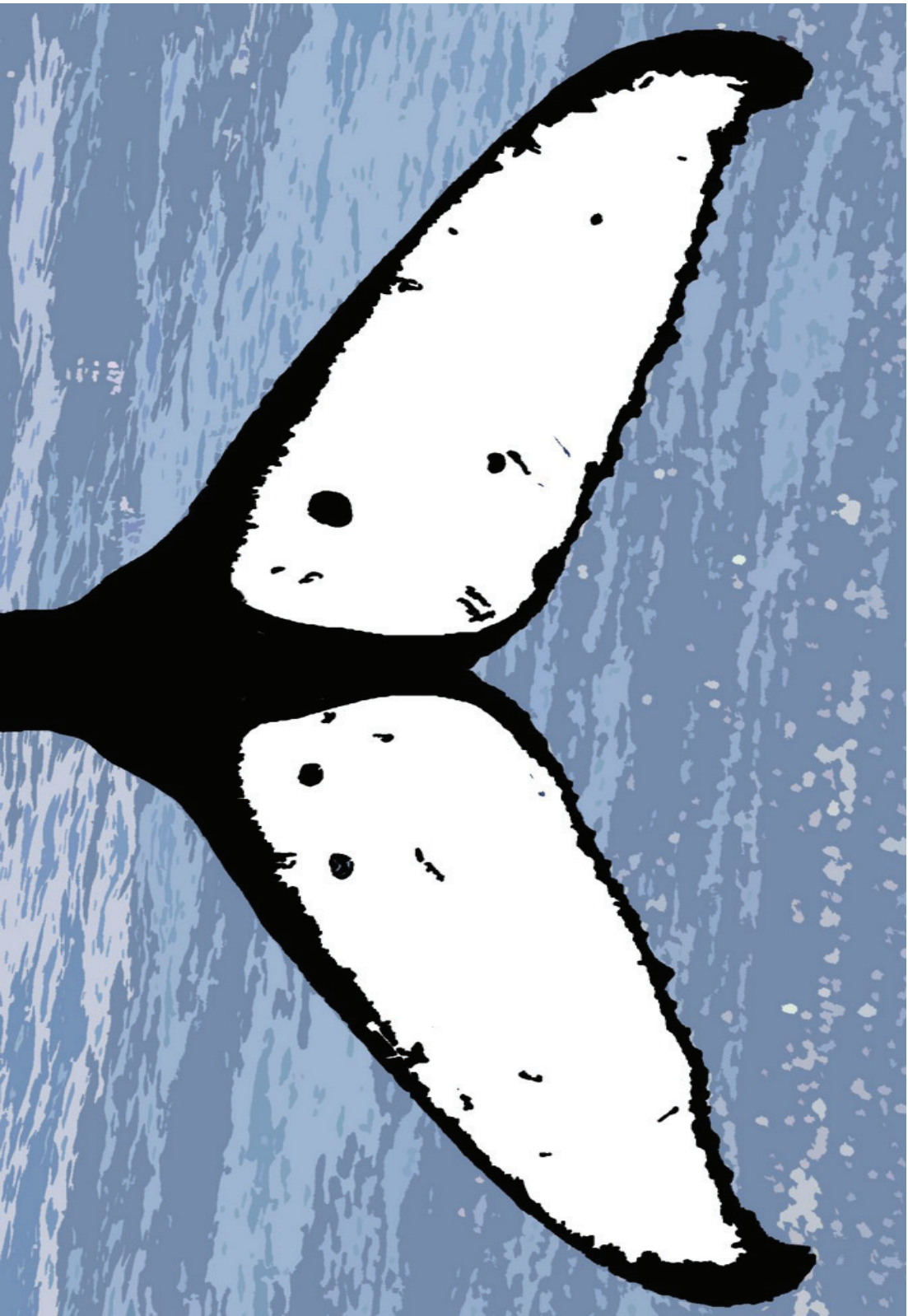
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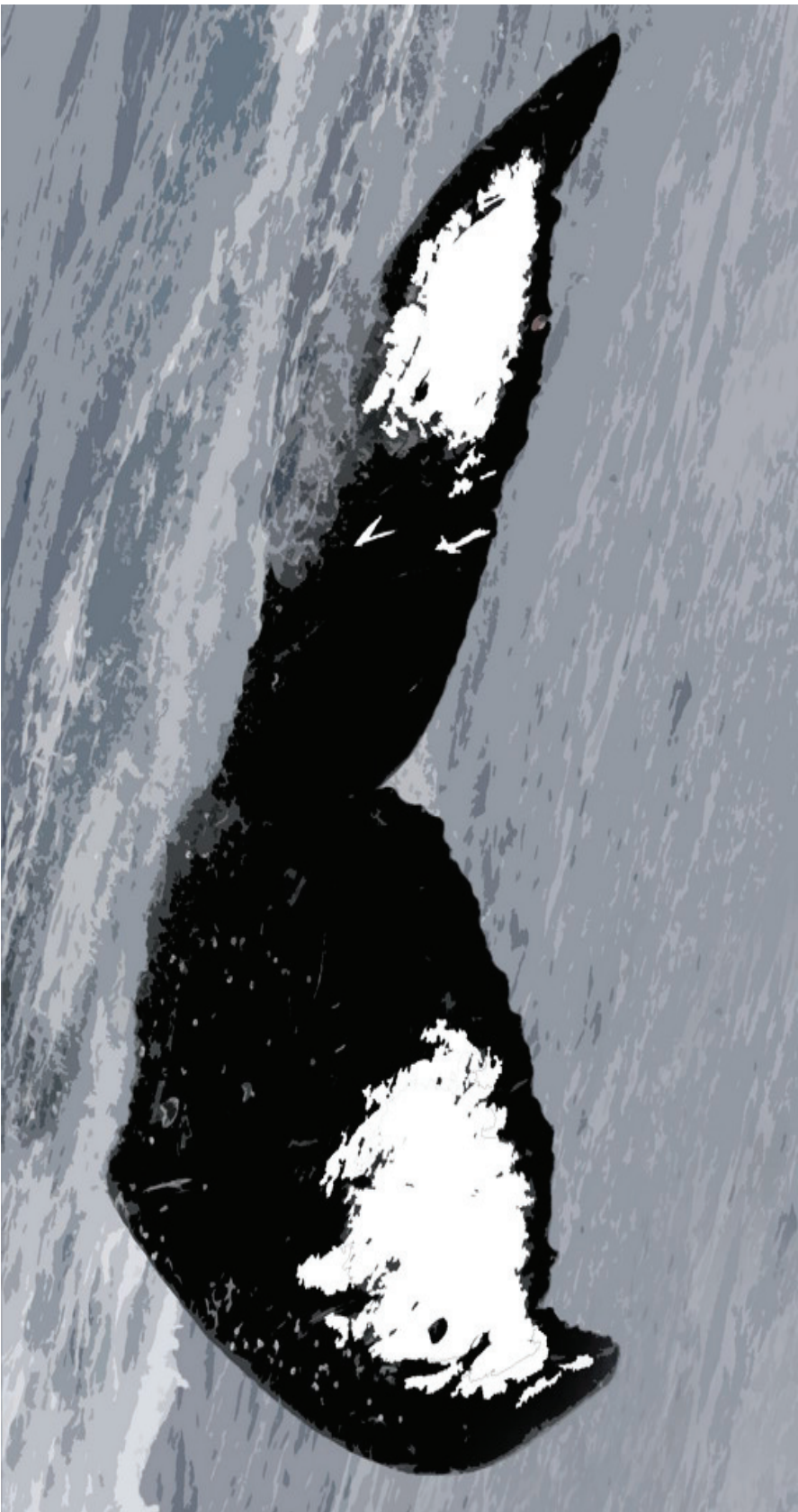
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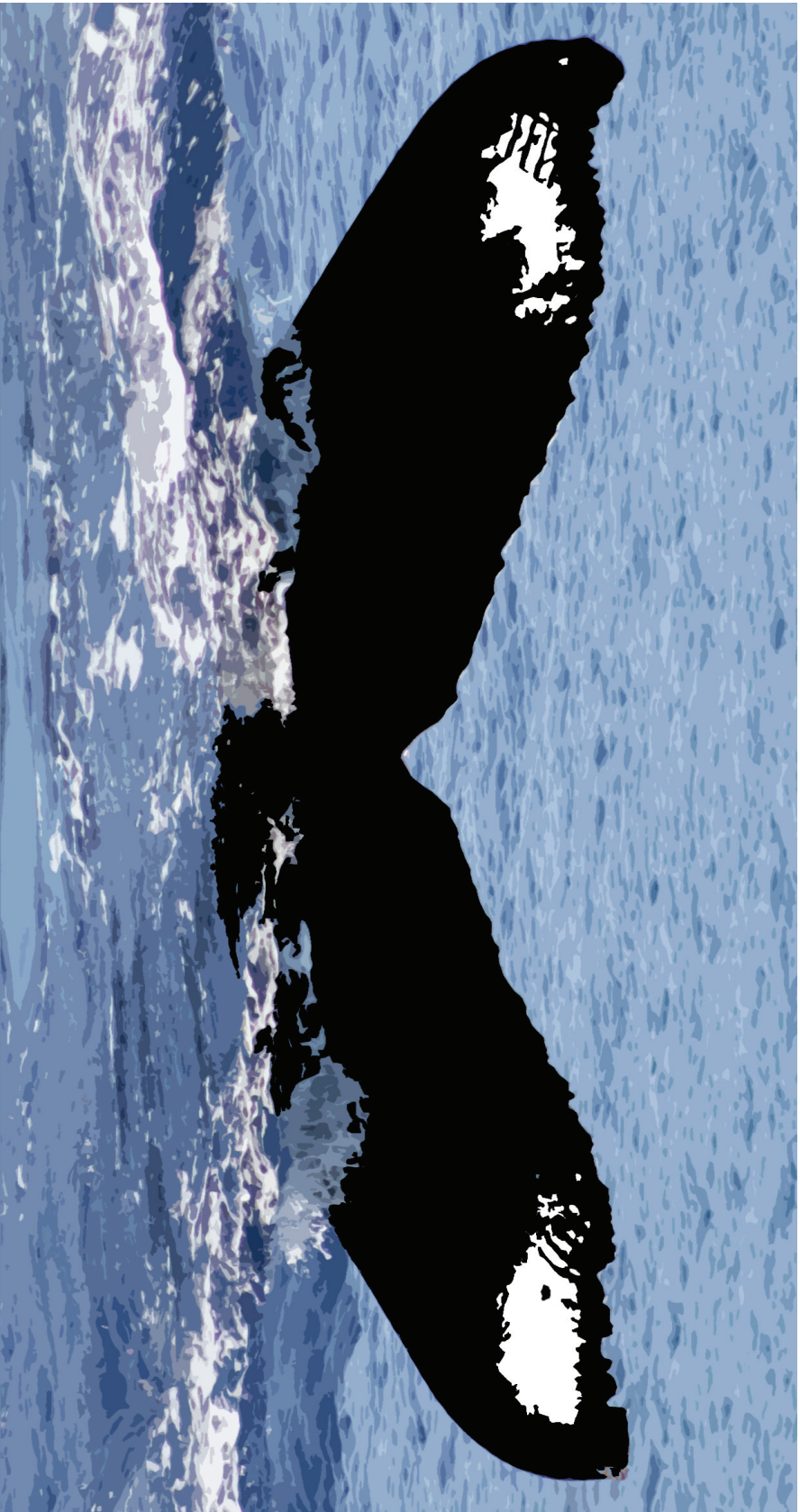
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