

E - Bio Worksheet

Using Dichotomous Keys and Fish Classification

The identification of biological organisms can be greatly simplified using tools such as dichotomous keys. A dichotomous key is an organized set of couplets of exclusive characteristics of biological organisms. You simply compare the characteristics of an unknown organism against an appropriate dichotomous key. These keys will begin with general characteristics and lead to couplets indicating progressively specific characteristics. If the organism falls into one category, you go to the next indicated couplet. By following the key and making the correct choices, you should be able to identify your specimen to the indicated taxonomic level.

When you follow a dichotomous key, your task becomes simpler if you use a few simple rules of thumb:

- A. Read both choices in a couplet carefully. Although the first description may seem to fit your sample, the second may apply even better.
- B. Keep rough notes telling what sequence of identification steps you took. This will allow you to double-check your work later and indicate sources of mistakes, if they have been made.
- C. If you are unsure of which choice to make in a couplet, follow both forks (one at a time). After working through a couple of more couplets, it may become apparent that one fork does not fit your sample at all.
- D. Work with more than one sample if at all possible. This will allow you to tell whether the one you are looking at is typical or atypical. This is especially true when working with plants – examine more than one leaf, branch, cone, seed, flower,...etc.
- E. When you have keyed out an organism, do not take your effort as the final result. Double check your identification scheme, using your notes.
- F. When reading a couplet, make sure you understand all of the terms used. The best keys will have a glossary of technical terms used in the key. If a glossary is unavailable, find a good reference work for the field (textbook, biological dictionary,...etc.) to help you understand the term. A key has been provided with this activity.
- G. When a measurement is indicated, make sure that you take the measurement using a calibrated scale. Do not “eyeball” it or take a guess.

Taxonomy Unit

Adapted from: Huntsman Marine Summer Institute
St. Andrews, N.B.

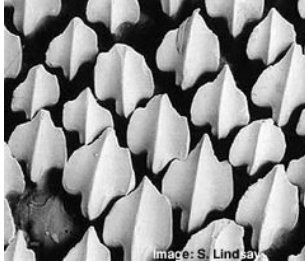
Fish Classification – This activity comes to us from the Huntsman Marine Biology Summer Institute for Students in St. Andrews, New Brunswick. (A great week long summer marine biology program for students – see Mr. Selig if interested in attending) Found below are some helpful descriptions used in the dichotomous key.

Barbells – a small whisker like structure found on the lower jaw

Caudal fin – tail fin

Dorsal fin – fin on the back of the fish

Placoid scales – special scales found in sharks and rays



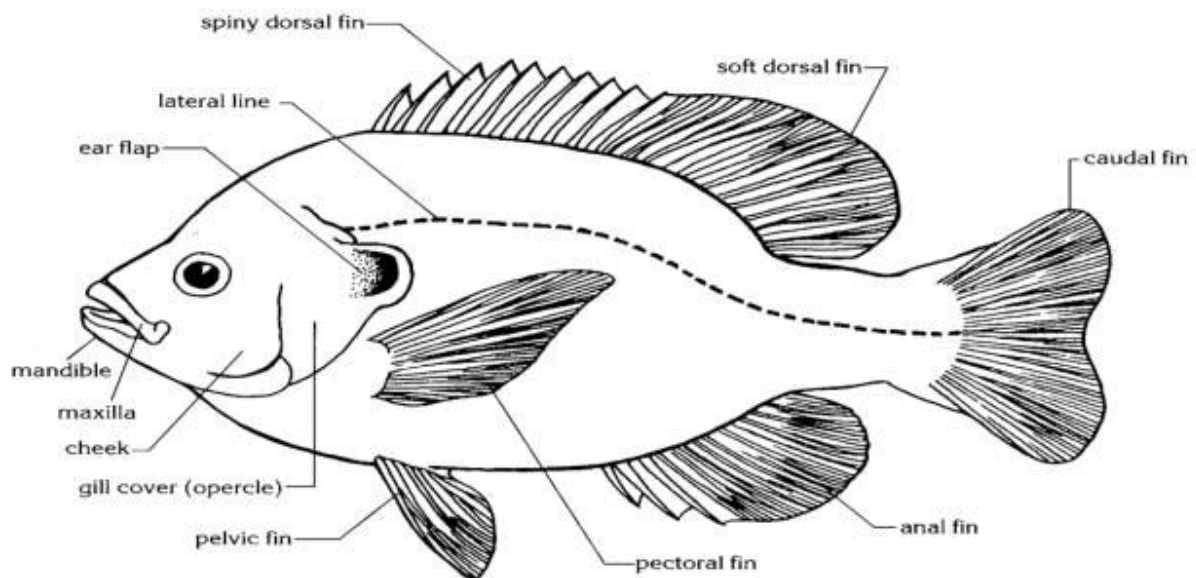
Notice how placoid scales are individual scales that do not overlap. They are much like the enamel of your teeth. Sharks skin can be used as sandpaper.

Adipose fin – small fleshy fin between the caudal and dorsal fin

Finlets - small finlike growths between tail and dorsal and anal fin

Your job is to classify the fish on the picture that is provided using the guidelines found above. The picture below will help you identify the location of the fins.

ANATOMY OF A FISH



Taxonomy Unit

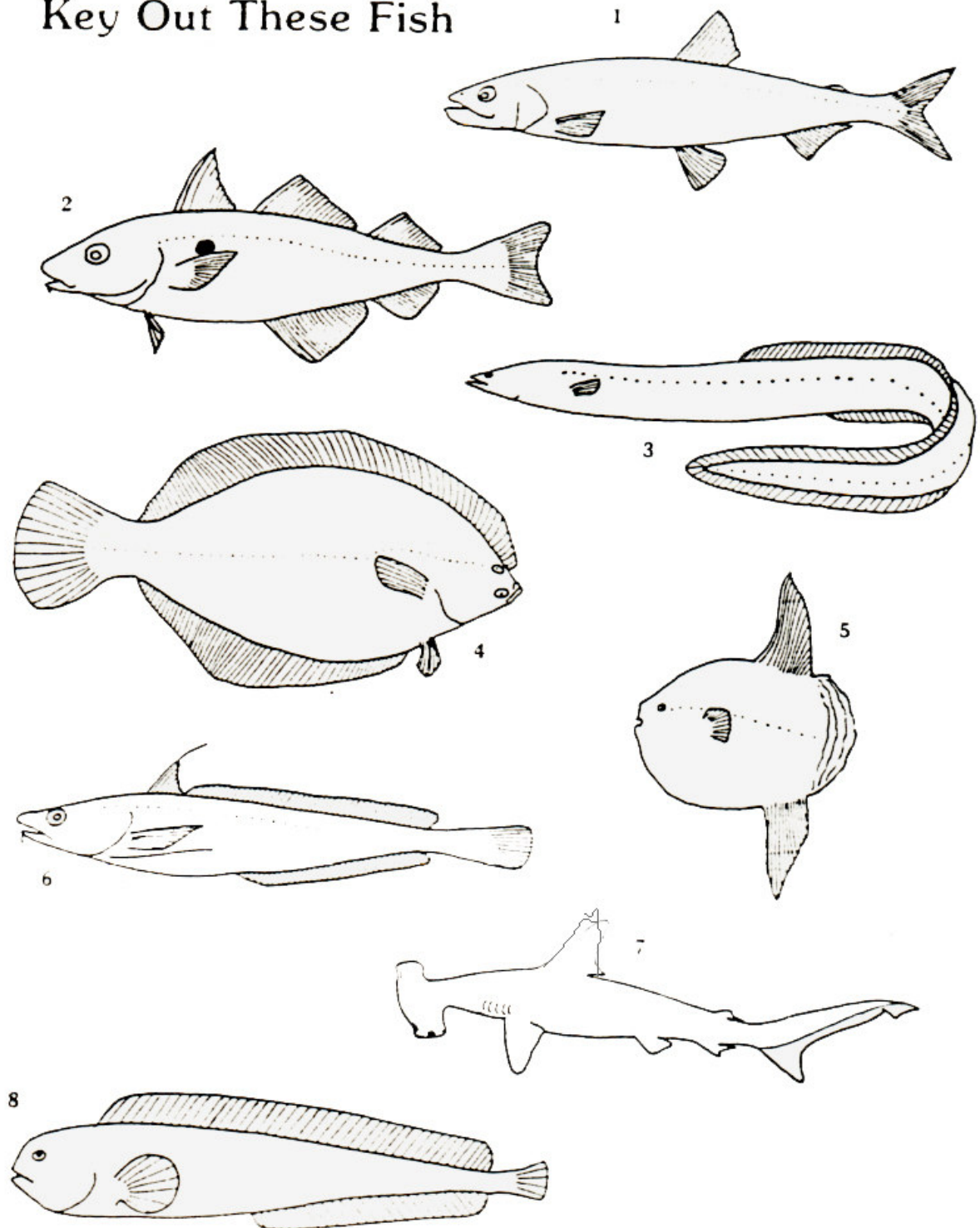
Adapted from: Huntsman Marine Summer Institute
St. Andrews, N.B.



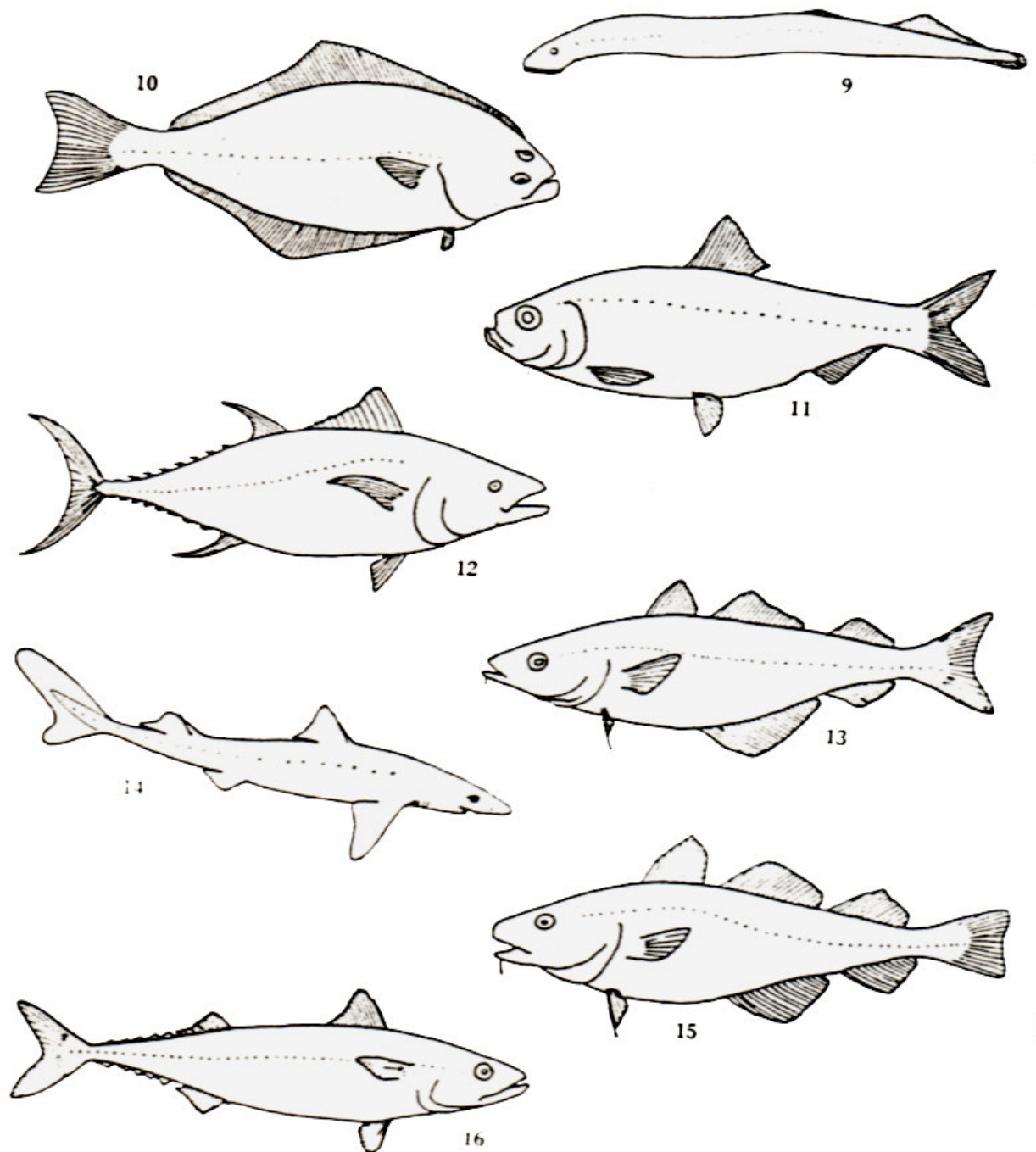
Huntsman Marine Fish Key

- | | |
|--|-----------------------------|
| 1. a. Does the fish have a body like a snake? | 2 |
| b. Does the fish not have a body like a snake? | 3 |
| 2. a. Does the fish have a beaklike mouth? | American eel |
| b. Does the fish not have a beaklike mouth? | Lampreys and hagfish |
| 3. a. Does the fish have eyes on the same side and a flattened body? | 4 |
| b. Does the fish not have eyes on the same side and no flattened body? | 5 |
| 4. a. Does the fish have a forked tail? | Halibut |
| b. Does the fish not have a forked tail? | Flounder |
| 5. a. Does the fish have placoid scales? | 6 |
| b. Does the fish not have placoid scales? | 7 |
| 6. a. Does the fish have a pointed head? | Dogfish shark |
| b. Does the fish not have a pointed head? | Hammerhead shark |
| 7. a. Is the fish body full moon shaped with a little caudal fin? | Ocean sunfish |
| b. Is the fish body not distinctly moon shaped and has a highly visible larger caudal fin? | 8 |
| 8. a. Is the fish body club shaped like a baseball bat? | Wolffish |
| b. Is the fish body not club shaped like a baseball bat? | 9 |
| 9. a. Is there evidence of a chin barbell? | 10 |
| b. Does the fish have no chin barbells? | 13 |
| 10. a. Is the caudal fin not notched or only slightly (just barely) notched? | 11 |
| b. Is the tail fin decidedly notched? | 12 |
| 11. a. Does the fish have 3 distinct dorsal fins (top side)? | Cod |
| b. Does the fish have 2 distinct dorsal fins? | Hake |
| 12. a. Does the lower jaw extend beyond the upper jaw? | American Pollock |
| b. Does the lower jaw not extend beyond the upper jaw? | Haddock |
| 13. a. Does the fish have finlets? | 14 |
| b. Does the fish not have finlets? | 15 |
| 14. a. Are the dorsal fins widely separated? | Mackerel |
| b. Are the dorsal fins not separated widely? | Tuna |
| 15. a. Does the fish have a small adipose fin? | Smelt |
| b. Does the fish not have a small adipose fin? | Alewife |

Key Out These Fish



Taxonomy Unit
Adapted from: Huntsman Marine Summer Institute
St. Andrews, N.B.



Taxonomy Unit
 Adapted from: Huntsman Marine Summer Institute
 St. Andrews, N.B.