Key That Fish!

Grade Level:
Upper Elementary

Subject Areas:
Social Studies, Language Arts, Math, Science

SD Standards:
Social Studies:
4.US.1.2

Reading/Language Arts:
4.L.VS.1.2
4.L.VS.1.3
4.L.2.2
4.W.4.1

Math:
4.G.2.1
4.S.1.1

Science:
4.L.1.1
4.L.1.2
4.L.2.1
4.S.1.1

Setting:
Classroom

Skills:
Observation, Research, Analyzing, Organizing, Applying

Prior Preparation:
Review the "Fishes of the Dakotas" poster and encourage students to discuss their experiences with fish.

Vocabulary:
none

Objective: Students will be able to describe basic physical characteristics of a fish. Students will use these basic characteristics to identify 20 native South Dakota fish families using a dichotomous fish key.

Materials:
Dichotomous Key: Native Fish Families of South Dakota
Identifying Parts of a Fish Illustration
Tail Shapes Illustration
9 Sample Fish
23 Fish Illustrations - Student Copies
Fish Identification Worksheet & Key
Fish Specific Descriptives

Other Materials to have on Hand:
Guide to the Fishes of South Dakota
Fishes of the Dakotas Poster
Scientific Dichotomous Fish Key

Background:
South Dakota is home to over 100 species of fish, most of which are native species. Native species have always been present, whereas non-native species were brought to South Dakota by humans. A species consists of individuals that share the same gene pool. There are 25 known fish families in South Dakota, though some families are non-native such as the trout and salmon family and there is one family that is no longer found here - the lamprey family. Today, there are 20 native fish families present in the state. Some of these families have survived for millions of years. These ancient fish can be found in fish families such as the paddlefish, sturgeon, and gar families. Fossil evidence proves that fish have been historically present in South Dakota for millions of years. Archaeological evidence also proves that fish have been used as food for as long as humans have been in the state. Students may be quite familiar with game fish (food) species, such as the walleye and the bluegill and maybe not so familiar with the minnow species.

Most fish have common features such as tails, fins, gills, and scales. There are different tail shapes, different kinds and number of fins, and different scale shapes. Some fish don't have scales at all! Colors and markings are also important features that can help you tell them apart. For example, some fish have spots while others may have stripes.   Physical traits or characteristics of each fish family help set them apart from other fish families.   Other features, such as mouth size and location can give you clues on what and how a fish feeds.   For example, the sucker family has a mouth facing down because they scavenge for food along the bottom of lakes and streams.   The catfish family has barbels or "whiskers" that help them locate food as they swim along the bottom of lakes and streams.   Some fish have very large eyes, which can tell you they are sight feeders.

Different families of fish have different features that help them to survive in their environment.   Fish can be organized and classified into groups using a dichotomous key.   Dichotomous means "divided into two parts".   When you use a dichotomous key, you are always given two choices as you move through the key, which eventually takes you to a final result.   Dichotomous keys that scientists use are very detailed and usually require them to use a microscope to look for details that are very hard to see with the naked eye.   Dichotomous keys help scientists figure out each fish to the exact species.

Procedure:
- This activity features a very simple dichotomous key that will allow you to pick any one of the provided fish illustrations and key the fish to its family and to the name of the fish itself.

- Discuss with the students the background information above. Incorporate the Fishes of South Dakota poster and the Guide to the Fishes of South Dakota handbook in your discussions.

- Make copies of the "Identifying Parts of a Fish" and "Types of Tails" illustrations and "Fish Identification worksheets", hand them out, and review them with your students.

- Divide the class into 4 or 5 groups. Make copies of the 9 Fish Examples for each group. As a class or as groups, start sorting the fish by their characteristics. Have each group jot down what characteristic they used to sort first, second, third…and so on. Explain to the group that it is important to see the differences in characteristics to help key out each fish. This is what ichthyologists (fish scientists) do when they try to figure out what family a fish belongs to or what species a fish might be.

- Next give each group a dichotomous key chart. Explain that you will be passing out 3 or 4 South Dakota native fish illustrations to each group. Have each group identify the family and fish name for each illustration they receive. Have each group share with the class how they arrived at their decision.

- Have each person in each group fill out their Fish Identification worksheets.

- Discuss with your class the importance of observing each fish they were given to identify.   Discuss what was easy or difficult to do. Would using a real fish have been easier? For example, having a real fish to look at may have made it easier to identify if the fish had scales or not.

- Discuss how a dichotomous fish key that a fish scientist (ichthyologist) uses differs from the key they just used. Explain how an ichthyologist may need to use a microscope to count scales or look at other microscopic features of a fish to determine the exact species. This is especially true when keying out certain minnow species.

- Discuss with the class if they think there would be more difficulty in keying out a very small, young

fish versus an older, bigger fish.   Would characteristics be easier to see and pick out?

Extension:
- Have a discussion with your class about native and non-native fish species.   Discuss examples and the differences between them.

- Discuss invasive species, such as the Asian carp, and the problems associated with them.   For more information see the South Dakota Game, Fish & Parks invasive species webpage: http://gfp.sd.gov/wildlife/nuisance/aquatic/ANS-species.aspx and the U.S. Fish & Wildlife Service Prairie-Mountain Region website: http://www.fws.gov/mountain-prairie/fisheries/ais.html

- Review the Aquatic Nuisance Species Teaching Curriculum for South Dakota: Grades 4-12. See webpage: http://gfp.sd.gov/wildlife/docs/ANS-lesson-plans-g4-12.pdf

- Have your class research the four fish hatcheries in South Dakota and discuss their similarities and differences. Invite a State Fish Hatchery representative to come and speak to your class.

- Have a discussion with your class on why stocking fish is important for South Dakota.
  - McNenny State Fish Hatchery - Spearfish
  - Blue Dog State Fish Hatchery - Waubay
  - Cleghorn Springs State Fish Hatchery - Rapid City
  - Whitlock Bay Salmon Spawning   Station - Lake Oahe

- See the South Dakota Game, Fish & Parks State Fish Hatcheries website: http://gfp.sd.gov/fishing-boating/hatcheries/default.aspx

- Discuss the federal fish hatchery (D.C. Booth National Historic Fish Hatchery) in South Dakota and how it differs from the state fish hatcheries.   See U.S. Fish & Wildlife Hatchery website: http://www.fws.gov/mountain-prairie/fisheries/brochures.html

- Have your class further research fish species in the state that are rare, threatened or endangered.   See website: http://www.fws.gov/southdakotafieldoffice/SpeciesByCounty.pdf

- Have discussions on why you think they are on the list and what can be done to remove them from the list.

- Have a class discussion on the Latin fish names.   Why Latin?   Meaning of the Latin names.

- Have the groups make their own dichotomous keys using items such as beans, bolts, or screws.