Dice Toss
(2-3 class periods)

Overview:
This math activity helps children learn about statistics, probability, and data representation, and practice and reinforce what they have learned about invertebrates.

Probability activities help people answer questions about the world in terms of the chances of future events occurring or not. Data analysis and probability are one of the content strands emphasized in state math standards. Students in primary grades can begin to use data to answer questions. Concepts of chance can be developed long before sophisticated ideas of probability are introduced. Children need to begin these experiences in the early grades so that an intuitive understanding of probability is developed on which more traditional methods can be built.

While this can be used as an introductory activity, it would be helpful if students had prior experience with dice games and/or recording data on a graph or other graphic organizer that encourages the ideas of probability.

Vocabulary: data, least, most, data collection, die, dice

Engagement (10 minutes)**:**
Ask students to help you think of the different kinds of invertebrates that they have learned about. As children share their thinking show them the animals that match on the die (have one to show students that is already made up).
Use the Tlingit (or other Native language) name of the animals, too. Model how to roll the cube with a few tosses, showing what comes up on each toss.

Exploration (20-30 minutes each day for 2 days)**:**
Show students the pictures on the animal dice pattern. Model how to make the die. Children might choose to color the pictures of the invertebrates on the die before cutting and folding. Cut around the solid outside line and then cut carefully on the inside dotted lines. Show children how to fold the die on the remaining solid lines toward the center with the animal pictures on the outside. Tape the die when all six sides have an animal on them.

After students have made the dice, provide time for the class to experiment with them. Let them roll and see what they get. Call the students together to discuss what they noticed. If you have included the Alaska Native words for the animals on the dice, children can 'practice' the words as they roll the dice.

On the second day, emphasize data collection. Ask the students to roll their dice 50 times and devise a system to record the results of each roll. Each child should have a blank piece of paper and pencil to record their rolls. *It is important to let children generate the ideas for recording the data.* (Do not model your method of keeping track of the rolls).

Allow students ample time to roll and record their dice 50 or more times. Save the children's work for the next part of the lesson. Be sure to look it over before continuing to the next part of the activity.

Explanation (10-15 minutes)**:**
Select student samples of a variety of record keeping methods. (For example, one child may have used tally marks, another may have used numbers, and another may have drawn pictures). Choose five or six samples and ask the students if they willing to share with the whole class. If possible, make overhead transparencies of the samples. Encourage children to describe how they gathered their data and how they decided to record it. After the children have shared, allow other children to add their ideas. Then ask the children what they noticed about the results of the data. Did one animal come up more often on the die? After a brief discussion, explain that each child will use his or her data. They will look at this information and then write about what they learned.

Elaboration (10-15 minutes)**:**
Encourage students to talk and describe their thinking and/or write their ideas on the paper. Have children describe why they think one animal got more rolls than another. If they want to compare with another student, they could do this in teams. If a child is struggling ask: Which animal got the least rolls? Why do you think that happened? Ask for volunteers to share their data records and their writing.

Evaluation:
Use these descriptors on the following continuum of understanding as you look at the students' work:

Emergent	Developing	Proficient	Advanced
The student records the rolls of the die in a way that is challenging to understand the data collected.	The student records the rolls of the die randomly so it is difficult to find the total number of rolls for each animal, but possible.	The student has a more organized method of recording the rolls. It is easy to see which animal has the most or least rolls, but it is more difficult to determine the total.	The student organizes the rolls of the die in an organized way and it is easy to understand the results and find a total.

Sea Anemone

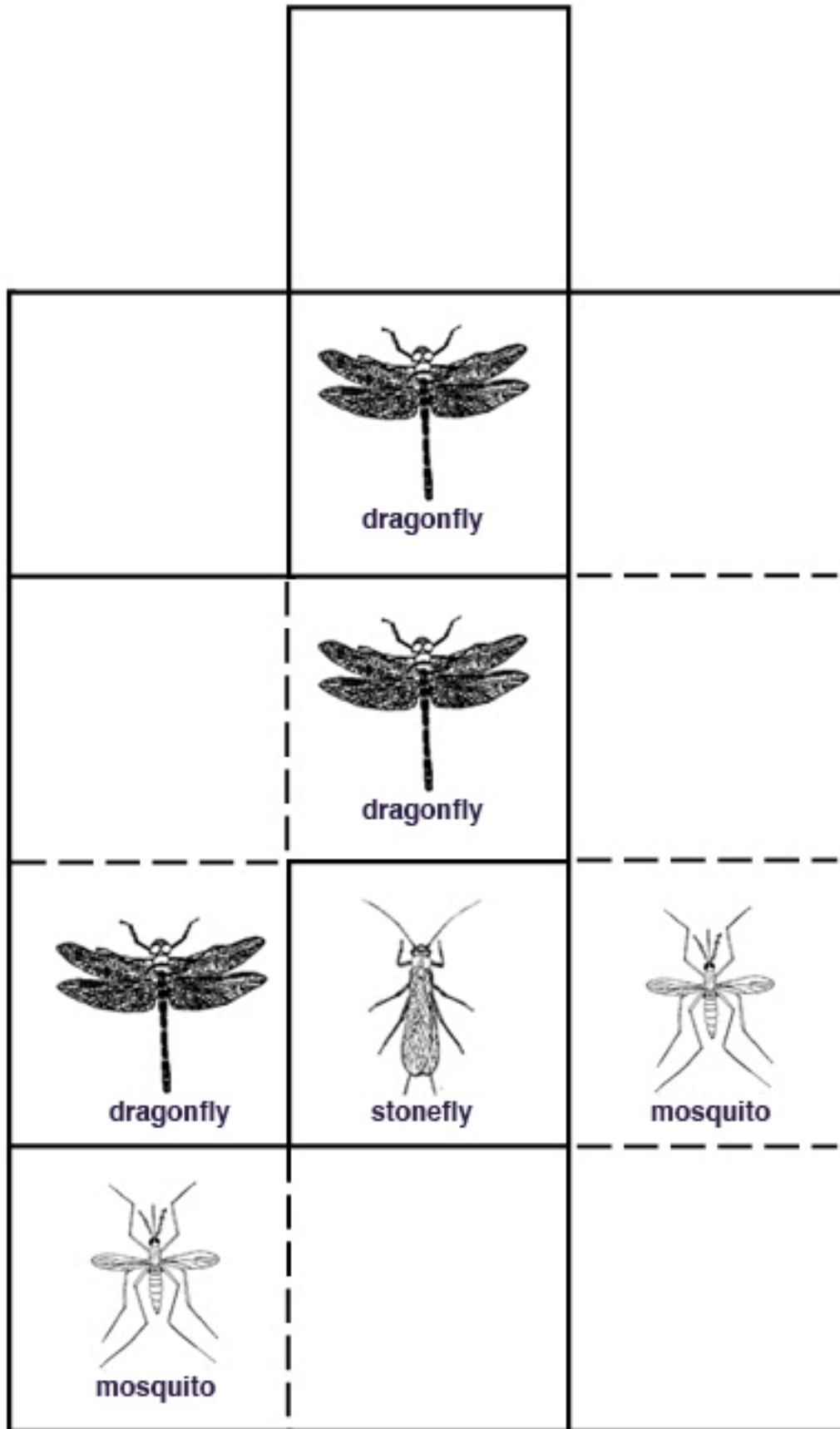Hermit crab

Sea Anemone

Hermit crab

Barnacle

Sea Anemone

Animal Die Template
Cut on dotted lines and form into a cube.

dragonfly

dragonfly

dragonfly

stonefly

mosquito

mosquito

Animal Die Template
Cut on dotted lines and form into a cube.