Hop To The Pond

Objective: Students will experiment with statistics and probability to discover how to predict and analyze data.

Grade Level:
3-5

Subject Areas:
Mathematics

Setting:
Classroom

Skills:
Communication, strategizing, observation, critical thinking

Prior Preparation:
Laminate the game board. Choose pairs of students to play the game. Set a time limit for each set of partners. This is a companion game to play with rainforest activities.

Vocabulary:
None

South Dakota Education Standards for 4th grade:
Math
4.A.4.1
4.S.2.1

Materials:
Laminated Hop to the Pond game board
6 - 12 frogs
One set of dice

Background:
This activity encourages students to explore statistics and probability with concrete materials; calculate "number facts" to 12; develop strategies to make likely predictions; collect and interpret data; work cooperatively and play fairly.

Procedure:
- Two people play the game at a time.
- Explain to students that they are going to use dice to play a frog race game called Hop to the Pond. Place 6 frogs on the number frogs (starting with Frog 1 pictured at the bottom of the board. Before explaining anything else about the game, ask students to predict which frog will get to the pond (top of the board) first.

Version 1
- Using one die, have students alternate rolling and moving frogs. With each roll, move corresponding frog up one space. Explain that the frog whose number corresponds to the number on the top face of the die can move forward one space (in many games that use dice, the number rolled corresponds to the number of spaces a playing piece can move. This is **not** the case in this game.).
- Students continue rolling the die and moving the frogs until one frog reaches the pond (top).
- Ask questions during the course of the game, such as: "Which frog is in the lead (winning)?" "Are any frogs still at the starting point?" "How many hops has Frog #3 taken so far?" "How many more hops until Frog 2 gets to the pond?" "Do you want to change your prediction?"
- When the game is finished ask, "Why did that frog win the race?" "Which frog(s) came in second?" "Were any frogs far behind in the race?" Note: in this version of the game, all frogs stand an equal chance of winning the game. Resist the temptation to explain the data the students are observing/accumulating any further than your students suggest.

Version 2
- Add 6 more frogs to the game board. Students will need to roll both dice in this version.
- Students follow the same procedure with this version as in the former. Again, students will need to predict which frog will get to the pond first. Additionally, you may want them to predict which will come in last, how many rolls of the dice it takes for the winner to get to the pond, which frog

will come in second, etc.

- You may want to keep a running total of the race results on the chalkboard to further discuss predicting, probability, etc.
- Discuss with students the outcome of their games. Explore reasons that the outcome turned out to be what it was....

Extensions:

- Play "Roll All Six." Have students predict how many times they will need to roll a die to get each of the six numbers to come up one time. Students then take a die and the recording sheet and find out if their predictions are accurate.

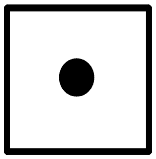
- Have students continue to play Hop to the Pond game with 12 frogs at other times. Keep an on-going data chart to record the race results. With more experience using the dice, it is likely that your students will begin to draw accurate conclusions about the dice. Some may understand the reason that Frogs Six, Seven, and Eight win more frequently than other frogs in the race with 12 frogs

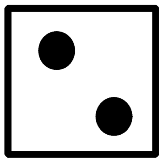
- Have students pretend they are going to a frog race in which 12 frogs are racing. They pretend they are buying one frog to enter the race. Which would they buy and why? Have them write an essay on their reasons.

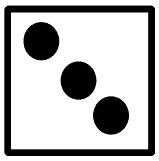
Activity developed from: Frog Math: Predict, Ponder, Play

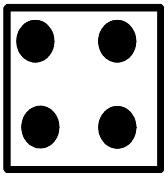
ROLL ALL SIX

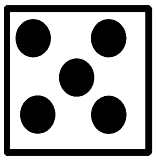
1. Guess how many times you need to throw the die before you see every number come up.
   Write down your guess: ☐
2. Now, throw the die and make a check mark for the number that comes up. Keep doing this until every number has come up.

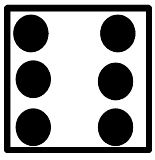
 _____

 _____

 _____

 _____

 _____

 _____

3. Add up all the check marks. How close was your guess to this number?