



GRADE 1 SUPPLEMENT

Set E2 Data Analysis: Probability

Includes

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Skills & Concepts

- ★ discuss events related to students' experiences as certain, impossible, or likely
- ★ pose questions, gather, and represent data
- ★ describe the data and draw conclusions
- ★ understand and represent commonly used fractions, such as $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$

Bridges in Mathematics Grade 1 Supplement

Set E2 Data Analysis: Probability

The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set E2 ★ Activity 1



ACTIVITY

Certain or Impossible?

Overview

The teacher places 4 yellow polydron triangles into a sock box and invites a volunteer to pull one back out. Before she does, students make predictions about the object she'll pull out of the box. This activity is designed to introduce the concepts of certain and impossible in an engaging way.

Skills & Concepts

- ★ discuss events related to students' experiences as *certain*, *impossible*, or *likely*
- ★ pose questions, gather, and represent data
- ★ describe the data and draw conclusions

You'll need

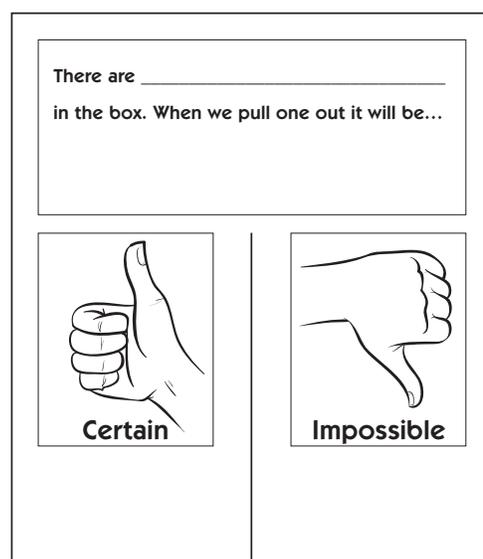
- ★ Certain & Impossible Markers (page E2.5, 2 copies, see Advance Prep)
- ★ Recording Chart Labels (page E2.6, 2 copies, see Advance Preparation)
- ★ 4 pieces of chart paper
- ★ a probability container from the Bridges kit
- ★ 4 yellow triangle polydrons
- ★ Unifix cubes
- ★ pattern blocks

Instructions for Certain or Impossible?

1. Gather students to your discussion circle and hold up the probability container. Take the plastic container out of the sock and show children the inside of the sock and the container to confirm that both are empty. Put the container back inside the sock. As the children watch carefully, place 4 yellow polydron triangles inside the container.

2. Explain that in a minute, you're going to shake the container gently to mix up the triangles and have a volunteer pull one out. Ask students to make predictions about what will happen. What do they know for sure about the object the helper will pull out of the container? Give them a few moments to pair-share and then call on volunteers. Ask students to explain their thinking as they share with the class.

Advance Preparation Cut the Certain & Impossible Markers and the Recording Chart Labels apart. Glue them to chart paper as shown below to create 4 poster-size record sheets for this session. Post 3 of the sheets on your whiteboard or pin the stack of them to an easel, whichever is most accessible when you're sitting with children in the discussion circle. (Save the fourth for Set E2 Activity 2.)



Activity 1 Certain or Impossible? (cont.)

Darryl *It's going to be a triangle.*

Teacher *How do you know for sure?*

Darryl *Because there are only triangles. That's all you put in that box.*

Gloria *It's going to be yellow because all the ones you put in the box were yellow.*

Teacher *Is there anything else you know for certain?*

Hector *It's going to be made out of plastic because all the polydrons are plastic.*

3. Draw students' attention to the first recording chart. Work with their input to record the contents of the container at the top and then list their ideas under the "certain" heading.

| | |
|--|---|
| <p>There are <u>4 yellow triangle polydrons</u> in the box. When we pull one out it will be...</p> | |
|  <p>Certain</p> <ul style="list-style-type: none"> • a triangle • yellow • plastic |  <p>Impossible</p> |

4. Now ask a volunteer to pull one of the objects out of the container and hold it up for everyone to see. Review the descriptions on the chart. Is this object a triangle? Is it yellow? Is it plastic? Ask students how they knew these things were certain to be true. Then ask your volunteer to put the polydron back in the box. Shake the box gently again to mix the objects and then invite another volunteer to pull an object out of the box. Before she does, ask the children what the chances would be of pulling a red triangle out of the box.

Eduardo *No way! There's no red ones in there. You showed us.*

Teacher *What about a green square? Could we pull a green square out of the box?*

Samantha *Impossible! All of the things in there are triangles and they're all yellow. We know for sure because you showed us.*

5. List your suggestions on the chart under "impossible" and ask students for other ideas. What else do they know for sure can't be true about the object that gets pulled out of the box? Since this activity is designed to familiarize first-graders with the terms "certain" and "impossible", you may need to re-phrase some of their statements. For instance, a child may say that the object won't be purple because all the

Activity 1 Certain or Impossible? (cont.)

ones you put in were yellow. In order to write this statement on the “impossible” side, it will have to be stated in the affirmative: “When we pull one out, it will be purple.” Reading the prompt at the top of the chart each time a student volunteers an idea will help.

Teacher *Karina's raising her hand. Let's read the sentence at the top of the chart together and let her fill in the ending. Ready?*

Students *There are 4 yellow triangle polydrons in the box. When we pull one out, it will be...*

Karina *...alive. Impossible! Polydrons are made out of plastic. They can't be alive!*

| | |
|---|---|
| <p>There are <u>4 yellow triangle polydrons</u> in the box. When we pull one out it will be...</p> | |
|  Certain |  Impossible |
| <ul style="list-style-type: none"> • a triangle • yellow • plastic • a polydron | <ul style="list-style-type: none"> • red • a square • green • alive |

6. Once 4 to 5 ideas have been listed, ask a volunteer to pull out an object. Is it red? Is it a square? Is it green? Is it alive? Ask students how they knew these things would be impossible.

7. Remove the 4 polydrons from the container. Ask a volunteer to get 6 red trapezoids from the tub of pattern blocks. Be sure everyone gets a good look at the blocks, and then place them into the container. Record the contents of the container at the top of your second chart. Read the resulting sentence with the class several times, asking students to fill in the ending with something they know for certain or something they know is impossible. Each time a new statement is made, ask the class to put their thumbs up if they think it's certain and thumbs down if they think it's impossible.

Teacher *Let's read the top of our new chart together. "There are 6 red trapezoid blocks in the box. When we pull one out, it will be...K'Sondra?"*

K'Sondra *Blue! (giggles)*

Students *Impossible
Thumbs down!
No way!*

8. Record children's ideas on the chart. When there are 4 or more on each side, shake the container to mix the objects. Then have a volunteer pull one out and hold it up for everyone to see. Review the chart with your students to make sure all their predictions were correct.

Activity 1 Certain or Impossible? (cont.)

| | |
|---|--|
| <p>There are <u>6 red trapezoid pattern blocks</u> in the box. When we pull one out it will be...</p> | |
|  <p>Certain</p> <ul style="list-style-type: none"> • red • a trapezoid • made out of wood • a pattern block |  <p>Impossible</p> <ul style="list-style-type: none"> • blue • a square • a T-Rex • an apple |

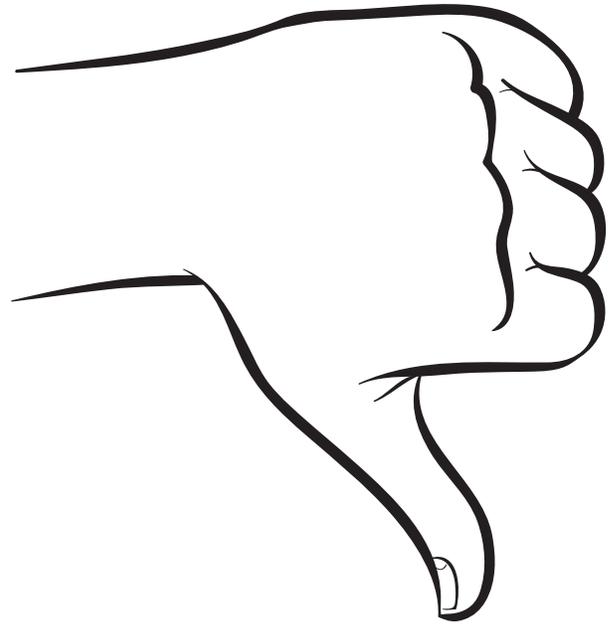
Extension

- Repeat this activity as time allows, either now or in the next few days. Encourage students to help you think of collections to put in the probability container. Here are a few examples: 7 black Unifix cubes; 5 green polydron squares; 4 yellow hexagon pattern blocks. If it proves to be a popular activity, you may need to make more recording charts.

Certain & Impossible Markers



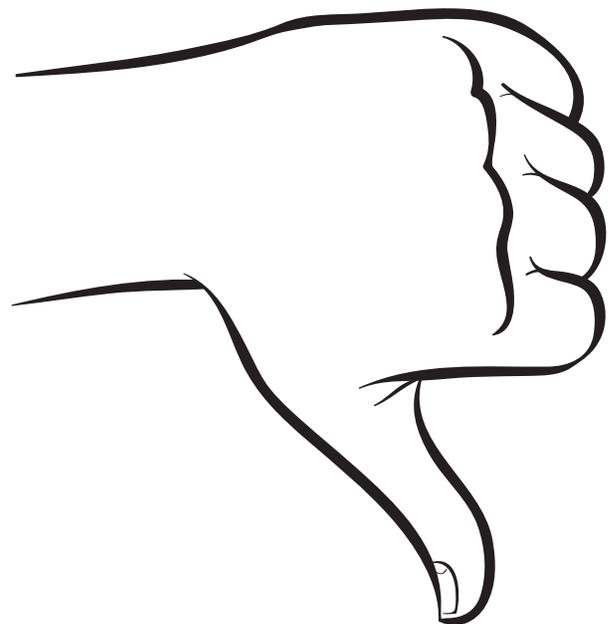
Certain



Impossible



Certain



Impossible

Recording Chart Labels

There are _____
in the box. When we pull one out it will be...

There are _____
in the box. When we pull one out it will be...

Set E2 ★ Activity 2



ACTIVITY

Red Frog, Green Frog

Overview

Students examine a collection of 4 frogs from the frog bucket—2 green and 2 red. The frogs are then placed in a sock box. Students make and test predictions about what will happen when 1 of the frogs is pulled out of the box, revisiting the concepts of certain and impossible from Set E2 Activity 1. Finally the class predicts and tests what will happen if the box is passed around the circle and each child takes a turn to pull a frog out and then put it back in the box. Will they get more reds, more greens, or about the same number of each?

Skills & Concepts

- ★ discuss events related to students' experiences as certain, impossible, or likely
- ★ pose questions, gather, and represent data
- ★ describe the data and draw conclusions
- ★ understand and represent commonly used fractions, such as $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$

Instructions for Red Frog, Green Frog

1. Gather students to your discussion circle. Place the 4 frogs in the middle of the circle where everyone can see them clearly. Ask students to share any observations they can make about the collection.

***Students** Those are frogs from our frog bucket.
2 red and 2 green.
Those red ones are my favorite.
I like playing frog army with those guys!*

2. Ask students what fraction of the frogs is green, and what fraction is red.

***Students** Half of those frogs are red.
Yeah, half because 2 and 2 is 4.
If you cut 4 in half, it makes 2.*

3. Record the fractions on the board. Most likely, students will report that half are red and half are green. If it doesn't come from the children, write the fraction $\frac{2}{4}$ on the board as well, and ask them what $\frac{2}{4}$ has to do with the collection.

You'll need

- ★ 1 poster-size recording chart from Set E2 Activity 1
- ★ a probability container
- ★ bucket of frogs (see Advance Preparation)

.....
Advance Preparation Select 2 green and 2 red frogs from the bucket. Make sure they are identical in shape, size, and texture. The only difference should be in their color.
.....

Activity 2 Red Frog, Green Frog (cont.)

Michelle *There are 4 frogs, right? And 2 of them are red, so maybe two-four means that.*

Teacher *That's pretty close. There are 4 frogs in this collection, so we can say that each frog is one-fourth of the collection. How many fourths are green?*

Students *Two!*

Teacher *And how many fourths are red?*

Students *Two-fourths.*

Oh yeah! I remember now. That number means 2 one-fourths. Two out of 4 are red and two out of 4 are green.

4. Hold up the probability container and demonstrate that it is empty. Then put the 4 frogs in. Record the contents of the container at the top of your chart. Read the resulting sentence with the class several times, asking students to fill in the ending with something they know for certain or something they know is impossible. Each time a new statement is made, ask the class to put their thumbs up if they know it's certain and thumbs down if they know it's impossible.

Teacher *Let's read the top of our new chart together. "There are 2 red frogs and 2 green frogs in the box. When we pull one out, it will be...DeShawn?"*

DeShawn *red!*

Students *Certain!*

Impossible!

Hey, wait! There are red and green frogs in there. We might get a red one, or we might get a green one.

I can get a red one if you let me be the helper.

How can your fingers know what color it will be?

The red ones feel different.

As students share their ideas, the fact that there are 2 different colors in the container is bound to stir some debate. Remind them that you can only record ideas that are absolutely certain or completely impossible.

5. When you've recorded 4 or more ideas on both sides of the chart, shake the container to mix the objects. Then have a volunteer pull one out and hold it up for everyone to see. Review the chart with your students to make sure their predictions were correct.

Activity 2 Red Frog, Green Frog (cont.)

There are 2 green frogs and 2 red frogs
in the box. When we pull one out it will be...



Certain

- a frog
- red or green
- plastic
- smaller than me



Impossible

- purple
- a cat
- a dog
- bigger than Mr. R.

6. Put the frog back in the container and tell students you're going to try an experiment. You're going to pass the box with the 4 frogs in it around the circle and let each child pull out one frog without peeking. After everyone sees what color it is, the frog will go back into the box, and the next child will have his or her turn. Each person will need to shake the box gently to mix up the frogs before he or she pulls one out. Before you get started, you'd like them to make some predictions. Will they pull out more reds, more greens, or about the same number of each? Why?

7. Record some of their predictions on the board and then start the experiment. Make a tally chart on the board to keep track of how many times a red frog is drawn and how many times a green frog is drawn. When the box has gone all the way around the circle, count the tally marks and record the results. Ask students to comment, and record some of their observations.

Frog Experiment

| | | | | | | | |
|---|---|-----|-------|--|--|----|----|
| <p>Predictions</p> <p>Will we get more greens, more reds, or about the same number of each?</p> <ul style="list-style-type: none"> • More reds because red is better. • More reds because I can feel what color they are with my fingers. • More greens because green is my favorite color. • About the same because half are red and half are green. • About the same because there are 2 and 2. | <p>Outcome</p> <table style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">Red</td> <td style="width: 50%;">Green</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>12</td> <td>14</td> </tr> </table> <p>Observations</p> <ul style="list-style-type: none"> • We got more green than red. • We got two more greens. • I thought red would win. • It kept going back and fourth. | Red | Green | | | 12 | 14 |
| Red | Green | | | | | | |
| | | | | | | | |
| 12 | 14 | | | | | | |

Activity 2 Red Frog, Green Frog (cont.)

Extension

- Leave the 4 frogs in the probability container and let interested students repeat the experiment on their own during Work Places. They can either add to the class data on the board or keep track of their own data on a piece of paper. You may want to make a display about the experiment if student interest is high enough.

Set E2 ★ Activity 3



ACTIVITY

Our Class Book of Certain & Impossible Events

Overview

The teacher reads a story to the class and then students list some of the story events that will certainly happen to them within the next few days, along with some of the events that are impossible. Then students each illustrate and describe an event that's certain and one that's impossible. Their work is bound into a book to share with the whole class.

Skills & Concepts

- ★ discuss events related to students' experiences as certain, impossible, or likely

You'll need

- ★ Certain & Impossible (page E2.13, class set plus a few extra)
- ★ a book that features some events that are impossible and some that are certain (see note)
- ★ whiteboard and markers
- ★ crayons
- ★ pencils

Note There are impossible events in nearly every folktale and fairy tale. In fact, it can be more challenging to find events that are certain to happen. It can be done, though. Consider the story of Chicken Little. Can animals talk? Can the sky really fall down? Impossible! Will a fox really eat a chicken? Quite likely, if he's hungry. Can dogs chase a fox away? Certainly. Choose a traditional or modern book that will appeal to your first-graders. Here are a few of our favorites: *Cloudy with a Chance of Meatballs*, by Judi Barrett, *Bony-Legs*, by Joanna Cole, *Heckedy Peg*, by Audrey Wood, *The Talking Eggs*, by Robert D. San Souci

Instructions for Our Class Book of Certain & Impossible Events

1. Gather students to your discussion circle. Tell them that you're going to read a story and you want them to listen carefully for events that are certain to happen, even tomorrow, and events that are impossible. Write the words on the whiteboard and label them with a simple thumbs-up and thumbs down sign if you like.
2. Read the book you've selected for this activity. When you're finished, invite students to comment on the things that interested them most. Then ask them to think about their own life. Were there any events in the story that are certain to happen to them this evening or tomorrow or next week? Were there any events in the story that are impossible, and will never, ever happen in their whole lifetime?
3. Record students' ideas on the board as they discuss these questions. Depending on the story, they may have to think harder about events that are certain to happen in their own lives than events that are impossible.

Activity 3 Our Class Book of Certain & Impossible Events (cont.)

| Heckedy Peg | |
|---|--|
| <p>Certain</p> <ul style="list-style-type: none"> • A mom going to the store • A mom loving her kids • A mom telling her kids not to play with fire | <p>Impossible</p> <ul style="list-style-type: none"> • A witch coming to my house • A witch turning kids into food • A kid turing into bread • A kid turning into a fish • A witch putting a spell on me |

4. Show students a copy of the Certain & Impossible worksheet. Read the labels at the top of the page with them. Then ask them to draw and write about an event that is certain to happen in their own life tomorrow and an event that definitely not happen tomorrow because it's impossible. Spend a few minutes brainstorming some ideas with the class. When the children understand what to do, send them back to their tables to get out their pencils and crayons while you hand out copies of the sheet. Circulate as they work, giving spelling help and guidance as needed. Encourage them to choose events that are really certain and definitely impossible, and to be as creative as possible.

NAME K'Sondra DATE _____

Certain & Impossible

| | |
|---|---|
| <p>Certain</p>  <p>I will get dressed in the morning.</p> | <p>Impossible</p>  <p>A dinosaur will come to my house tomorrow.</p> |
|---|---|

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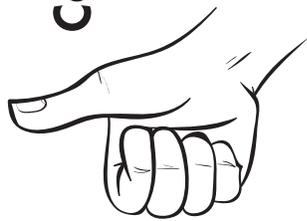
5. When students have finished their work, collect their papers and bind them into a book to read to the class. You might also consider placing their work on display in the hall or on a classroom wall for a week or two before making it into a book.

Extension

- Analyze the events in other read-aloud stories just as you did in this activity. Most first graders never get tired of thinking about the very reassuring certainties in their lives as well as the many events in children's literature that will never happen to them tomorrow because they're impossible.

NAME _____ DATE _____

Certain & Impossible



Certain



Impossible

