

 **Instructional Targets**

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on a single count or measurement variable:

- Create a bar graph to represent data.
- Interpret data from a graph.
- Compute the mean (average) and median of a data set.

Summarize, represent and interpret data on two categorical and quantitative variables:

- Design questions and make a plan to conduct a survey to gather data.
- Compare data on graph to show the relationship between two sets of data.

Math Standards for Statistics and Probability—Making Inferences and Justifying Conclusions

Understand and evaluate random processes underlying statistical experiments:

- Determine the likelihood of an event based on a data sample.
- Evaluate reports based on data.

 **Differentiated Tasks**

Level 3 Students will...

- Organize data on a graph.
- Compare data from tables and graphs to report specific information.
- Calculate an average (mean) and median from data.
- Design a survey to ask questions and collect data to present on a graph.
- Compare data from two different populations on a graph.
- Identify and explain the rate of change of a line graph.
- On the basis of information, determine the probability that something is likely or unlikely to occur.
- Make an inference about the data in tables and graphs.

Level 2 Students will...

- Display data on a graph.
- Identify specific data from a table or graph.
- Identify a middle point (average) in a set of data.
- Ask questions to gather data for a survey.
- Identify specific data from a graph of two different populations.
- Identify the rate of change of a line graph with support.
- On the basis of available information, determine that something is likely to happen.
- Identify information about a group from a table or graph.

Level 1 Students will...

- Select pictures as part of a graph-creating process.
- Report data information that is presented in a table or graph.
- Communicate data information that describes an average.
- Ask a question and select pictures as part of a data-gathering process.
- Select pictures to indicate data on a graph of two different populations.
- Select a rate of change of a line graph with support.
- Select an activity that is likely to occur.
- With support, select a statement about a group based on data presented in a table or graph.

 **Topic Connection**

Throughout this unit, students learn about fitness through a study of the Olympics. In this lesson, students will analyze a bar chart about which Olympic event students watch the most. They will also learn how to conduct a survey and graph the results. They will practice finding the mean and median using various numbers. And last, they will compare data using a double bar graph.



Topic Words



Math Words

athlete medal Olympics sport

average data mean population
bar graph group median probability
chart information middle survey

* Power Words

Benchmark Assessments

- Math Problem Solving: Math: Data Analysis
- Early Learning: Emerging Math
- Emerging Skills: Early Emerging Math Rubric
- Emerging Skills: Number Match





Lesson at a Glance

	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
<p>Instructional Activities</p>	Read a Chart	Conduct a Survey	Make a Graph	Mean, Median and Probability	Compare 2 Groups of Data
<p>? See how these activities fit into the Suggested Unit Pacing.</p>					
<p>ULS Materials and Resources</p>	<p>Chart Chart Questions</p>	<p>Survey Cards </p> <p>Picture/Word Cards and Picture Cards </p> <p>basketball gymnastics swimming skateboarding other</p>	<p>Survey Graph Survey Questions</p>	<p>Mean and Median Probability Quiz</p>	<p>Double Bar Graph Double Bar Graph Questions</p>
		<p>Transition Passport: Personal Life/Everyday Communication/ Introducing Yourself</p>			
	<p>n2y Math Manipulatives Kit Unifix® Cubes</p>				
<p>Additional Materials</p>					

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Instructional Target

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on a single count or measurement variable.

- Interpret data from a graph.



Instructional Routine



Introduce	<ul style="list-style-type: none"> Introduce this activity by asking a focus question about charts and graphs. For example, ask, "What does a chart or graph give us—markers or information?" Discuss students' responses. Explain to students that different types of charts and graphs tell us different types of information. Explain how various charts and graphs work, including bar graphs, pie charts and line graphs. Ask, "What kind of information can go on a chart or graph?" Tell students that they will be reading and answering questions about a chart on what type of Olympic event students like to watch. For example, say, "We will be looking at a chart on what Olympic event people like to watch the most. Your job is to read the information on that chart and answer the questions." Review the learning goals with students: I will read information from a chart. I will answer questions using information from a chart.
Model	<ul style="list-style-type: none"> Display the chart. Model how to read the chart. Read the title and the information. Point out the scale and emphasize the quantity each interval represents. Model how to identify the type of chart that is displayed and how to analyze the information from the chart. For example, say, "This is a bar graph. I know this is a bar graph because I can see an x-axis and y-axis. There are also bars on this chart. The bars show different values." Model how to analyze the information by reading it out loud. Discuss how the size of each bar of the chart shows a number. For example, say, "The section for soccer looks the biggest. That must mean that more people like watch soccer in the Olympics."
Provide Practice	<p>Display the chart and chart questions.</p> <p>Level 3: Have the student independently read the chart and answer the chart questions.</p> <p>Level 2: Have the student use visual supports to read the chart. Read the questions and have the student answer the chart questions.</p> <p>Level 1: Have the student actively participate in answering the chart questions from a narrowed field or errorless choice(s).</p>
Review	<ul style="list-style-type: none"> Review the learning goals. Discuss the process students use to read the information on the chart and answer questions. Review the chart questions with students.



Check Understanding ?



Level 3: Can the student read the chart and answer the chart questions independently?



Level 2: Can the student use visual supports to read the chart and answer the chart questions?



Level 1: Can the student actively participate in answering the chart questions from a narrowed field or errorless choice(s)?





Instructional Target

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on two categorical and quantitative variables:

- Design questions and make a plan to conduct a survey to gather data.



Instructional Routine



Introduce	<ul style="list-style-type: none"> • Introduce this activity by asking a focus question about surveys. For example, ask, "How can we find out what a person's favorite Olympic sport is—conduct a survey or read a book?" • Explain to students that a survey is when a group of people are asked a question to gather information about a subject. • Tell students that they will ask questions to conduct a survey on people's favorite Olympic sport. • Review the learning goal with students: I will ask questions to gather information for a survey.
Model	<ul style="list-style-type: none"> • Review the survey question: "What is your favorite Olympic sport?" • Identify and explain the Survey Cards. Show how the Survey Cards are used by modeling how to conduct a survey. For example, select a student to participate in your survey. Ask the student, "Would you like to participate in a survey on Olympic sports?" Hand the student a Survey Card and ask the student, "What is your favorite Olympic sport?" or provide student with a choice of Picture/Word Cards and have them model answering from a field or single choice. • Optional: Use the Introducing Yourself poster located in the Transition Passport/ Personal Life/ Everyday Communication to model and practice introduction skills.
Provide Practice	<p><i>Provide students with Survey Card and Picture/Word Cards, and alternative forms of communication if needed. Have students use Picture/Word Cards to encourage choice making as an answer option when needed.</i></p> <p>Level 3: Have the student conduct a survey independently. Have the student collect the information independently.</p> <p>Level 2: Have the student ask the survey question using visual supports. Have the student collect the survey.</p> <p>Level 1: Have the student use their communication mode to ask a survey question. Have the student answer the survey question by making a selection from a narrowed field or errorless choice(s).</p>
Review	<ul style="list-style-type: none"> • Review the learning goal. Review the process of answering and recording answers. • Review the answers students received during the survey.



Check Understanding ?

- 🌟 **Level 3:** Can the student independently conduct a survey by asking a question and collecting the answer?
- 🌟 **Level 2:** Can the student use supports to ask survey questions and collect answers?
- 🌟 **Level 1:** Can the student use their communication mode to ask a survey question? Can the student make a selection to answer a survey question from a narrowed field or errorless choice(s)?



Instructional Targets

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on a single count or measurement variable.

- Interpret data from a graph.
- Create a bar graph to represent data.



Instructional Routine



Introduce	<ul style="list-style-type: none"> • Introduce the activity by asking a focus question about surveys. For example, ask, "How can we find out which Olympic sport is the most popular—graph the answer on a bar graph or listen to a story?" • Explain that a bar graph is a graph that uses columns made up of rectangles to record information. • Tell students that they will make and interpret a bar graph. • Review the learning goals with students: I will make a bar graph. I will use a bar graph to answer questions.
Model	<ul style="list-style-type: none"> • Model how to create the bar graph. Examine each answer and separate into different piles. • Determine into which column the answers go. Then color the appropriate number of squares in each column based on the number of answers. • Model how to interpret the information found on the bar graph to answer the Survey Questions. For example, say, "I see that swimming is the tallest bar. This means that most people's favorite sport is swimming. How many people chose swimming as their favorite sport? I can count the number of colored rectangles in the bar to see how many."
Provide Practice	<p>Level 3: Have the student organize and create a bar graph independently. Have the student answer the survey questions independently.</p> <p>Level 2: Have the student use supports to create a bar graph. Have the student answer survey questions from a field of 2-3 choices.</p> <p>Level 1: Have the student select pictures from an errorless field to create the bar graph. Have the student answer a survey question by selecting a picture from a narrowed field or errorless choice(s).</p>
Review	<ul style="list-style-type: none"> • Review the learning goal. Discuss the process students used to read the information on the chart and answer questions. • Review the answers the students have from their charts. • Discuss why the students have different answers, if graphs were made independently.



Check Understanding ?

- **Level 3:** Can the student independently organize and create a bar graph? Can the student independently answer questions using information on a chart?
- **Level 2:** Can the student use supports to create a bar graph? Can the student answer questions from a field of 2 - 3 choices?
- **Level 1:** Can the student select pictures from an errorless field to place on a bar graph? Can the student answer a survey question by selecting a picture from a narrowed field or errorless choice(s)?

 **Instructional Targets**

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on a single count or measurement variable.

- Compute the mean (average) and median of a data set.

Math Standards for Statistics and Probability—Making Inferences and Justifying Conclusions
Understand and evaluate random processes underlying statistical experiments:

- Determine the likelihood of an event based on a data sample.






Instructional Routine



Introduce	<ul style="list-style-type: none"> • Introduce the activity by asking a focus question about the mean. For example, point to an object in the room, or a number on the board and denote the middle/half-way point asking, "What is the equal distance (half way) between two points—start or middle?" • Point out that the median is the middle point of data information and that the mean is the average of the data numbers. • Remind students there is a middle point in a set of numbers. The middle point can be the mean or the median. • Tell students they will find the middle points of some data and make guesses to questions. • Review the learning goals with students: I will find the middle point of a set of numbers. I will make a guess to see if something is likely to happen.
Model	<p>Model finding the mean:</p> <ul style="list-style-type: none"> • Model how to find the mean or average. For example, say, "I wonder what the average number, or the middle point of Olympic medals won by countries is?" • Demonstrate the steps of adding up the numbers and dividing by 5 to reveal the mean. <p>Model finding the median.</p> <ul style="list-style-type: none"> • Model how to find the median, or middle most number, by putting the data in order and crossing off numbers in the beginning and end until only one number remains. <p>Model answering probability questions:</p> <ul style="list-style-type: none"> • Explain that probability means the likelihood of something happening. To further explain, say, "Look at the list of countries and the number of medals they have won. Is it likely that all of the countries will win the same exact amount of Olympic medals?" Discuss why or why it is not likely.
Provide Practice	<p>Provide students with the Mean and Median or Probability Quiz, any form of alternative writing needed and any visuals or Manipulatives.</p> <p>Level 3: Have the student calculate the mean and median independently. Have the student use data to determine the probability that something will occur.</p> <p>Level 2: Have the student identify the mean and median from a field of 2-3 choices. Have the student use data to determine if something is likely to happen again.</p> <p>Level 1: Have the student select the median from a narrowed field or errorless choice(s). Have the student select an activity that is likely to occur from a narrowed field or errorless choice(s).</p>
Review	<ul style="list-style-type: none"> • Review the learning goals. Discuss the process students used to read the information on the chart and answer the questions. • Review the answers for the Mean and Median activity and the Probability Quiz.



Check Understanding ?

-  **Level 3:** Can the student find the mean and median of a set of numbers independently? Can the student determine the probability that something will occur?
-  **Level 2:** Can the student find the mean and median of a set of numbers from a field of 2-3 choices? Can the student determine if something is likely to happen given data and support?
-  **Level 1:** Can the student select the median of a set of numbers from a narrowed field or errorless choice(s)? Can the student select an activity that is likely to occur from a narrowed field or errorless choice(s)?

 **Instructional Targets**

Math Standards for Statistics and Probability—Interpreting Categorical and Quantitative Data
Summarize, represent and interpret data on two categorical and quantitative variables:

- Compare data on graph to show the relationship between two sets of data.

Math Standards for Statistics and Probability—Making Inferences and Justifying Conclusions

Understand and evaluate random processes underlying statistical experiments:

- Evaluate reports based on data.






Instructional Routine



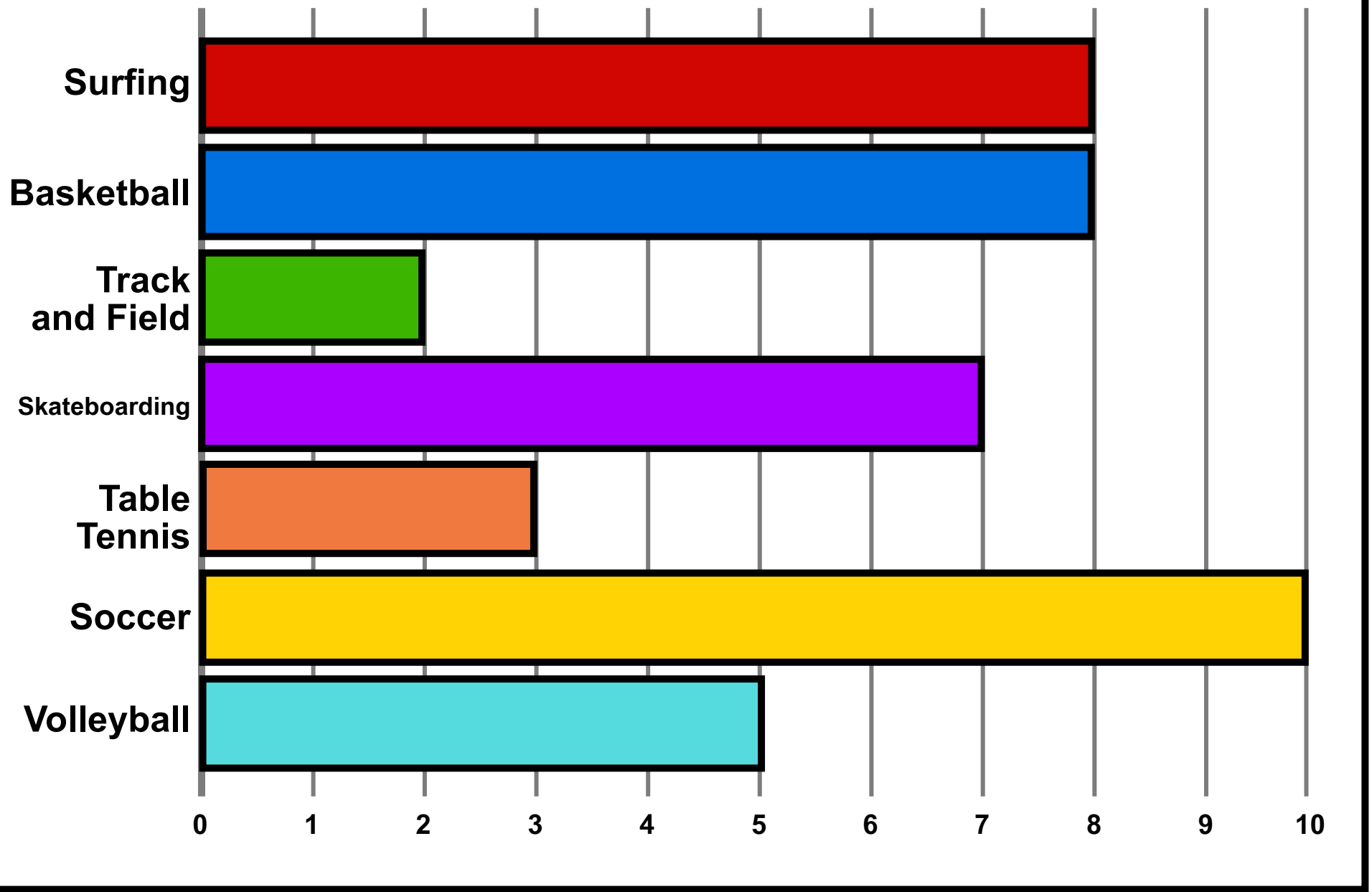
Introduce	<ul style="list-style-type: none"> • Introduce this activity by asking a focus question about charts and graphs. For example, display the double bar graph with two groups and ask, "What two groups are represented on this graph—teachers and students or cats and dogs?" Discuss students' responses. • Explain to students that graphs can be used to show information for two different groups or populations. For example, say, "One graph can show not only the favorite movies of boys, but can also show the favorite movies of girls. The group of boys would be shown with one bar in one color and the group of girls would be shown in another bar with a second color." • Tell students that they will be reading and answering questions about a double bar graph that shows the favorite Olympic sport to watch. For example, say, "We will be looking at a double bar graph of the favorite Olympic sport to watch of teachers and students. Your job is to read the information on the double bar graph and answer the questions." • Review the learning goals with students: I will compare information from two groups on a double bar graph. I will use a double bar graph with two groups to answer questions.
Model	<ul style="list-style-type: none"> • Display the double bar graph. • Model how to read the double bar graph. Read the title and the information. Point out the scale and emphasize the quantity each interval represents. Point out the two groups being represented by the information on the double bar graph. • Model how to analyze the information by reading it out loud. Point out the color code for each group represented on the double bar graph. Discuss one set of bars and the information they represent. For example, say, "The blue bar is bigger than the orange bar for basketball. That must mean that more teachers picked basketball as their favorite."
Provide Practice	<p>Display the double bar graph and questions.</p> <p>Level 3: Have the student answer questions on a double bar graph to compare two groups.</p> <p>Level 2: Have the student use visual supports to read the double bar graph comparing two groups. Read the questions and have the student answer the double bar graph questions.</p> <p>Level 1: Have the student actively participate in answering the double bar graph questions comparing two groups from a narrowed field or errorless choice(s).</p>
Review	<ul style="list-style-type: none"> • Review the learning goals. Discuss the process students use to read the information on the double bar graph and answer questions. • Review the double bar graph questions with students.



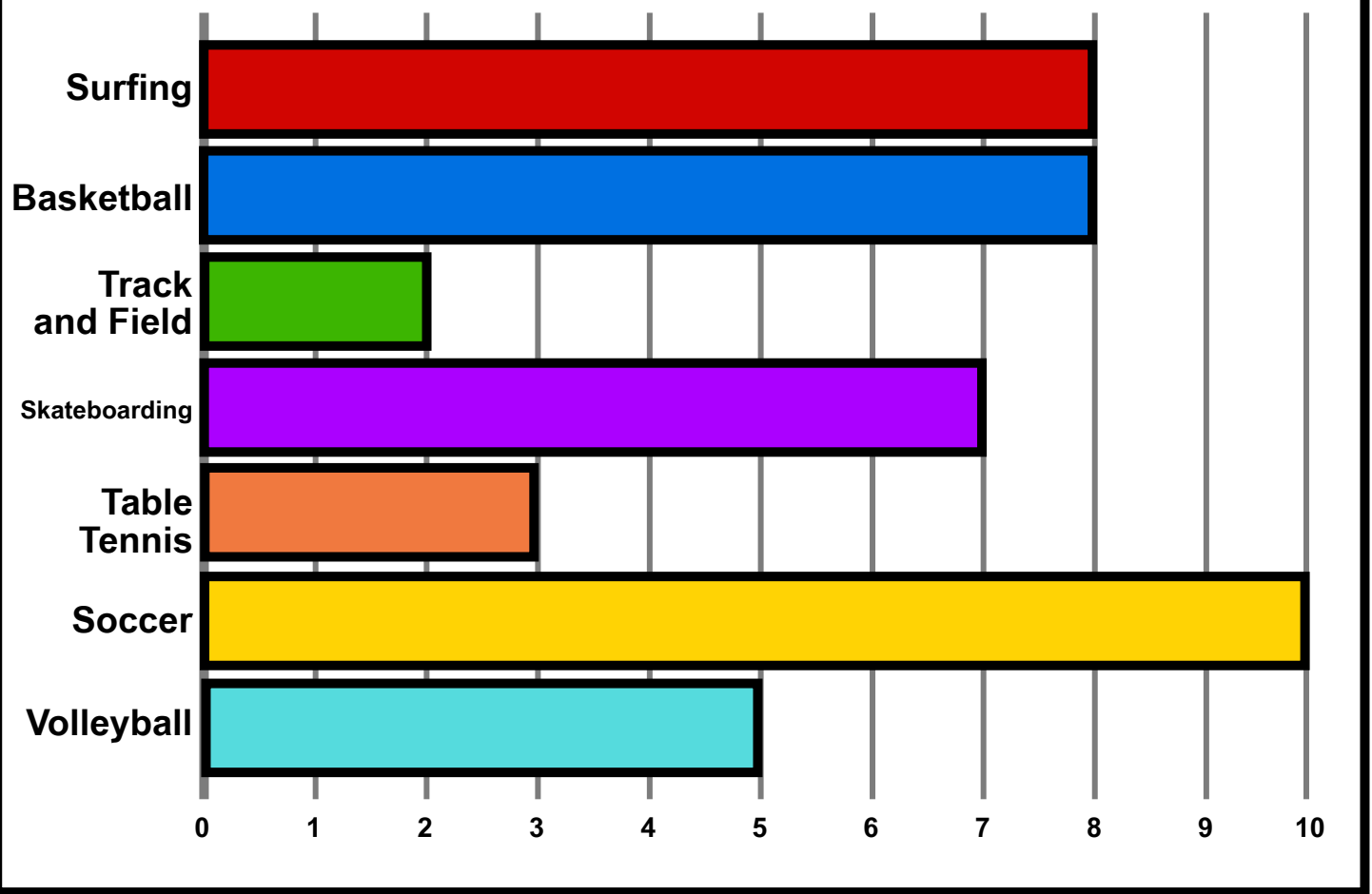
Check Understanding 

-  **Level 3:** Can the student answer questions on a double bar graph to compare two groups?
-  **Level 2:** Can the student use visual supports to read the double bar graph comparing two groups and answer the double bar graph questions?
-  **Level 1:** Can the student actively participate in answering the double bar graph questions comparing two groups from a narrowed field or errorless choice(s)?

What Olympic event do students watch the most?



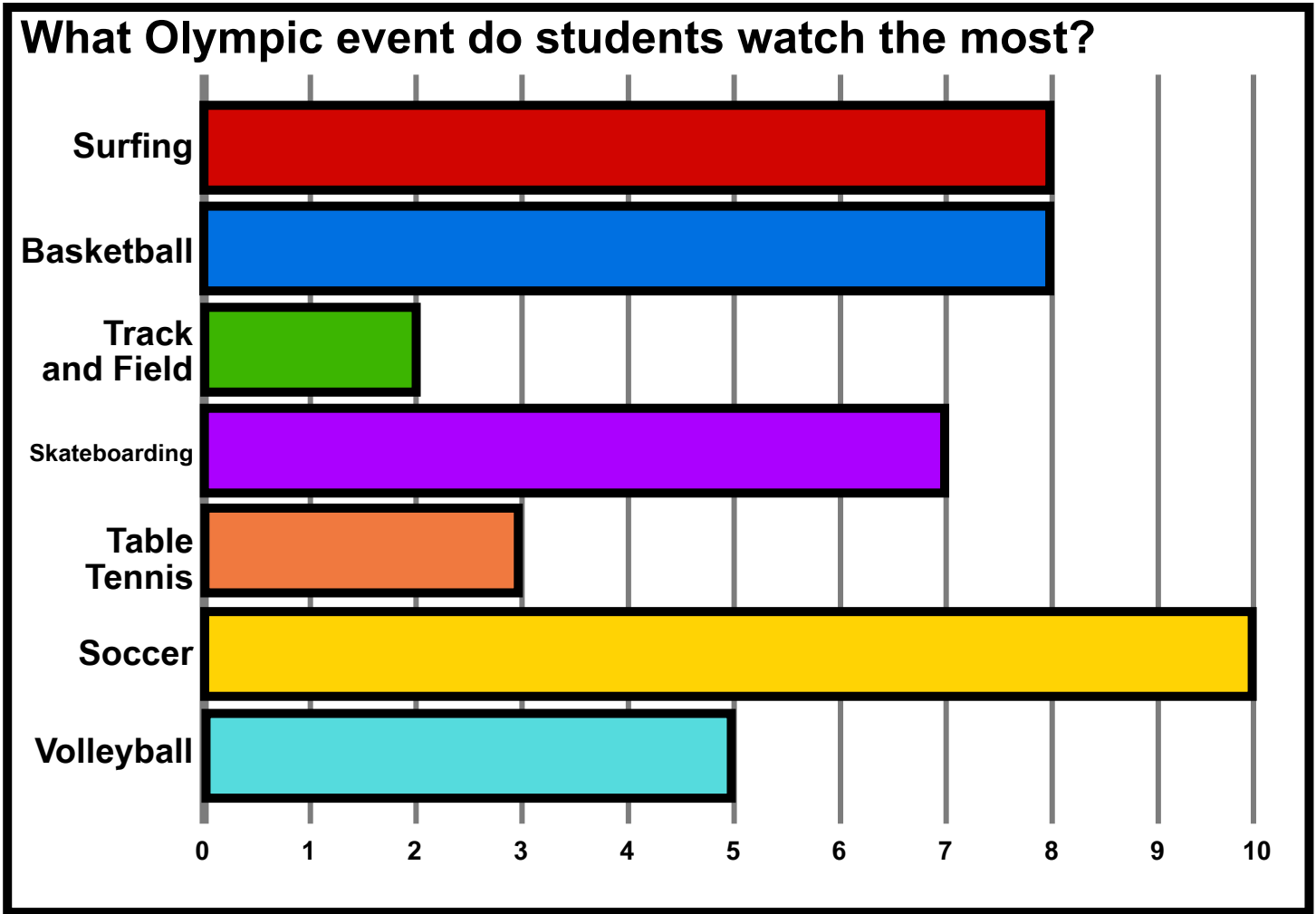
What Olympic event do students watch the most?



1. How many students watch the skateboarding events?

2. Do more students watch table tennis or volleyball?

3. How many students watch basketball?



4. What type of Olympic event do students watch the most?

5. What type of Olympic event do students watch the least?

What is your favorite Olympic sport?

10					
9					
8					
7					
6					
5					
4					
3					
2					
1					

basketball



gymnastics



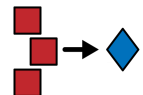
swimming



skateboarding

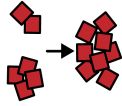
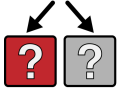


other



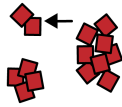
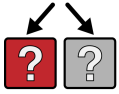
Name: _____

Which had the most ?



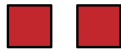
basketball gymnastics swimming skateboarding other

Which had the least ?



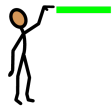
basketball gymnastics swimming skateboarding other

Were any the same ?

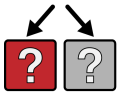


yes no

What was the highest number ?



Which was your favorite ?



basketball gymnastics swimming skateboarding other

1 2 3 Finding the Mean and Median

Olympic Medals Won by Country Since 1896		
Mexico	73 medals	3
Belgium	155 medals	5
India	35 medals	2
Chile	13 medals	1
Turkey	104 medals	4

$\frac{1}{2}$ \div Mean is the average of the chart.
 \times Find the mean.

Step 1: Use a calculator and add all the numbers on the chart.



$$13 + 35 + 73 + 104 + 155 = 380$$

Step 2: There were 5 items on the chart. Divide 380 by 5.



$$380 / 5 = 76$$

Step 3: We need to round to the closest number.

$$76 \rightarrow 76$$

76 is the mean. The average number of Olympic medals won by countries is 76.

1 2 3 Finding the Mean and Median

↑ ↑ ↑

Olympic Medals Won by Country Since 1896		
Mexico	73 medals	3
Belgium	155 medals	5
India	35 medals	2
Chile	13 medals	1
Turkey	104 medals	4

↓
Median is the number that is in the middle of the data set.
Find the median.

Step 1: Write the numbers in order from smallest to largest.

13 35 73 104 155

Step 2: To find the number in the middle, start at 13 and cross it off. Then cross off 155. Go back and forth until there is one number left.

~~13~~ ~~35~~ 73 ~~104~~ ~~155~~

Step 3: Circle the number that is left. 73 is the median.

~~13~~ ~~35~~ (73) ~~104~~ ~~155~~

**Note: If the median is between two numbers, find the average of the two numbers.*

Olympic Medals Won by Countries Since 1896

Brazil	150 medals	
Sweden	683 medals	
Canada	551 medals	
Switzerland	381 medals	
Australia	560 medals	

1 2 3 Finding the Mean and Median - Your Turn!

$\frac{1}{2}$ \div Find the mean.

\times Use a calculator and add all the numbers on the chart.

$$\boxed{\underline{\quad}} + \boxed{\underline{\quad}} + \boxed{\underline{\quad}} + \boxed{\underline{\quad}} + \boxed{\underline{\quad}} = \boxed{\underline{\quad}}$$

Divide:

$$\boxed{\underline{\quad}} / \boxed{\underline{\quad}} = \boxed{\underline{\quad}}$$

The mean is: $\boxed{\underline{\quad}}$

\downarrow Find the median.

$\square \square \square$ Write the numbers in order from smallest to largest.

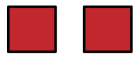
Cross off. Go back and forth until there is one number left.

$$\boxed{\underline{\quad}} \quad \boxed{\underline{\quad}} \quad \boxed{\underline{\quad}} \quad \boxed{\underline{\quad}} \quad \boxed{\underline{\quad}}$$

Circle the number that is left. The median is: $\boxed{\underline{\quad}}$



Probability Quiz



1. Will all of the countries win the exact same amount of Olympic medals?

likely



unlikely



impossible



2. Will every country on Earth win at least 1 medal at the 2024 Olympics?

likely



unlikely



impossible



3. Will every country that wants to participate be able to participate in the Olympics?

likely



unlikely

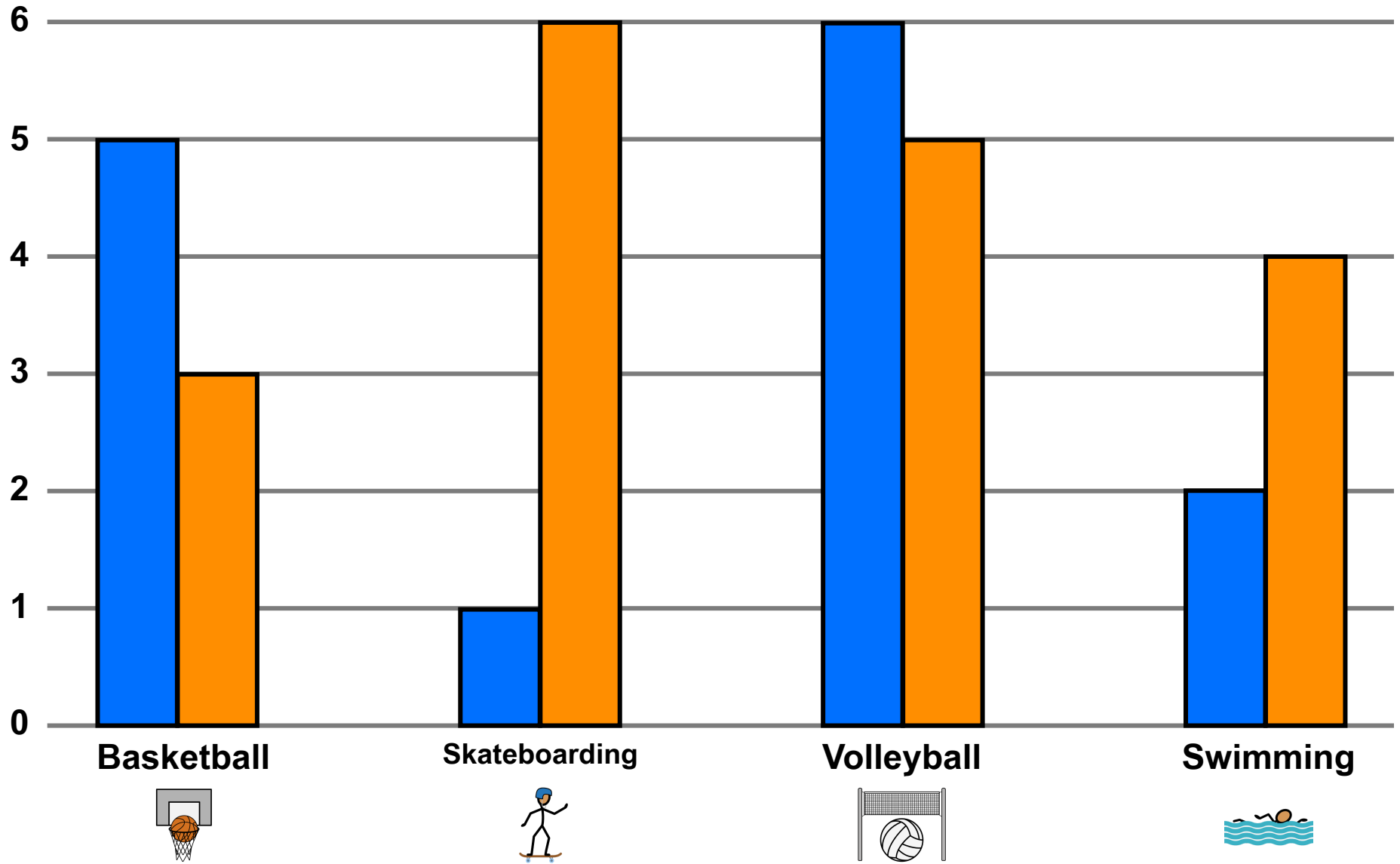


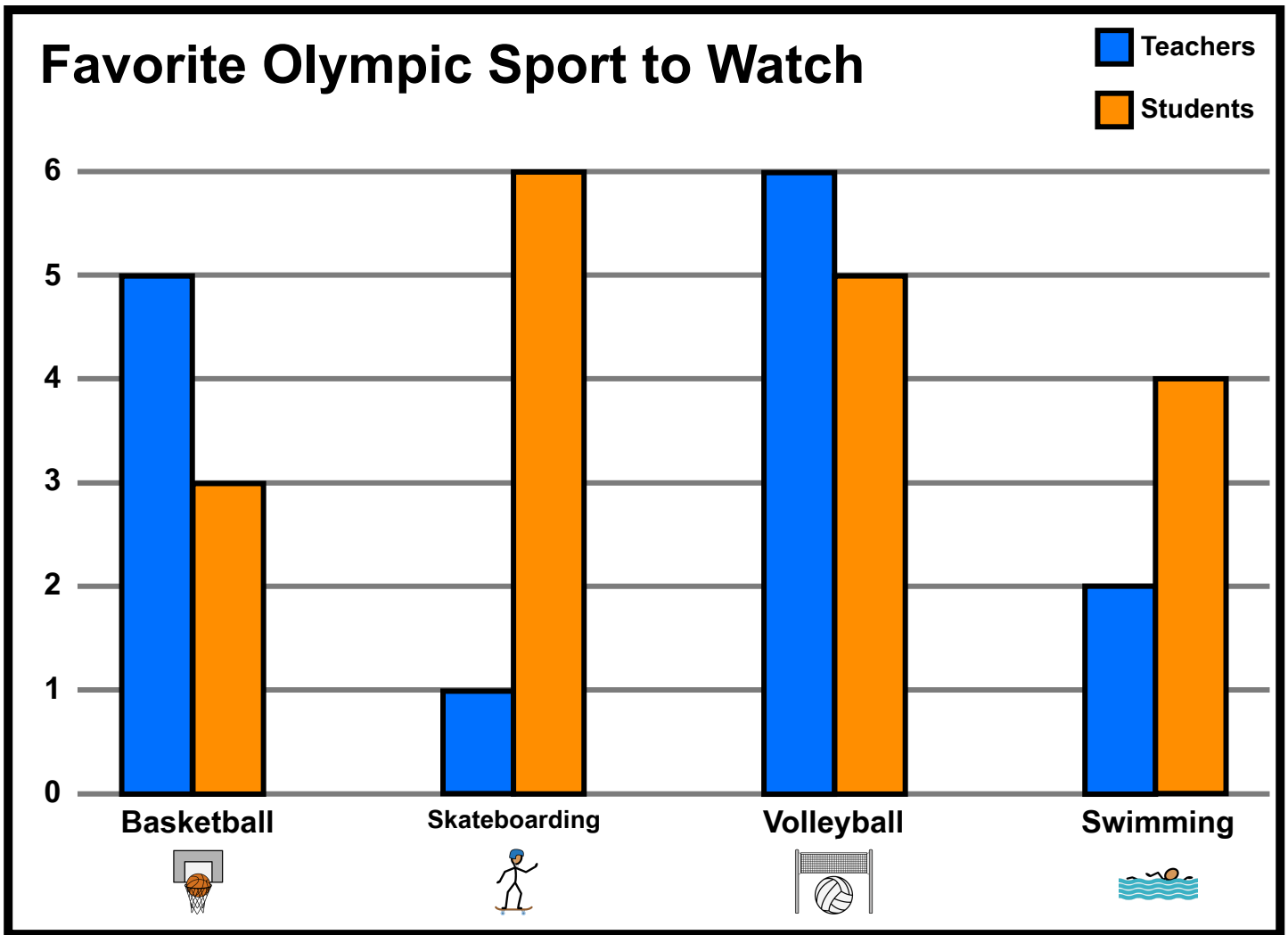
impossible



Favorite Olympic Sport to Watch

Teachers
Students

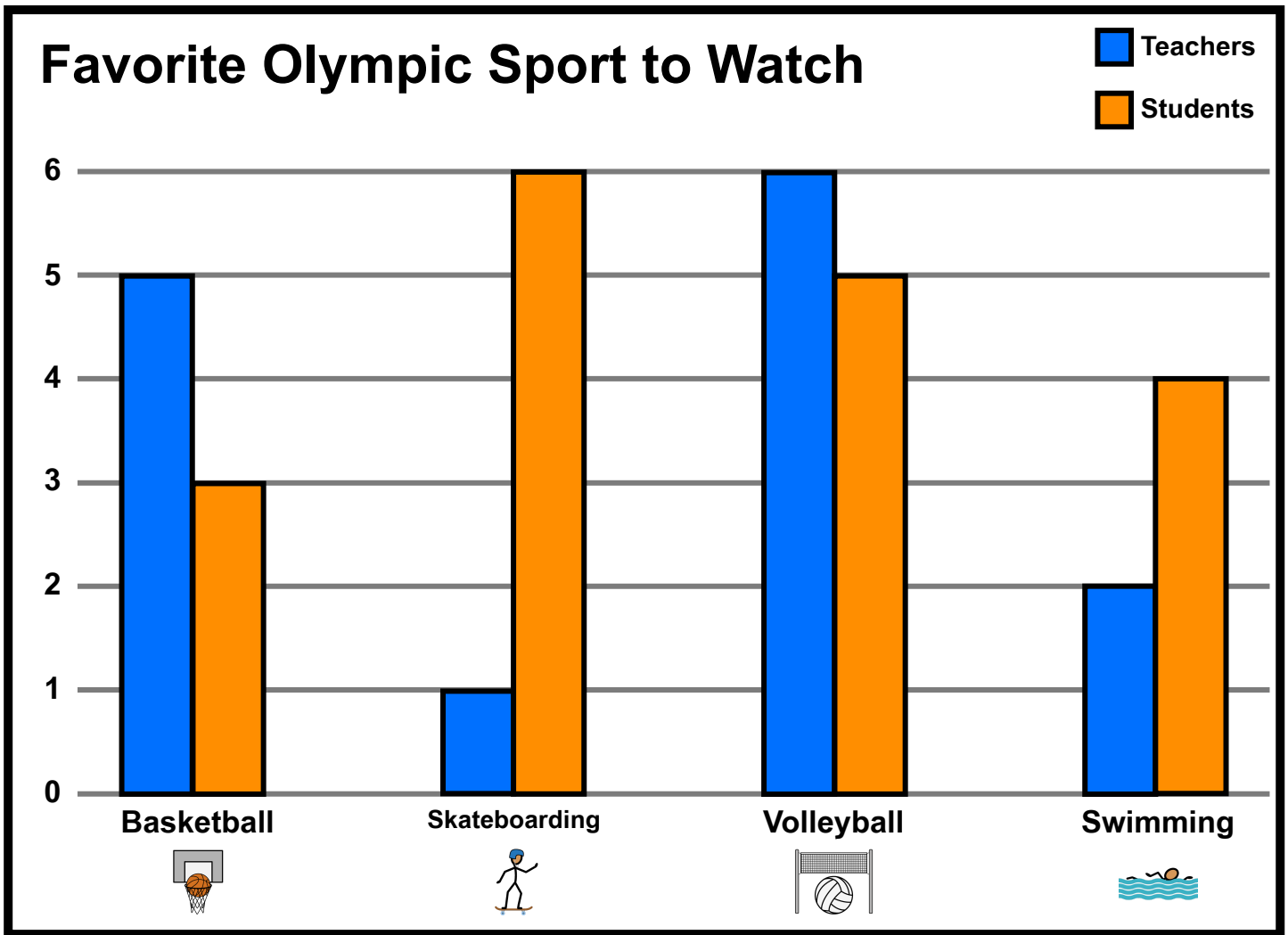




1. How many more teachers like to watch volleyball than students?

2. What is the total number of students who voted for skateboarding?

3. Which sport got the least votes?



4. Which sport got the most votes?

5. Based on this data, will more teachers or students watch water sports?



What is your favorite Olympic sport?



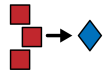
basketball



skateboarding



gymnastics



other



swimming

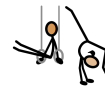
What is your favorite Olympic sport?



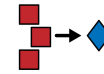
basketball



skateboarding



gymnastics



other



swimming

What is your favorite Olympic sport?



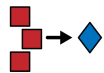
basketball



skateboarding



gymnastics



other



swimming

What is your favorite Olympic sport?



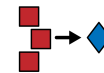
basketball



skateboarding



gymnastics



other



swimming

What is your favorite Olympic sport?



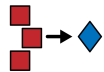
basketball



skateboarding



gymnastics



other



swimming

What is your favorite Olympic sport?



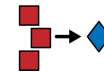
basketball



skateboarding



gymnastics



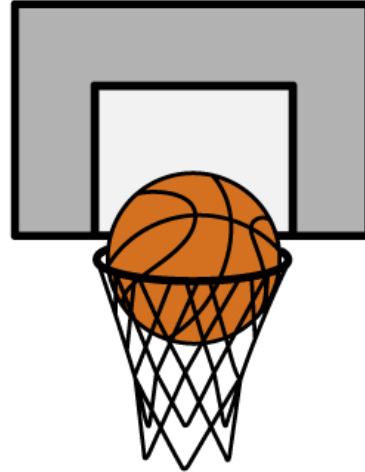
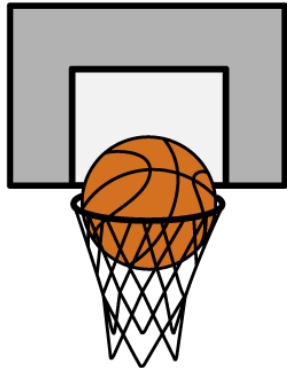
other



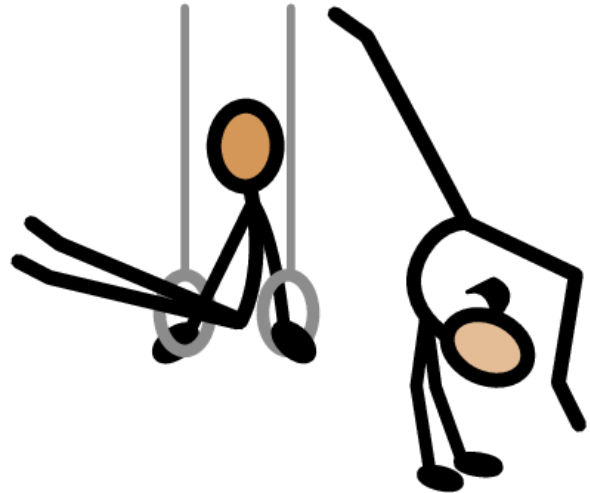
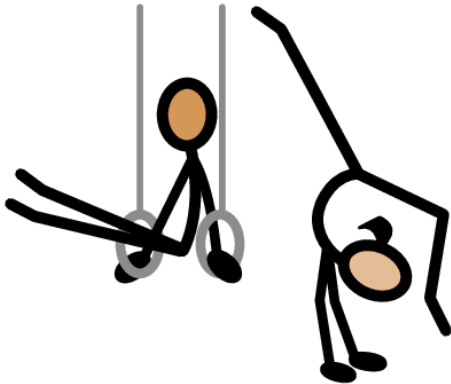
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gymnastics

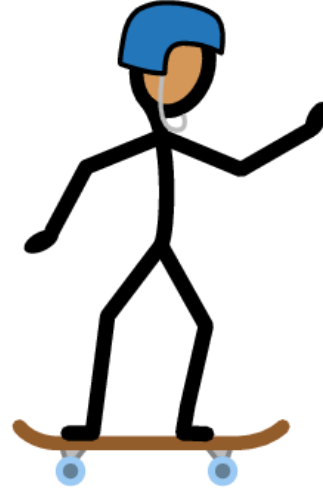
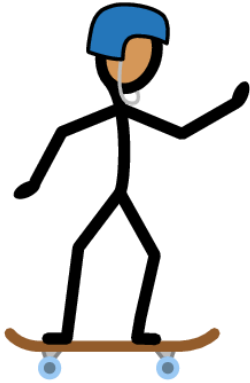


swimming

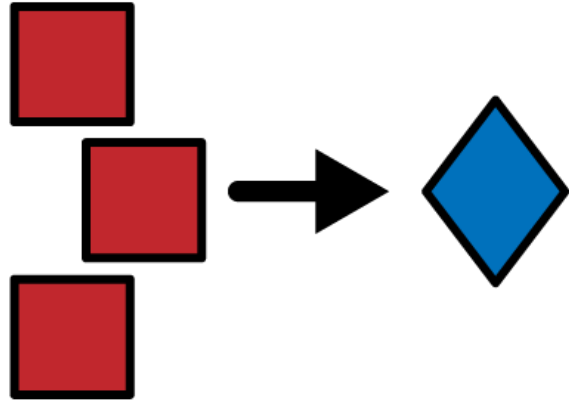
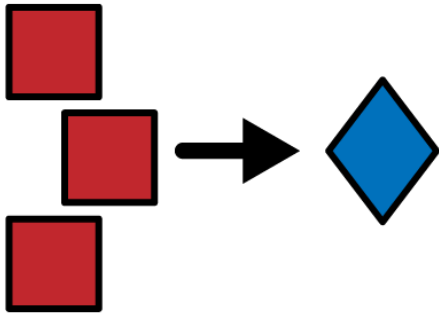




skateboarding



other



1	2	3
4	5	