**Words to Know**

*Fill in this table as you work through the lesson. You may also use the glossary to*

*help you.*

formulate conclusions.

graphs.

and

data from charts and

**Examine** data to draw

in

**Predict**

.

**Analyze** data to determine their validity and

**Lesson Goals**

**Lesson Question**



**?**

**W**

**2K**

|  |  |
| --- | --- |
| qualitative data | a type of non-numerical, data |
| quantitative data | a type of data that can be measured |



.

the results.

* Replication should produce the

and increases confidence in

* Repetition

results.

* Good design and repeatability ensure

follow a similar method.

**Experimental Design Principles**

* Different

.

* Reproducibility is the ability of data to be

measured values.

to other

* Precision is the closeness of

accepted value.

is the closeness of measured values to the

•

.

* Data must be reliable and

**Slide**

to reproduce data.

* the

.

* measurement or recording

data.

•

data.

•

data may result from:

•

scientists.

and reproduced by the researcher and other

**Valid vs. Invalid Data**

* Valid data can be

**2**

**4**

.

data that can be

data are

•

but not measured.

data can be

**Data Analysis**

•

.

**Slide**

\_\_\_\_ analyze

E. a visual representation of data

\_\_\_\_ linear

D. to examine in detail

C. the likelihood that a given event will occur

\_\_\_\_ graph

B. forming a straight line

\_\_\_\_ probability

A. not forming a straight line

\_\_\_\_ nonlinear

**Words to Know**

*Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.*

**7**

data.

.

Draw

data.

.

Collect

**Data Analysis**

*Write the correct phrase into the boxes in the flow diagram.*

**Slide**

in a variety of ways

•

complicated facts

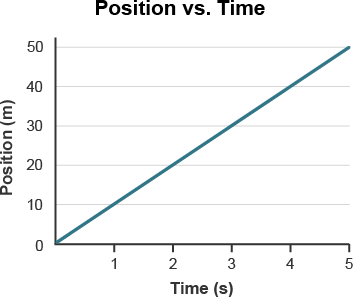
•

is a visual representation of data.

A

**Types of Graphs**

**7**



* This graph shows a linear relationship between the position of the object

and time. Based on the pattern shown here, you could predict that the object will continue moving at a rate of 10 m/s.

.

or

They may be

.

* The 𝑦-axis shows what is being

.

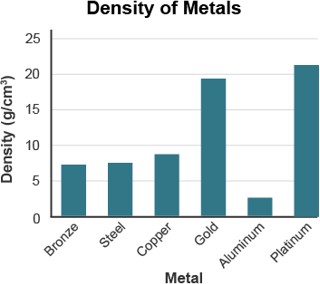
* The 𝑥-axis displays

**Line Graphs**

graphs show changes over a period of time.

**Slide**

**9**



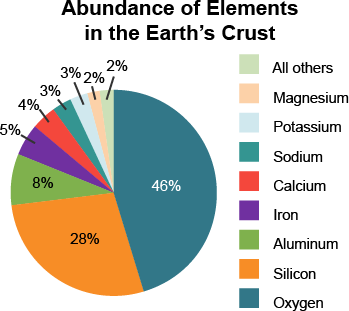
# Bar Graphs

graphs quantities for particular categories.

* Used to see quickly
* This graph compares the density of different metals. The higher the bar, the more dense the metal.

**Slide**

**9**



# Pie Graphs

graphs show the relationship among .

* In this pie graph, the color of each “slice” relates to an element in Earth’s crust. Using the pie graph, it is easy to see that oxygen is the most abundant element in Earth’s crust.

**Slide**

# Scatterplots

show the between two sets of data.

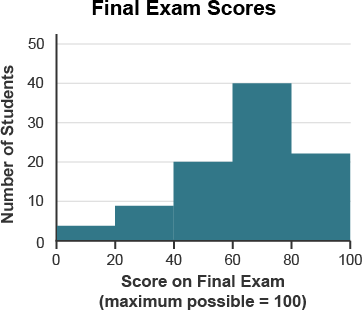
**12**

|  |  |
| --- | --- |
|  |  |
| This scatterplot shows a direct relationship between time spent  studying and quiz grade. | This scatterplot shows that there is no relationship between boys’ height  and birth month. |

**Slide**

# Histograms

**12**



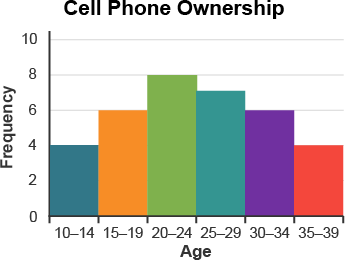
represent the of data.

* + Groups numbers into
  + This graph shows the final exam scores of students in in a physical science class. Each bar represents a score range, such 0–20%, 20–40%, and so on. About 20 students scored between 40–60% on the final exam. Most students (about 40) scored between 60–80%.

**Slide**

# Frequency Distributions

**12**



group data into and

show how often occurs. Both the table and the histogram show the same frequency distribution.

|  |  |
| --- | --- |
| **Age** | **Frequency** |
| 10–14 | 4 |
| 15–19 | 6 |
| 20–24 | 8 |
| 25–29 | 7 |
| 30–34 | 6 |
| 35–39 | 4 |

**Slide**

2

when flipping a coin is 1.

Because a coin has two sides—heads and tails—the probability of getting tails

number of outcomes

Probability =

outcomes

Number of

that a given event will occur.

is the

**Probability**

**15**

likely

Likely

1

1

2

Unlikely

0

More likely

Less likely

**Probability: Number Line**

Probabilities have a value between 0 and 1.

**Slide**

# Probability: Example

**GUMBALL MACHINE**

* + What is the probability of getting a yellow gumball?

Number of desired outcomes Total number of outcomes

**Step 1:** Count the number of yellow gumballs in the machine: .

**Step 2:** Count the total number of gumballs in the machine: .

**Step 3:** Solve using the probability equation: .

**Step 4:** Analyze the likelihood of getting a yellow gumball: Since 1

10

is between 0

and 1

**15**



2

, it is unlikely that you will get a yellow gumball.

Why are data analyzed?

**Lesson Question**

**Slide**

**?**

data.

, or the inability to reproduce

measurement or recording

data may result from inadequate data, false data,

•

and other scientists.

by the researcher

* Valid data can be verified and

**Review: Key Concepts**

**VALID AND INVALID DATA**

**Answer**

**2**

**Slide**

show how often a particular value occurs.

and

data into

* **Frequency distributions**

of data.

* **Histograms** represent the
* **Scatterplots** show the relationship between two sets of data.

.

of

* **Pie graphs** show the relationship among

for particular categories.

* **Bar graphs**

.

* **Line graphs** show

Graphs are visual representations that display data in a variety of ways.

**Review: Key Concepts**

**GRAPHS**

**2**

2

* 1 = certain
* 1 = equally likely
* Values between 0 and 1
  + 0 = impossible

Total number of outcomes

Probability = Number of desired outcomes

•

that an event will occur.

**Review: Key Concepts**

**PROBABILITY**

is the

*Use this space to write any questions or thoughts about this lesson.*