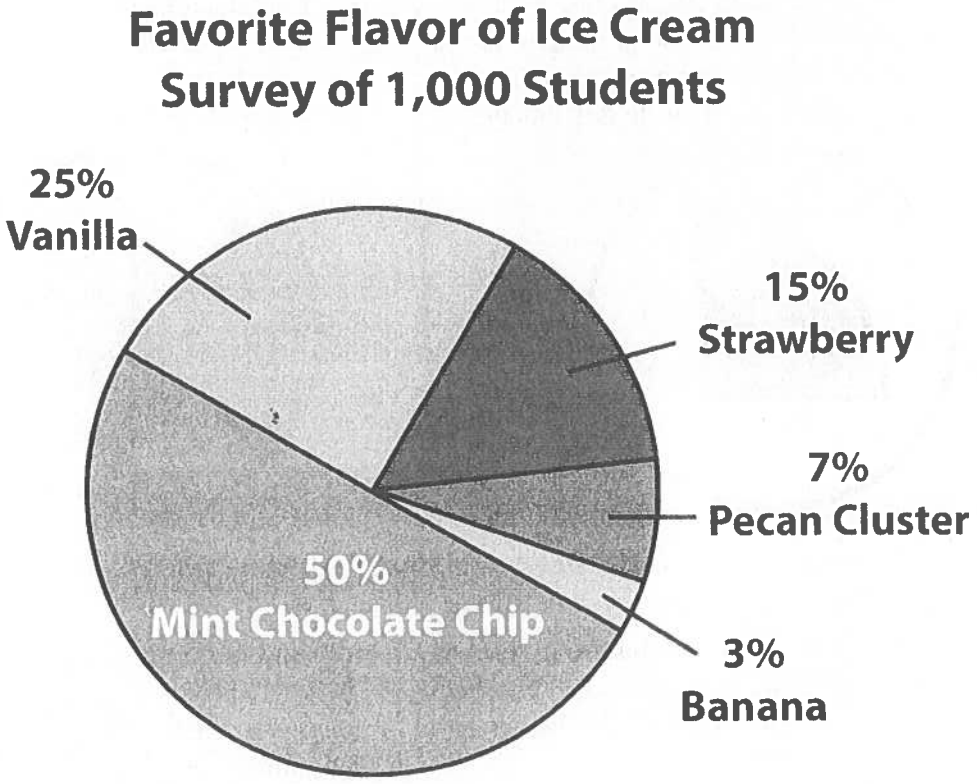
12.7 Circle Graphs

Circle graphs represent data expressed in percentages of a total. The parts in a circle graph should always add up to 100%. Circle graphs are sometimes called pie graphs or pie charts. A few examples of circle graphs are: percentage of kids who prefer a peanut butter and jelly sandwich; or the least favorite color between red, yellow, and purple.

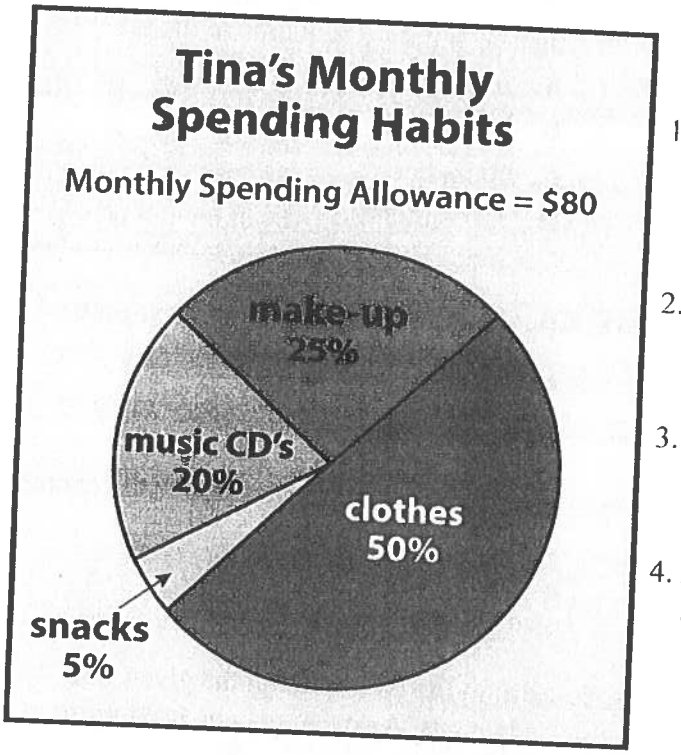
Example: A survey of 1,000 students was taken to see which flavor of ice cream should be added to the list of flavors in the school cafeteria: mint chocolate chip, strawberry, vanilla, banana, or pecan cluster. How many students voted for strawberry?



Step 1: Locate the category "Strawberry" on the circle graph. 15% of students choose strawberry.

Step 2: Multiply the percentage of students who chose strawberry to the total number of students. $0.15 \times 1{,}000 = 150$. Of the 1,000 students surveyed, 150 of them chose voted for strawberry as their favorite flavor of ice cream.

To calculate the value of a percent in a circle graph, multiply the percent by the total. Use the circle graphs below to answer questions. The first question is worked for you as an example.



1. How much does Tina spend each month on music CDs?
   $80 × 0.20 = $16.00

   $16.00

2. How much does Tina spend each month on make-up?

   _____

3. How much does Tina spend each month on clothes?

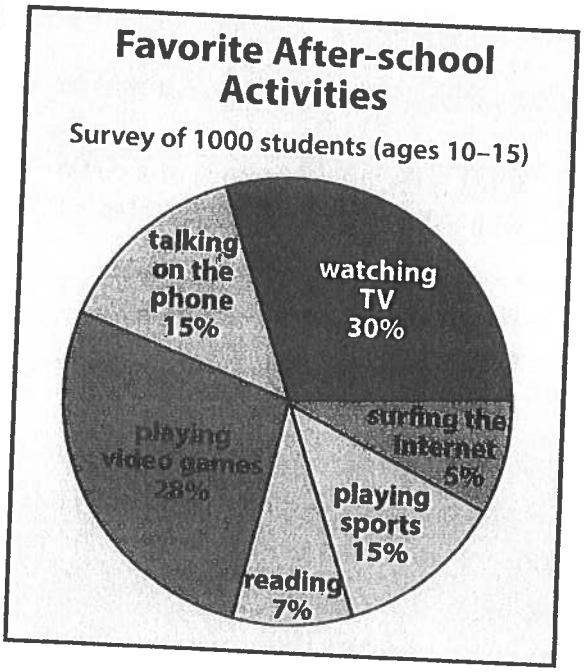
   _____

4. How much does Tina spend each month on snacks?

   _____

Fill in the following chart.

Favorite Activity	Number of Students
5. watching TV	
6. talking on the phone	
7. playing video games	
8. surfing the internet	
9. playing sports	
10. reading	



Case Study: Polar Bears and Climate Change

The polar bear is an iconic symbol of the Arctic and is the largest land carnivore in the world. They are perfectly adapted to life in the Arctic and rely on sea ice for hunting, mating, and traveling. Climate change has had a significant impact on their habitat, and polar bears are now facing a variety of threats that jeopardize their survival.

One of the most significant threats to polar bears is the loss of sea ice due to rising temperatures in the Arctic. As sea ice melts earlier in the spring and forms later in the fall, polar bears have less time to hunt and build up fat reserves, which they need to survive the long summer months when there is no ice. With less sea ice available, polar bears are forced to swim longer distances to find food and are more likely to get stranded and drown. They also have to resort to eating terrestrial foods, which are not as nutrient-dense as their natural prey, which can lead to malnutrition.

Another impact of climate change on polar bears is the disruption of their breeding and reproductive patterns. As sea ice melts earlier in the spring, female polar bears are forced to come onshore earlier and spend more time on land, away from the male polar bears. This results in a shorter mating season, which reduces the chances of successful breeding. Additionally, pregnant females are forced to travel farther and for longer periods to find suitable denning sites, which can also result in lower survival rates for cubs.

Climate change is also having indirect impacts on polar bears through changes in their prey populations. Arctic sea ice is home to a variety of marine mammals that polar bears rely on for food, such as seals. As sea ice disappears, these species are also impacted, and their populations decline. This means that there is less food available for polar bears, which can lead to starvation and a higher mortality rate.

Overall, the impacts of climate change on polar bears are significant and pose a serious threat to their survival. Immediate action is needed to reduce greenhouse gas emissions and slow the pace of climate change to ensure that polar bears and other Arctic species have a chance to adapt and survive.

Polar Bear – Reading Questions

1. How are polar bears adapted to life in the Arctic?

2. What is the primary threat to polar bears from climate change?

3. Why do polar bears need sea ice, and how does its loss impact their survival?

4. How does climate change impact polar bear breeding and reproductive patterns?

Name _____ Date _____

Symbiotic Interactions

Read each scenario below. First, indicate which kind of symbiotic interaction is being described. Write P for parasitism, M for mutualism, or C for commensalism. Be prepared to explain your reasoning for your choices.

_____ 1. Some shrimp and crab live and capture food from within the tentacles of giant anemones.

_____ 2. A pearlfish spends the day inside the alimentary tract, or intestines, of a sea cucumber. The fish emerges from the sea cucumber at night to feed on small crustaceans. The pearlfish gets a safe place to live. The sea cucumber does not gain anything from the relationship, nor is it harmed.

_____ 3. A cymothoid isopod lives inside the mouth of a snapper fish. The isopod severs blood vessels in the fish's tongue, causing the tongue to atrophy and degenerate. The isopod then hooks its pereopods, or legs, to the base of the fish's tongue, essentially replacing the tongue. The isopod stays there for the rest of its life, feeding on blood, mucus, and stray pieces of food from the fish.

_____ 4. A boxer crab carries a pair of small anemones in its chelipeds, or claws. When approached by a predator, the crab waves the stinging tentacles of the anemones to deter the predator. The anemones benefit from the small particles of food dropped by the crab during feeding.

_____ 5. An alpheid shrimp digs and maintains a deep burrow. While underground, the shrimp is safe. Above ground, it is vulnerable to predators. A goby fish lives in the burrow with the shrimp. The goby fish sits at the entrance, keeping watch for predators, and signals the shrimp with a flick of its tail when it is safe to come out. Or, if a predator swims by, the goby darts into the burrow and the shrimp retreats further inside. These two animals are completely dependent on each other—the goby benefits by getting a burrow to live in and the shrimp knows when predators are near.

_____ 6. Corals feed off the byproducts of a microscopic algae living within their own tissue, called zooxanthellae. The photosynthetic activity of the algae is vital to the survival of the coral animals, which use the energy to extract calcium from the seawater and build their calcareous skeletons. The zooxanthellae are protected by the hard coral and obtain plant nutrients from the coral.

Symbiotic Interactions

_____ 7. Some species of barnacles attach themselves to sea turtles or whales. As the whales or sea turtles travel, the barnacles gain access to food in nutrient-rich waters. Their host neither benefits nor is harmed by its riders.

_____ 8. A tapeworm needs to eat food that is already digested, so it lives in the intestines of a dogfish shark and derives nourishment from the shark. As a result of the tapeworm infestation, the shark is weakened and more vulnerable to disease and predation.

_____ 9. Imperial shrimp attach themselves to sea cucumbers and get transported by their host to a large area of potential food with only a minimal expenditure of energy. They have been observed getting off their host cucumber to feed in productive areas and then getting back on for a ride to the next spot.

_____ 10. The siboglinid tube worm, found at deep-sea hydrothermal vents and cold seeps, has no digestive tract. It relies on symbiotic bacteria that live in the tube worm's tissues. The bacteria oxidize hydrogen sulfide or methane for the worm.

Name: _____ Date: _____

Directions: Read the text, and study the photo. Then, answer the questions.

Read About It

Ancient Greece and Rome: A Shared Past

There are reasons why ancient Greece and Rome are paired together in history books. First, they overlapped in territory, including the land that is Greece today. The Roman Empire spread farther west and south. The Greeks conquered more land to the east in Asia. They also overlapped in time. Ancient Greek civilization began centuries before the founding of Rome. Yet Roman expansion was already underway when the Greek civilization fell.

Ancient Greece passed on culture and territory to Rome. Romans adopted the Greek gods with a few changes. For example, Zeus became Jupiter. Poseidon became Neptune. Romans built upon Greek philosophical and political ideas. Even Greek art and architecture had a heavy influence on Rome. That influence is seen in the entrance to the Pantheon, a Roman temple. It is lined with Greek-style columns.

Greeks and Romans spread their cultures across Europe through conquest. Yet even centuries after these empires crumbled, their influence continues to shape the world. People still look to ancient Greek and Roman art, architecture, and ideas for inspiration.

1. Why did ancient Greece and Rome share so much culturally?

_____

_____

2. How does the photo of the Pantheon above show the Greek influence on ancient Rome?

_____

_____

3. How were the ancient Greeks and Romans able to spread their culture across Europe?

_____

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Name: _____ **Date:** _____

Directions: This chart shows Greek and Roman gods and goddesses. Though the names changed, most of the characteristics, stories, and responsibilities of these gods stayed the same. Study the chart, and answer the questions.

Greek Name	Roman Name	Key Responsibilities
Aphrodite	Venus	beauty and love
Ares	Mars	war
Artemis	Diana	hunting
Hades	Pluto	the underworld
Hera	Juno	marriage and family
Hermes	Mercury	travel and trade
Poseidon	Neptune	the sea
Zeus	Jupiter	the sky; the ruler of the gods

1. What do you notice about most of the Roman names for these gods?

_____

_____

2. Why do you think the largest planet shares a name with the ruler of the gods?

_____

_____

_____

3. What do the key responsibilities of these gods suggest about the values of ancient Greeks and Romans?

_____

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