Measures of Angle Pairs

Brenda Meery

Jen Kershaw

To access the online version of this FlexBook
click the link below:

cK-12 flexbook
next generation textbooks

AUTHORS
Brenda Meery
Jen Kershaw

To access a customizable version of this book, as well as other interactive content, visit www.ck12.org

CK-12 Foundation is a non-profit organization with a mission to reduce the cost of textbook materials for the K-12 market both in the U.S. and worldwide. Using an open-source, collaborative, and web-based compilation model, CK-12 pioneers and promotes the creation and distribution of high-quality, adaptive online textbooks that can be mixed, modified and printed (i.e., the FlexBook® textbooks).

Complete terms for use for the CK-12 website can be found at:
http://www.ck12info.org/terms-of-use/

Printed: December 11, 2023 (PST)

7.4 Measures of Angle Pairs

Last Modified: Aug 23, 2023

[Figure 1]

The foul lines of a baseball diamond intersect at home plate to form a right angle. A baseball is hit from home plate and forms an angle of 36° with the third base foul line. What is the measure of the angle between the first base foul line and the bath of the baseball?
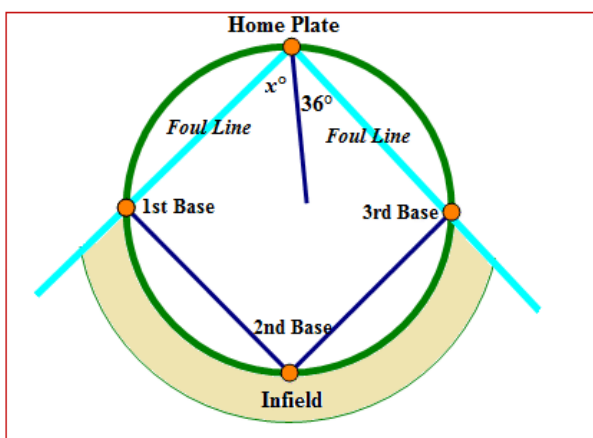
[Figure 2]

How can you use your knowledge of angles to figure out the measure of the angle?

In this concept, you will learn measure of angle pairs.

Measuring Angle Pairs

There are different types of angle pairs. **Vertical angles** are an angle pair formed by intersecting lines such that they are never adjacent. They have a common vertex and never share a common side. Vertical angles are equal in measure. The following diagram shows vertical angle pairs.
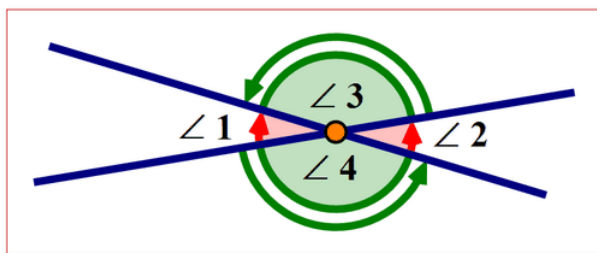
[Figure 3]

$\angle 1$ and $\angle 2$ are vertical angles. $m\angle 1 = m\angle 2$

$\angle 3$ and $\angle 4$ are vertical angles. $m\angle 3 = m\angle 4$

Adjacent angles are an angle pair also formed by two intersecting lines. **Adjacent angles** are side by side, have a common vertex and share a common side. The following diagram shows pairs of adjacent angles.
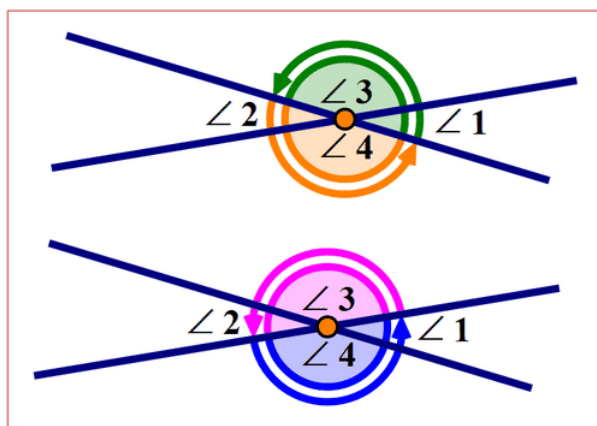
[Figure 4]

Each pair of adjacent angles forms a straight angle. Therefore the sum of any two adjacent angles equals 180°.

$$
\begin{aligned}
m\angle 1 + m\angle 3 &= 180° \\
m\angle 2 + m\angle 4 &= 180° \\
m\angle 2 + m\angle 3 &= 180° \\
m\angle 1 + m\angle 4 &= 180°
\end{aligned}
$$

If the sum two angles is 180° then the angles are called **supplementary angles**. The following diagram shows two supplementary angles.
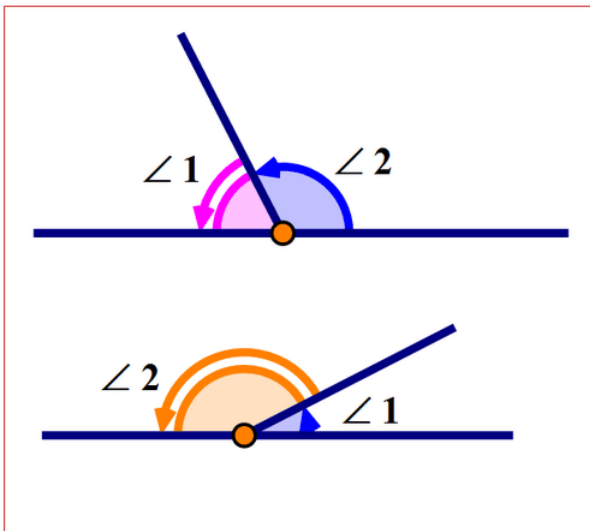
[Figure 5]

In both diagrams , $m\angle 1 + m\angle 2 = 180°$.

If the sum of two angles equals 90° then the angles are called **complementary angles**. The following diagram shows two complementary angles.
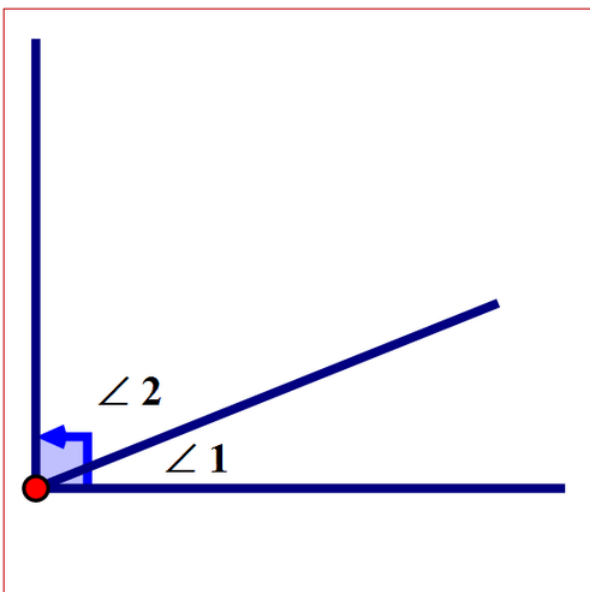
[Figure 6]

$m\angle 1 + m\angle 2 = 90°$

Let's apply all this information about angles and their measure to determine the measure of $\angle a$, $\angle b$, $\angle c$ in the following diagram.
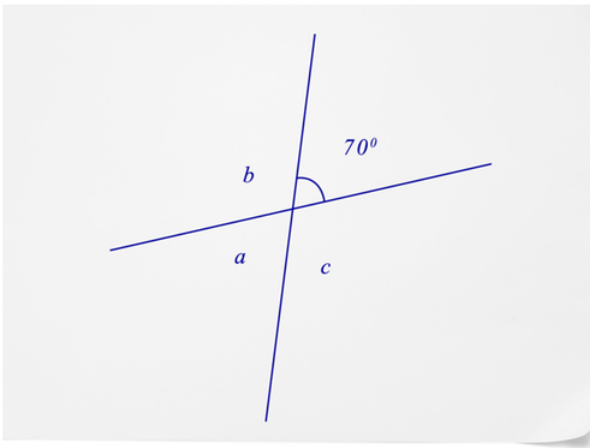
[Figure 7]

There are four angles formed by intersecting lines. The measure of one of the angles is 70°.

First, state the relationship between the angle of 70° and $\angle b$.

The angle of 70° is adjacent to $\angle b$ and the two angles form a straight angle.

Next, express the relationship using symbols.

$$\angle b + 70° = 180°$$

Next, subtract 70° from both sides of the equation.

$$\begin{aligned} \angle b + 70° &= 180° \\ \angle b + 70° - 70° &= 180° - 70° \end{aligned}$$

Then, simplify both sides of the equation.

$$\begin{aligned} \angle b + 70° - 70° &= 180° - 70° \\ \angle b &= 110° \end{aligned}$$

The answer is 110°.

$$m\angle b = 110°$$

First, state the relationship between the angle of 70° and $\angle a$.

The angle of 70° and $\angle a$ are vertical angles and are equal in measure.

Next, express the relationship using symbols.

$$m\angle a = 70°$$

The answer is 70°.

$$m\angle a = 70°$$

First state the relationship between the angle of 70° and $\angle c$.

The angle of 70° is adjacent to $\angle c$ and the two angles form a straight angle.

Next, express the relationship using symbols.

$$\angle c + 70° = 180°$$

Next, subtract 70° from both sides of the equation.

$$
\begin{aligned}
\angle c + 70° &= 180° \\
\angle c + 70° - 70° &= 180° - 70°
\end{aligned}
$$

Then, simplify both sides of the equation.

$$
\begin{aligned}
\angle c + 70° - 70° &= 180° - 70° \\
\angle c &= 110°
\end{aligned}
$$

The answer is 110°.

$$m\angle c = 110°$$

Examples

Example 1

Earlier, you were given a problem about the baseball field and the foul lines.

The angle between the path of the ball and the first base foul line needs to be figured out. This can be done using complementary angles.

First, draw a diagram to model the problem.
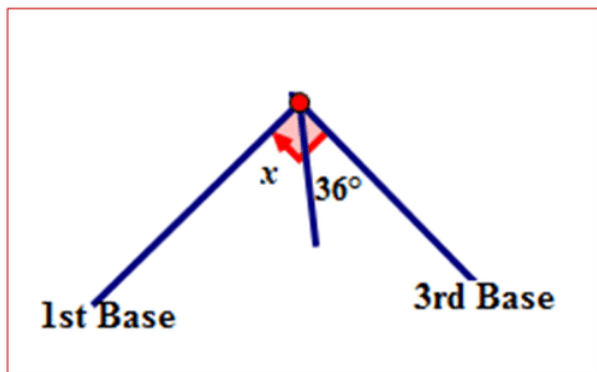
Next, state the relationship between 36° and $\angle x$.

36° and $\angle x$ are complementary angles. The sum of the angles is 90°.

Next, express the relationship using symbols.

$$36° + \angle x = 90°$$

Next, subtract 36° from both sides of the equation.

$$
\begin{aligned}
36° + \angle x &= 90° \\
36° - 36° + \angle x &= 90° - 36°
\end{aligned}
$$

Then, simplify both sides of the equation.

$$
\begin{aligned}
36° - 36° + \angle x &= 90° - 36° \\
\angle x &= 54°
\end{aligned}
$$

The answer is 54°.

An angle of 54° is made between the first base foul line and the path of the baseball.

Example 2

If the following angles are complementary, find the measure of the missing angle.

$\angle A = 37°$ then $\angle B =?$

First, draw a diagram to model the problem.
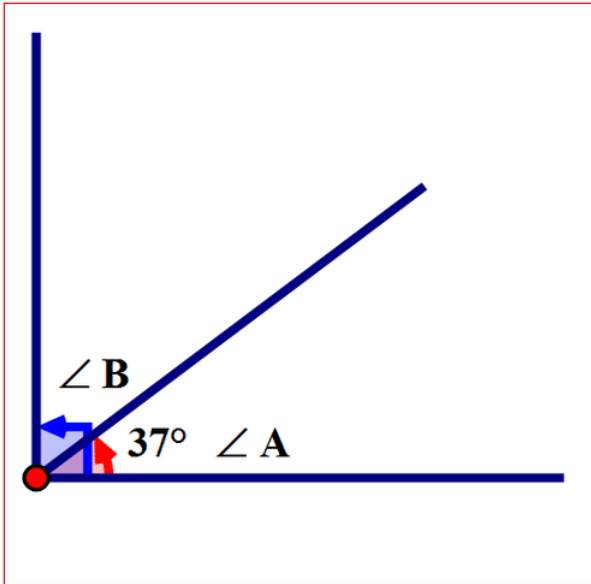
Next, state the relationship between $\angle A$ and $\angle B$.

$\angle A$ and $\angle B$ are complementary angles. The sum of the angles is 90°.

Next, express the relationship using symbols.

$$\angle A + \angle B = 90°$$

Next, substitute the measure of $\angle A$ into the equation.

$$37° + \angle B = 90°$$

Next, subtract 37° from both sides of the equation.

$$
\begin{aligned}
37° + \angle B &= 90° \\
37° - 37° + \angle B &= 90° - 37°
\end{aligned}
$$

Then, simplify both sides of the equation.

$$37° - 37° + \angle B = 90° - 37°$$
$$\angle B = 53°$$

The answer is 53°.

$$m\angle B = 53°$$

Example 3

If the following angles are supplementary, find the measure of the missing angle.

$\angle A = 102°$ then $\angle B =?$

First, draw a diagram to model the problem.
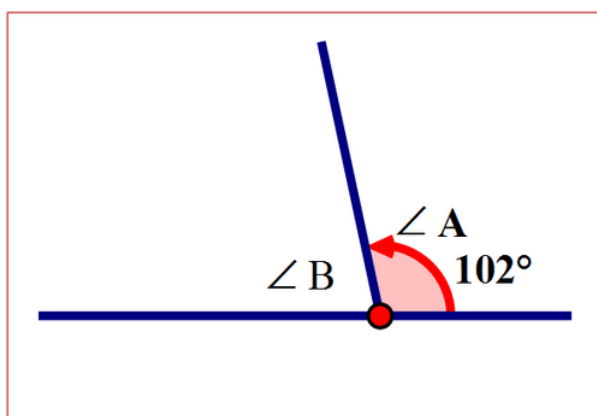
[Figure 10]

Next, state the relationship between $\angle A$ and $\angle B$.

$\angle A$ and $\angle B$ are supplementary angles. The sum of the angles is 180°.

Next, express the relationship using symbols.

$$\angle A + \angle B = 180°$$

Next, substitute the measure of $\angle A$ into the equation.

$$102° + \angle B = 180°$$

Next, subtract 102° from both sides of the equation.

$$102° + \angle B = 180°$$
$$102° - 102° + \angle B = 180° - 102°$$

Then, simplify both sides of the equation.

$$102° - 102° + \angle B = 180° - 102°$$
$$\angle B = 78°$$

The answer is 78°.

$$m\angle B = 78°$$

Example 4

Using the following diagram, determine the measures of the missing angles.
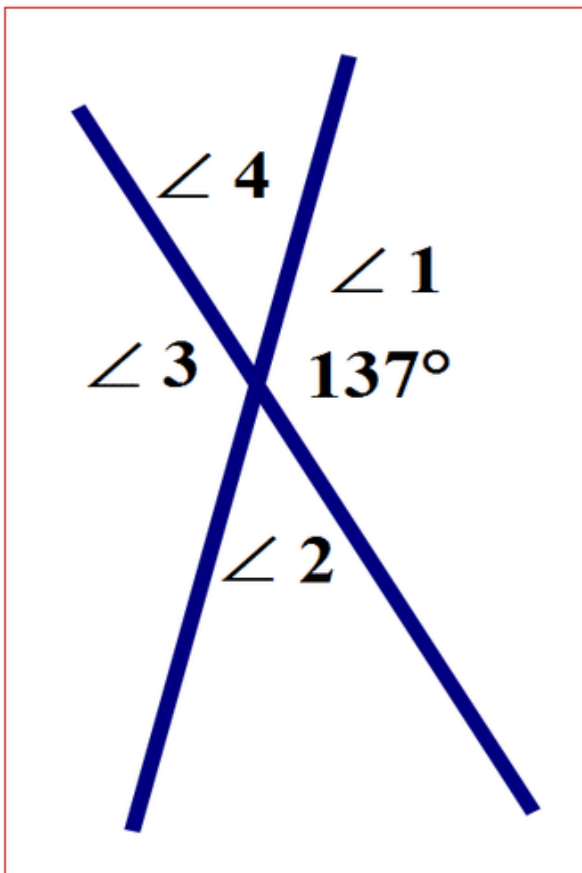
[Figure 11]

First, state the relationship between the angle of $\angle 1$ and $\angle 3$.

$\angle 1$ and $\angle 3$ are vertical angles and are equal in measure.

Next, express the relationship using symbols.

$$m\angle 1 = m\angle 3$$

Next, substitute the measure of $\angle 1$ into the equation.

$$
\begin{aligned}
m\angle 1 &= m\angle 3 \\
137° &= m\angle 3
\end{aligned}
$$

The answer is 137°.

$$m\angle 3 = 137°$$

First, state the relationship between the angle of $\angle 1$ and $\angle 2$.

$\angle 1$ is adjacent to $\angle 2$ and the two angles form a straight angle.

Next, express the relationship using symbols.

$$\angle 1 + \angle 2 = 180°$$

Next, substitute the measure of $\angle 1$ into the equation.

$$137° + \angle 2 = 180°$$

Next, subtract 137° from both sides of the equation.

$$
\begin{aligned}
137° + \angle 2 &= 180° \\
137° - 137° + \angle 2 &= 180° - 137°
\end{aligned}
$$

Then, simplify both sides of the equation.

$$137° - 137° + \angle 2 \quad = \quad 180° - 137°$$
$$\angle 2 \quad = \quad 43°$$

The answer is 43°.

$$m\angle 2 = 43°$$

First, state the relationship between the angle of $\angle 2$ and $\angle 4$.

$\angle 2$ and $\angle 4$ are vertical angles and are equal in measure.

Next, express the relationship using symbols.

$$m\angle 2 = m\angle 4$$

Next, substitute the measure of $\angle 2$ into the equation.

$$m\angle 2 \quad = \quad m\angle 4$$
$$43° \quad = \quad m\angle 4$$

The answer is 43°.

$$m\angle 4 = 43°$$

Review

If the following angle pairs are complementary, then what is the measure of the missing angle?

1. If $\angle A = 45°$ then $\angle B =$?

2. If $\angle C = 83°$ then $\angle D =$?

3. If $\angle E = 33°$ then $\angle F =$?

4. If $\angle G = 53°$ then $\angle H =$?

If the following angle pairs are supplementary, then what is the measure of the missing angle?

5. If $\angle A = 40°$ then $\angle B =?$

6. If $\angle A = 75°$ then $\angle B =?$

7. If $\angle C = 110°$ then $\angle F =?$

8. If $\angle D = 125°$ then $\angle E =?$

9. If $\angle M = 10°$ then $\angle N =?$

10. If $\angle O = 157°$ then $\angle P =?$

Define the following types of angle pairs.

11. Vertical angles

12. Adjacent angles

13. Complementary angles

14. Supplementary angles

15. Interior angles

Review (Answers)

To see the review answers, return to the Table of Contents and select 'Other Versions' or 'Resources'.

Resources

https://flexbooks.ck12.org/flx/render/embeddedobject/168465

[!] **Report Content Errors**

1.0 REFERENCES

Image	Attributions
	Credit: Emily & Chris **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemily/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D

Image	Attributions
	Credit: Emily & Chris;Pat Pilon **Source:** https://www.flickr.com/photos/chrisandemiIy/2868452221/in/photolist-5ntyUM-hbG9J-bBqhia-bBqhkz-bBqhMi-6Pt4oR-bBqgUg-bovns3-bovnBL-hbG2v-hbG5i-bBqh7z-4GtRiS-4Yaxm5-hbGb6-edZtzq-edZuNd-6Pt2rR-6PxbQQ-6Pt5sH-bovnE1-bovmLh-6Pt5hg-6Pt4Ni-eXD7c-ifoBr-4RyuT6-hbLhF-er954-f3Fo5D-f3Vr1S-eWrwFm-egDvpf-edZhwN-f3FeH8-edZvBN-f3Vkww-edZtHf-edZvky-edTNYn-edTNr2-edTP5e-edTNwR-f3FeTK-eWfbsx-f3VfJC-f3VooW-f3F8HH-f3Vupu-f3F8kH ; https://www.flickr.com/photos/pat00139/5875537892/in/photolist-4sMYuV-9XcEHs-bovn4j-bovnTy-bovmzq-bBqhia-bovmr5-bovmEQ-bBqhB4-bBqhcH-bBqgK4-bovkHJ-9mDPgC-6PxcaG-6Pt2jn-6PxcUy-6Pxc4f-6Pt5ck-6Pt4ZH-6PxbKj-6Pxd5o-6Pt56g-6Pxcsb-6PxcfE-6Pt45T-bBqgoa-bovnvb-bovmPh-bovkPy-bovkAd-bovns3-bovnJy-bBqgBg-bovmRQ-bBqgav-bBqhMi-f3Vr1S-eWrwFm-5ntyUM-Tntxi-6Pt4oR-bovkE3-6Pt2rR-6PxbQQ-6Pt5sH-6Pt5hg-6Pt4Ni-4GtRiS-4Yaxm5-f3Fo5D