

Chameleon Eyes

OBJECTIVE

Students will learn how...two eyes working together judge distance better than one eye working alone.

Background Information

Did you ever wonder why you have two eyes that face forward? Why don't people have two eyes at the sides of their head or on top? One reason is that two eyes facing forward help you see depth.

Our eyes are set apart from each other and so see everything from slightly different angles. The images your brain gets from each eye are a little different from one another. By comparing the images, your brain can give you a three-dimensional picture that helps you judge distances. This is called stereoscopic vision. When you cover one eye, you no longer have stereoscopic vision and you see things in two dimensions, that is, the world looks more like a photograph. This makes judging distance much more difficult, although not impossible.

A chameleon has two eyes that can work independently. One eye can be looking backward and the other eye forward at the same time. But when the chameleon spots something to eat, both eyes focus on the target. This gives the chameleon the stereoscopic vision it needs to judge distance before it strikes with its sticky tongue.

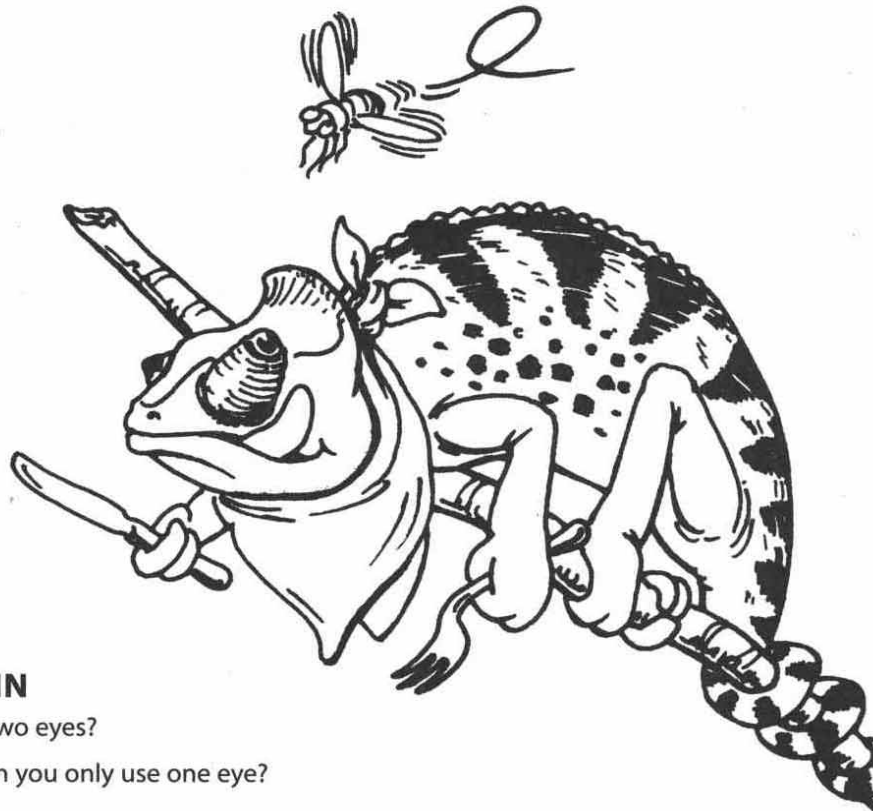
This activity gives your students a closer look at how two eyes work together to give you stereoscopic vision.

Activity

Materials

For each student team:

- A cup.
- A penny.



QUESTIONS TO BEGIN

Why do you think you have two eyes?

Do things look different when you only use one eye?

life sciences,
physical sciences

SUBJECTS

2 - 8

GRADES

adaptations

CONCEPTS

one class period

DURATION

Procedure

1. Divide your class into teams of two students.
2. Have Student 1 put the cup on a desk or table and hold the penny at arm's length above the cup, but slightly in front of it.
3. Have Student 2 stand about 9 feet away, facing the cup and Student 1.
4. With both eyes on the cup and the penny, have Student 2 tell Student 1 where to move his or her arm so that the penny will fall into the cup when it's dropped.
5. When ready, have Student 2 tell Student 1 to drop the penny and see if it lands in the cup.
6. Have students record what happens.
7. Repeat the activity, only this time have Student 2 cover one eye.
8. Have students record what happens.
9. Have the students repeat the activity a second time with one eye covered and record the results.
10. Then have Student 1 and Student 2 switch roles and follow the same procedure.
11. Have students record what happens and possible reasons why.

QUESTIONS TO CLOSE

Was it easier to hit the cup with both eyes open or one eye covered? Why?

Did you get better the second time you tried with one eye covered? Why?

Why do you think a chameleon focuses both eyes forward when it aims?

Can you think of other animals that have forward-facing eyes? How does that help them?

Can you think of any animals that have eyes on the sides of their head instead of facing forward?

What do you think the advantages of that are?

Adapted from

Ontario Science Centre. *Scienceworks*. Reading, MA: Addison-Wesley Publishing Co., Inc., 1986.

Additional Sources

Parker, Steve. *How the Body Works*. Pleasantville, NY: Reader's Digest, 1994.